The Pennsylvania State University
The Graduate School
The Department of Civil Engineering

ANALYSIS OF DIRECT AND INDIRECT IMPACT COSTS ATTRIBUTED TO THE WETLANDS REGULATORY PROGRAMS OF THE LOCAL, STATE AND FEDERAL GOVERNMENTS OF THE UNITED STATES

A Report in Civil Engineering
by
Joseph A. Angell II

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Engineering

December 1991

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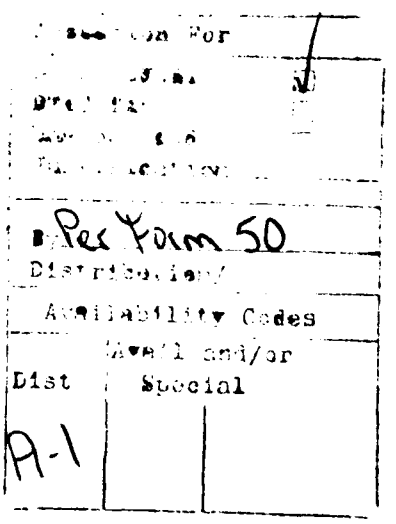

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ABSTRACT

Analysis of Direct and Indirect Impact Costs Attributed to the Wetlands Regulatory Programs of the Local, State and Federal Governments of the United States
Joseph A. Angell II
M.Eng.; December 1991
The Pennsylvania State University
Jack H. Willenbrock, Report Adviser

The objective of this Master of Engineering Report is to evaluate the direct and indirect impact costs attributed to the wetlands regulatory programs of the local, state, and federal governments. These costs are investigated for several housing related projects in the Pennsylvania area to determine the extent of these costs and to determine the changes that are necessary to reduce these costs. Additionally, this report provides an insight into the current problems associated with wetland area construction such as delineation (the identification of the wetland boundaries), mitigation (the construction of new wetlands to replace wetlands that are filled) and the permitting process. This report does not argue that wetland protection is not vital or important to society, it merely addresses the concerns of developers and owners as to the cost, in both time and money required, to develop within the confines of wetlands. It is hoped that by better understanding the requirements for wetland protection and development, less wetland areas will be mistakenly destroyed.

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Thank You.

CHAPTER 1

INTRODUCTION

1.1 Background

Since the enactment of the Army Corps of Engineers' (Army Corps) Regulatory Programs Document in 1987 [1] and the Interagency Cooperative Publication in 1989 (hereinafter referred to as the Manual) [2], the federal, state and local regulatory agencies have enjoyed a substantial increase in authority with regard to the approval or disapproval of development permits for wetland areas. Numerous findings of the courts have supported liberal interpretations of such terms as "waters of the United States", "navigable waterways", "prevalence of vegetation", and "importance to the public interest." These terms, and many others, are used throughout the new manuals to determine the requirements for permit approval or disapproval.

Several studies have been conducted to determine the intent of the legislation based on the court's findings and comments. William L. Want, an attorney in Washington, D.C., has written several papers on this subject. One of these papers investigates these issues and relates the opinions and findings of the courts to associations such as the National Association of Home Builders [3]. Additionally, a paper by Lawrence Liebesman and Virginia Albrecht provides insight into the court's interpretations and provides answers to many of the most frequently asked questions, such as "What are the waters...which come under the...program?", "What is involved in the individual permit review process?", and "May a permit applicant be compensated if a permit is denied or property restricted from development due to possible wetland impacts?" [4]. Liebesman and Albrecht support their answers by stating court decisions which substantiate these responses. Several examples are provided to assist the reader in understanding the full impact of the regulations.

The results of these papers, and many others, have been compiled by the National Association of Home Builders into the "Developer's Guide to Federal Wetlands Regulations" [5]. The guide was developed by Liebesman to help developers and private property owners understand the many requirements included in the Clean Water Act [6] and the Army Corps of Engineers Regulatory Document [1]. While the requirements are fairly well established, presented and substantiated by case history, very little information is available to assess the costs associated with compliance to these documents. Additionally, no cost data research has been found for the Commonwealth of Pennsylvania with regard to the Interagency Cooperative Publication of 1989 [2].

The last two years have seen numerous discussions on this issue in places such as federal and state legislatures, the regulatory agencies, the courts and the press. Some of these discussions have resulted in the introduction of new legislation, changes in government policy, and occasionally in law suits and fines. As a result of complaints and requests from constituents with particular problems, some legislators seem to have essentially abandoned the "no net loss of wetlands" position developed by the Bush administration during the campaign of 1988. However, their positions are rarely supported by actual dollar impacts experienced by these individuals.

1.1.1 Legislative Actions

At the request of associations such as the National Association of Home Builders (NAHB), ten wetlands bills have been introduced in the House of Representatives [7]. Officials of the federal government have been lobbied by developers, home builders and other organizations for a simpler permitting process and for compensation to the individual property owners who privately own 75% of the nation's most significant wetlands and are not allowed to develop their property [8]. One of these, the

Comprehensive Wetland Conservation and Management Act of 1991 (H.R. 1330) [9] has the backing of NAHB. This bill would establish the Army Corps as the single source of permits and the Environmental Protection Agency (EPA) would be stripped of the veto authority that it has enjoyed over the past several years. Additionally, the legislation would narrow the identification of wetlands by requiring the combined presence of surface water, hydric vegetation and wetland soils in order to result in a wetland classification. The present delineation requirements allow the presence of any one of these conditions to identify the area as a wetland [10].

Representative Lindsay Thomas of Georgia, a cosponsor of the bill also chairs an organization called the "Wetlands Task Force in the Sunbelt". He has requested that President Bush postpone several of the policies that the EPA and Army Corps have enacted during the years of 1989 and 1990. While these requests have been denied, the Army Corps has begun a review of the manual to include public hearings across the country. Representative Thomas expects comprehensive changes to be made to the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" that was produced jointly by the Army Corps, the EPA, the Soil Conservation Service (SCS) and the Fish and Wildlife Service (FWS) [11].

Another cosponsor of the bill, Representative Bill Clinger of Pennsylvania, has aggressively campaigned inside Pennsylvania for the Act [9] and has the support of the Pennsylvania Builder's Association (PBA). This legislation would require compensation to developers and land owners for claimed property losses and financial impacts due to the strict interpretation of wetlands statutes [7].

Within the Commonwealth of Pennsylvania, a Wetlands Bill has been in the Senate for two sessions and has yet to be enacted as of this writing. Several drafts and compromises have been incorporated into a completely new, comprehensive "Wetlands Mapping and Protection Act" [12] that was reintroduced in the 1991-

1992 Session of the Pennsylvania Senate. The Bill's Chairman, Senator David J. Brightbill, has worked closely with members of the Pennsylvania Builder's Association and the Pennsylvania Partnership (both representing home builders) to develop a Bill which will detail the specific requirements of the regulatory agencies, and provide less authority to the Pennsylvania Department of Environmental Resources in determining the outcome of a wetlands permit.

1.1.2 Regulatory Agency Actions

Revisions to the "Manual" [2] to scale back the amount of protected areas will undoubtedly prompt complaints from the environmental groups that were instrumental in developing these guidelines in the mid-1980's. The revisions are said to concentrate on the need for all three of the necessary criteria (hydrology, vegetation and soil), rather than the assumption that if one of the items is present, then the other two can be assumed to be present. According to Jon Kusler, executive director of the Association of State Wetland Managers, "We're against curing the problems of the [404] program by cutting back the definition of wetlands". However, EPA Administrator William K. Reilly told a Senate environmental protection subcommittee that his agency could not guarantee the Bush administration's policy of "no net loss" of wetlands [13]. It appears that the issue is headed for a long emotional debate in Washington during the 1991 Congressional session. Senator John H. Chafee (R-R.I.), ranking member of the Environmental and Public Works Committee, dismissed arguments made by developers and others that regulators have gone too far in interpreting what the Clean Water Act authorizes the federal government to do. He told conferees at the sixth Conference on Wetlands Law and Regulation in June of 1991 that "We simply cannot afford to roll back existing wetland protection measures. The more opponents press to

weaken existing wetland protection laws, the more likely I am to press for strengthening changes."[14]

Several of the regulatory agencies have attempted to identify the amount of wetlands existing in the United States and the amount that has been destroyed (lost) each year to development. One estimate puts the losses due to the building industry at less than 6% of the nation's fresh water wetlands total losses per year [15]. However, there exists a great disparity between the total estimated losses. The Audobon Society, for instance, claims losses of 300,000 to 500,000 acres per year while the EPA estimates losses from 300,000 to 400,000 acres. However, the FWS states that under the old definition of wetlands, approximately 500,000 acres of wetlands per year were added to the wetlands listing in the United States. This was caused by redefining areas that were not categorized as wetlands previously to be included in the current inventory. Obviously, the disparity is in the definition of wetlands, the topic upon which the federal agencies disagree the most [16].

To completely understand why the regulations became more restrictive, it is important to understand how the rules for wetland delineation were developed. To develop the Manual [2], the representatives from the four federal agencies (Army Corps, EPA, SCS & FWS) met in the Summer of 1988 to discuss the requirements for delineating a wetland. Each organization had its own definition of wetlands that it wanted included. During the development sessions, negotiations took place to determine the definition that would appear. At the completion of the sessions, the members of the group had developed a guideline that was extremely restrictive. Each of the agencies' most restrictive guidelines were included in the Manual and the definition of a wetland was specified so explicitly that many areas that were not previously classified as "wet" prior to this agreement were suddenly protected areas [17].

As the debate progresses, the issues continue to grow. Recently, the EPA awarded a $50,000 grant to the Sierra Club to help the agency spot violations of the wetland protection rules.

Approximately 100 volunteers in the environmental group's Illinois chapter received the grant to assist the Army Corps and the EPA in patrolling wetlands and reporting violations [18].

The Army Corps has conducted its own review of the wetlands issue and Major General Patrick Kelly (Director of Civil Works in the Office of the Chief of Engineers) issued a policy memo on September 26, 1990 that decreased the protection afforded to low-value wetlands, such as croplands, so that it could focus on the "really high-value wetlands". This decision may release approximately 60 million acres of marginal wetlands for development [19]. In the article written by General Kelly, he indicates that the protection of the environment, and specifically wetlands, is directed to the Corps by Section 306 of the Water Resources Development Act of 1990. He states that approximately 15,000 permits were received and evaluated in 1990 through a public interest review process. In that process, the anticipated benefits of the proposed project are balanced against the reasonably foreseeable detrimental impacts. Permits are issued only when the proposed project complies with the Guidelines and the Army Corps determines that it is not contrary to the public interest. Regarding mitigation, however, General Kelly also notes that individual permits may not always be required. An estimated 40,000 projects were authorized by either a national or regional general permit. General Kelly states that typical mitigation for wetland sites that cannot be avoided is one-to-one (replace each acre filled with one acre of new wetland).

The Army Corps is presently conducting an ambitious research and development (R&D) program on wetlands. The principal components of the program are focused on: (1) restoration and development; (2) minimization of impacts; (3) assessment techniques for regional and cumulative changes; (4) stewardship and management; (5) critical processes; (6) delineation and evaluation; (7) technology and information transfer; (8) interagency co-ordination and (9) co-operative R&D. The Army Corps hosts

wetlands training courses that grow in demand each and every year.

General Kelly also mentions that the budget for the regulatory program has increased from $40 million to $75 million during the past ten years. He states that these increased resources will allow the Army Corps to advance wetland protection and to "provide fair and timely decisions" [20].

1.1.3 Developer and Owner Actions

While all the lobbying and research is being conducted, developers and land owners are attempting to proceed with business. Many times, as noted below, proceeding with business without a clear understanding of the rules and regulations can be a risky undertaking. Some projects are reduced in scope to avoid any interference with the regulations. The Virginia Department of Transportation, for instance, halved the width of a proposed Virginia Beach freeway from eight to four lanes to reduce the impact to the adjacent wetlands. While the permits had not yet been approved as of this writing, the designers hoped that the balance between the project needs and the environmental concerns would convince the regulatory agencies to grant approval [21].

In a separate case, a subsidiary of Mobil Corporation was sued by the U.S. Justice Department for damming a creek in Georgia to build a lake and recreation area. The suit claims that the developer destroyed more than 100 acres of wetlands without obtaining the permits required by Section 404 of the Clean Water Act. The suit also claims that the damming of the creek has had an adverse impact on the area's drinking water supply [22].

Other projects may require complete removal of the completed work and restoration of the wetland to its original condition. A golf course was built on 123 acres of wetlands in South Carolina in 1988 and 1989. The developer admits that his

environmental consultant incorrectly delineated the wetlands. The EPA and the South Carolina Coastal Council are battling over how to undo the damage and over who has the authority to order the remedy. EPA eventually proposed a $75,000 fine and ordered the developer to restore approximately one-third of the destroyed wetlands. Additionally, the developer was ordered to purchase and maintain 50 to 100 acres of existing wetlands nearby. The Coastal Council proposed that more of the site be restored and, as a result, the two parties are working to develop a proposal that is satisfactory to all the regulatory parties [23].

The Army Corps is even contemplating a project to restore a wetland that developed as a result of rice farming in South Carolina during the 19th century. The abandoned paddies began to resemble freshwater wetlands that attracted migrating birds. The Army Corps is attempting to determine the value of the project since the current environmental laws may not give the Army Corps the authority to initiate projects aimed solely at protecting the environment [24].

In the state of Washington, engineering and land use consultants are proceeding with the identification of natural resource lands and critical areas. The state legislature set a deadline of September 1991 to have the areas identified. The requirement is part of the state's 1990 Growth Management Act which aims to identify those areas critical to the housing, transportation and land use industries. The hope is that the geographic mapping will decrease the time required for permitting and delineation and will allow developers to proceed without substantial delays [25].

The cases noted above represent a small portion of the projects that are proposed and awaiting Army Corps action or that are not proceeding due to the uncertainty of the owners. With the risk that wetland violators may be heavily fined or even jailed, many owners are obtaining environmental consultants to determine the exact extent of the impact that these projects have. However, with the additional uncertainty of the regulatory agency rules concerning

wetlands, the owners and developers are hoping that by delaying their projects, more definite policies will be established to reduce the risk associated with their development. The exact number of those projects that are delayed solely due to wetlands policies is hard to determine, especially with a slumping economy adding to the risks involved.

1.2 Problem Statement

The Army Corps of Engineers Regulatory Document [1] lists twelve general policies that are investigated during the permit review process. The first of these policies considers public interest. The benefits of a certain project are compared to the detriments that could occur due to the loss of the wetlands. The benefits and detriments rating is primarily based on social and ecological factors. Questions such as: Will the loss of the wetlands affect the local drinking water supply? Will the development provide an essential service to the community? etc.

While these factors should be considered because of their effect on man and the environment, one issue that is consistently overlooked is the cost associated with complying with these regulations. Many developers that discover wetlands related to a project do not abandon it and walk away. Many projects simply incorporate the additional costs incurred due to the regulations and pass this cost on to the homebuyer. For a subdivision developer, all permitting fees, wetland relocation costs and delay costs are typically transferred directly to each plot of land and each house sold. Additionally, many developers do not correctly estimate the costs and time associated with wetlands. On numerous occasions, unnecessary development delays are experienced as a result of inadequate prior planning. The permit review process is lengthy and the construction of new wetlands (should this be required) may take even longer.

1.3 Objectives and Benefits

The objective of this research will be to analyze the costs to developers as a result of the existing legislation. If a consistent mark-up ratio can be determined, then developers can include this factor in their planning and argue before the Army Corps' permit panel that excessive mitigation (restoration or relocation) requirements will reduce the benefit and increase the detriment to the community by increasing costs and reducing services.

Additionally, if the order of magnitude of the costs, in terms of both time and money, required for wetlands development can be determined, the developers and owners can more efficiently plan their projects and reduce costs. For example, if permitting takes two years and costs $25,000, then the developer must incorporate this information into his master schedule and budget and should probably not have prematurely obtained a contractor and possibly exposed himself to a later claim for delays.

1.4 Methodology

The analysis was conducted by locating projects in Pennsylvania or surrounding areas that were completed or underway by member firms belonging to either the National Association of Home Builders or the Pennsylvania Builders Association. Face to face interviews were conducted with the actual project managers or owners. The actual records for the selected projects were reviewed and the budgets were analyzed. All of the costs directly or indirectly attributable to federal, state or local wetland regulatory documents were compared. The costs were divided into similar categories to enable comparisons to be made between projects and to provide estimates for other developers and owners.

In addition, the procedures utilized by each firm to obtain the required permits and clearances were reviewed to determine the

reasoning behind any significant differences that were encountered. Additionally, the procedures utilized were studied to determine if a system could be generated to assist developers and owners in obtaining the necessary permits at the lowest cost and in the shortest amount of time.

To ensure that uniformity was achieved throughout the projects examined, several conditions were established:

1. Similar project types were selected, ie:housing, marinas, golf courses, etc. This report focuses on the residential housing industry and subdivision development in particular.
2. All costs that were determined, whenever possible, were actual costs. Where actual costs were not available, estimated costs were provided by the developers and discussed with them by the writer.
3. All projects studied contained inland wetlands. This means that no projects that were on navigable waterways, channels, canals or oceans that may carry commerce were analyzed.
4. All projects were located in the Northeastern part of the United States to ensure similarity of the wetlands. Only Pennsylvania projects were studied in detail. Projects outside Pennsylvania were used for comparison purposes only.
5. Public interest may unequally add costs to certain projects. High profile projects that may affect a town's drinking water, recreation area or tourist attraction were not included to insure that the profile of the projects was relatively equal. Legal and advertising fees for some projects may exceed other administrative costs and may cause inaccuracies.

1.5 The Projects Examined

The residential subdivision (housing) projects that were examined by the writer were identified through contacts made at the National Association of Home Builders (NAHB) and the Pennsylvania Builders Association (PBA). Both of these associations have assigned specific people to assist their members

in dealing with the many rules and regulations that the federal and state governments have implemented to protect wetlands. At the federal level, Mike Luzier and Ken Ford, who are in the Environmental Regulations Department at NAHB, provided assistance. At the state level in Pennsylvania, Debra Tingley, the Director of Communications, and Louis Biacchi, the Director of Governmental Affairs, at the Pennsylvania Builders Association provided important insight and assistance because they have been dealing with the wetlands issue on a day to day basis for a long time.

These individuals and their organizations provided the names of companies and individuals that had experienced wetland protection problems. Some of these companies agreed to allow the use of their costs and others, who wished to shield their cost figures from the public did, however, offer insights into the wetlands management process. Firms that provided background data and/or assisted in the location of projects for the study included:

1 - Walter B. Satterthwaite Associates Inc.
West Chester, PA
Environmental Consulting Firm

2 - Eastern States Engineering
Morrisville, PA
Residential Home Builder and Fabricator

3 - BCM Engineers
Plymouth Meeting, PA
Engineering and Environmental Consulting Firm.

Several housing and subdivision developers and construction companies were willing to share the impacts that they had experienced. Their willingness resulted from a sincere desire to assist other developers in the avoidance of the pitfalls that they had encountered, and from a strong feeling that once the public, and more importantly the legislators, understood the extent of the impacts that result, the regulations would be modified to reduce these impacts. These firms and a brief description of their projects are listed below:

1 - Westfield Construction, Inc.
Edgmont, PA
27 single family, detached residence subdivision.

2 - Media Real Estate Company
Media, PA
Real estate sales and development company. Owns several townhouse developments and commercial buildings and rents or leases to public. Experienced several problems on a 35 acre, 88 unit townhouse development.

3 - The Hankin Group
Exton, PA
Multi-purpose developer. Recently involved in a 100 acre, 100 lot residential development. Costs provided are estimates based on experience from similar projects.

4 - Carroll Construction Company
Pocono Pines, PA
Owns over 2200 acres and had plans to develop approximately 2000 homes on the property. The development is scheduled to have recreation and entertainment facilities for the community.

5 - Maleno Developers
Erie, PA
Plans to develop a 40 acre site for 110 townhouse lots.

6 - Sugar Hollow Homes, Inc.
Reeders, PA
Is planning a residential development of 60 single family lots an 80 acres.

Additionally, several companies and organizations either offered impact cost information for projects that were not residential in nature or offered cost estimates that were charged to their clients. A brief summary, description of the costs experienced and comparison of these costs is discussed in Chapter 5. These organizations and their projects are listed below:

1 - Northern Division, Building 77L
Naval Facilities Engineering Command
Philadelphia, PA
Construction of a control tower for a reserve airfield is planned. The site is inside the boundaries of a wetland.

2 - BCM Engineers
Provided estimated charges to clients for typical wetland services.

3 - Pennsylvania State Department of Transportation
Engineering District 1-0
Franklin, PA
Project as planned included 2 to 3 miles of Pennsylvania State Route 8, a four lane highway connecting Route 80 with Barkeyville, PA.

4 - Pennsylvania Builders Association
Distributed a survey to members that requested information concerning wetland impacts, including monetary and time delays.

These companies and agencies were very helpful in locating potential projects for this study. Additional sources of information that became available are presented in Chapter 6 as items for further research.

1.6 Chapter Outline

The first chapter provides the background to the changing wetlands environment and establishes the need to accurately determine the costs associated with wetlands development for project planning purposes and for incorporation into the delineation and permitting process. The Army Corps states that the permits are reviewed based upon the relationship between the benefits and the detriments that each project affords to the community and to society. This entire report suggests that the added costs associated with compliance with these regulations should be incorporated into this benefits versus detriments analysis. Chapter 1 also describes the scope of the objectives, the methodology of the research effort and a brief description of the projects studied.

Basic terminology is defined in Chapter 2 to assist the reader in understanding the numerous definitions that have been developed for wetlands. The most commonly used terms such as

delineation, mitigation, hydric soils and vegetation, surface water, and hydrology are discussed and where applicable, various definitions are presented. Additionally, the regulatory programs developed by the Army Corps and the Pennsylvania Department of Environmental Resources (DER) are discussed and outlined.

A sample project is discussed in detail in Chapter 3 to provide a clear understanding of the various impact costs that can be experienced on a project. The impacts are divided into several categories and presented as individual line items of cost for the project. Additionally, extenuating circumstances that possibly affected the costs are illustrated and discussed.

Chapter 4 presents the data that was collected for the five other residential subdivision projects that were studied. The cost impacts are divided into the same categories that were presented in Chapter 3. All extenuating circumstances, assumptions, and estimates are presented for each project. A comparison of the five projects presented in Chapter 4, and the sample project discussed in Chapter 3, is conducted to evaluate the ability to estimate the wetlands related costs associated with each cost item.

Chapter 5 discusses the wetlands associated project costs that became available from other sources during the research. The impact costs to these projects and the estimated environmental consultant charges are presented and discussed in this chapter. A comparison between these costs and the impacts on the residential subdivision projects is provided to determine the ability to estimate the regulatory impact costs regardless of the project type.

Conclusions regarding the ability to estimate the costs associated with a development adjacent to or in wetlands are presented in Chapter 6. The items that were identified as costs were analyzed to determine (1) those that are reasonably predictable and (2) those that are the more dynamic and pose the greatest risk to developers. The significance of this research to owners and developers is presented and evaluated. In addition, Chapter 6 presents recommendations for further research into wetland development and management.

CHAPTER 2

WETLAND TERMINOLOGY AND REGULATORY AGENCIES

2.1 Introduction

Wetlands were once considered simply as insect ridden, unattractive and dangerous areas. As a consequence of the research conducted by wetland scientists, they are now recognized as valuable resources. They provide many important functions since they are habitat for fish and wildlife, and provide flood control, water purification, and groundwater recharge services. Most critical to man's survival, they serve as nature's stormwater management facilities and replenish vital aquifers that supply potable water to millions of people nationwide [5].

As stated in Chapter 1, the purpose of this report is to assist the reader in understanding and estimating the most common cost categories that are experienced in wetland area construction. This chapter aims to provide a working knowledge of the most common terms associated with these wetlands and to introduce the reader to the regulatory agencies and requirements mandated by the Clean Water Act [6].

2.2 Wetland Terminology and Definitions

To understand the impact of wetland regulations, it is essential to understand the terms associated with them. All the regulatory agencies (Pennsylvania DER, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Soil Conservation Service and U.S. Fish and Wildlife) now use the same method for delineating wetlands. However, these agencies still use individual definitions that, while similar, define wetlands somewhat

differently. All of the definitions depend on the three wetlands criteria of hydrology, soils, and vegetation.

2.2.1 Wetlands

The term 'wetlands' has come to mean many different things to the environmental community. Often, the definition is based primarily on the mandate of the agency providing the definition. The official agency definitions are as follows [6]:

Environmental Protection Agency (EPA) & Army Corps of Engineers (Army Corps)
Those areas 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. Wetlands generally include swamps, marshes, bogs, and similar areas. [2]

Pennsylvania Department of Environmental Resources (DER)
Those areas 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, including swamps, marshes, bogs and similar areas. The term includes but is not limited to wetland areas listed in the state Water Plan, the United States Forest Service Inventory of Pennsylvania, the Pennsylvania Coastal Zone Management Plan, and any wetland area designated by a river basin commission[26].[1]

U.S. Soil Conservation Service (SCS)
Wetlands are defined as areas that have a predominance of hydric soils and that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions..[27].

[1] The underlined portion of the state definition is essentially the same as the federal definition.

U.S. Fish and Wildlife Service (FWS)
Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For the purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water and is covered by shallow water at some time during the growing season of the year. [28].

Prior to the adoption of the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (known as the manual) [2], the four federal agencies had been utilizing different field methodologies for identifying these wetlands as well. This obviously causes great confusion among the organizations and developers attempting to comply with the regulations, and to the state regulatory agencies attempting to enforce these same regulations. As mentioned, on January 10, 1989, the Army Corps, EPA, SCS, and FWS adopted a joint federal manual to reduce the confusion. The three essential criteria of wetlands: (1) hydrophytic vegetation, (2) wetlands hydrology and (3) hydric soils, remained essential for the requirements to be met.

However, it is important to note that the joint manual [2] allows observers to presume the existence of one or more of these indicators in the absence of direct field evidence. This change in the identification of a wetland from the Army Corps regulatory document of 1987 [1] has caused many areas not previously recognized as wet to suddenly become restricted to development and subject to the jurisdiction of the federal, state and local governments.

2.2.2 Hydrophytic Vegetation

The manual [2] emphasizes vegetation as the parameter best suited to identification of wetlands. This is due to the fact that it is readily identifiable and constantly present at an undisturbed site.

Hydrophytic vegetation is defined in the manual [2] as plant life growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. This criteria is based on the dominance and frequency of occurrence of plant species within a wetlands. The listing of these common wetland plants is provided by the Fish and Wildlife Service under the publication *The National List of Plant Species That Occur in Wetlands* [29]. The percentage of occurrence of each plant type yields a certain "frequency-of-occurrence value" on a prevalence index. Values above a certain amount for each plant category delineate the area as wet.

2.2.3 Wetlands Hydrology

The joint manual [2] refers to wetlands hydrology as the driving force in creating wetlands. Hydrology can result from precipitation, upland drainage, groundwater, tidal action, flooding from streams and rivers, or a combination of the above. Standing water greater than 6.6 feet above the ground surface is the upper water depth limit of a wetland area because such situations are categorized as deepwater habitats and are restricted under a different section of the regulations. The depth of saturation into the soil may vary. Saturation to 18 inches or closer to the surface may be considered sufficient for identification as a wetland should a specific set of soil conditions occur. These conditions are established based on the type and quality of soil present. These hydrologic conditions must be present for a minimum of seven consecutive days per year under the present guidelines. It should be noted that this issue is currently under review at the Army Corps due to increased lobbying actions by developers and land owners [19].

If the hydrological conditions are not present at the time of the observation, some of the other indicators that can be used to assist in the delineation are:

* Wetlands, floodplain, and county soils maps.
* Stream gauge data.
* Aerial photographs.
* Water marks.
* Topography.

The hydrology criteria are often the most difficult standard to establish because the hydrologic cycle is so dynamic. For this reason, where any of the clear indicators are absent, the manual [2] allows a presumption of wetlands hydrology if an area meets the criteria for hydric soils and there has been no hydrologic modification.

2.2.4 Hydric Soils

The Soil Conservation Service (SCS) defines hydric soils as "Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic (lack of oxygen) conditions that favor the growth and regeneration of hydrophytic vegetation." [2: 10-11] There are two types of hydric soils: organic and mineral. Organic soils result from organic matter accumulation and decay in areas that are inundated or saturated. Mineral soils are composed of mineral and rock derivatives with less than 35 percent organic matter by dry weight. This soil exhibits a certain characteristic when exposed to saturated conditions. Specifically, the iron is converted to a ferrous state and moves through the soil. Streaking occurs and provides the appearance of rusting by presenting a reddish color to the soil. Lists of hydric soils are compiled by the SCS and soil type maps are usually contained with the county soils surveys at the local SCS office.

2.2.5 Other Terms

The following list of terms are provided to assist the reader in understanding the commonly used phrases associated with development adjacent to or in wetlands [5]:

Adjacent - Bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by manmade dikes or barriers, natural river berms, beach dunes, and the like are "adjacent wetlands."

Artificial Wetlands - Those created by human activities, either purposefully or accidentally.

Chapter 105 Permit - Required for any activities that would disturb a wetland.

Clean Water Act (CWA) - The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977 and later amendments.

Creation - Actions performed that establish nontidal wetlands on upland sites.

Disturbed Area - An area where vegetation, soil, and/or hydrology have been significantly altered, thereby making a wetlands determination difficult.

Fill Material - Any material used for the primary purpose of replacing an aquatic area with dry land or of changing the bottom elevation of a waterbody.

General Permit - An Army Corps of Engineers authorization that is issued on a nationwide or regional basis for a category or categories of activities when (1) those activities are substantially similar in nature and cause only minimal individual and cumulative environmental impacts; or (2) the general permit would result in avoiding unnecessary duplication of regulatory control exercised by another Federal, state, or local agency provided it has been determined that the environmental consequences of the action are individually and cumulatively minimal.

Mitigation - Avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time and compensating for impacts. Compensation covers creation, restoration, or enhancement of wetlands that were or will be lost.

Permitting Authority - The district engineer of the U.S. Army Corps of Engineers or such other individual as may be directed by the Secretary of the Army to issue or deny

permits under Section 404 of the Clean Water Act: or the state director of a permit program approved by EPA under Section 404(g) and Section 404(h)
or his or her designated representative.

Restoration - Actions performed to establish nontidal wetlands on former wetlands sites.

Section 404 Permit - Required for any activities involving dredging and filling in the Waters of the United States.

Waters of the United States - (a) All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters subject to the ebb and flow of the tide; (b) all interstate waters, including interstate wetlands; (c) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce, including any such waters (i) that are or could be used by interstate or foreign travelers for recreation or other purposes; or (ii) from which fish and shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) that are used or could be used for industrial purpose by industries in interstate commerce; (d) all impoundments of waters otherwise defined as waters of the United States under the definition; (e) tributaries of waters identified in paragraphs above; (f) the territorial seas;
(g) wetlands adjacent to waters (other than waters that are themselves wetlands).

Wetlands Boundary - The point on the ground at which a shift from wetlands or nonwetlands occurs.

Wetlands Determination - The process by which an area is identified as a wetlands or nonwetlands.

2.3 The Role of the Army Corps of Engineers

This section summarizes the actions of the Army Corps with regard to the permit reviewing process. In the state of Pennsylvania, the Army Corps has delegated most of the responsibility for wetlands development permit review and approval/disapproval to the Pennsylvania Department of Environmental Resources (DER).

This action was taken to afford the local governments more accessibility to the decision-making process. Generally, if a local government denies a permit or license for a project requiring a Section 404 permit, then the Army Corps will deny the permit. Even where no local action is required, the views of local officials significantly influence the Army Corps' decisions.

As stated, the Army Corps has delegated most of the wetland permitting authority to the Pennsylvania DER, however, the DER must comply, as a minimum, with the requirements of the Army Corps regulations. (The Army Corps maintains approval authority for all dredging activities in navigable waterways.) In Pennsylvania, the requirements established by the state regulations are in excess of those required by the Army Corps, therefore, enabling the federal agencies to leave the decision making to the state agency. The DER reviews all permits and forwards decisions to the Army Corps for review and concurrence. The federal agencies (Army Corps, EPA) retain veto authority should they believe that a permit was granted that may cause unacceptable damage to the local and surrounding environment.

The permitting process begins with the developer/owner. The person most responsible for the project must make a decision regarding applicability of the wetlands regulations. With the significant risks (fines, jail terms) associated with noncompliance, many owners/developers are hiring environmental firms to determine if a wetlands area may be on the project site even if the area appears completely dry. Figures 2.1 and 2.2 illustrate the responsibilities of the parties involved in the permitting process and the flow of the decisions that must be made. Figure 2.1 lists the steps involved in obtaining a building permit from the local township. Figure 2.2 lists the steps involved with the wetlands permit application review process.

Should the owner decide that a permit is not required and he proceeds with the project, he is solely responsible for any errors in identification of wetlands that occur. Even if a conference with the local regulatory agencies regarding the project site is conducted.

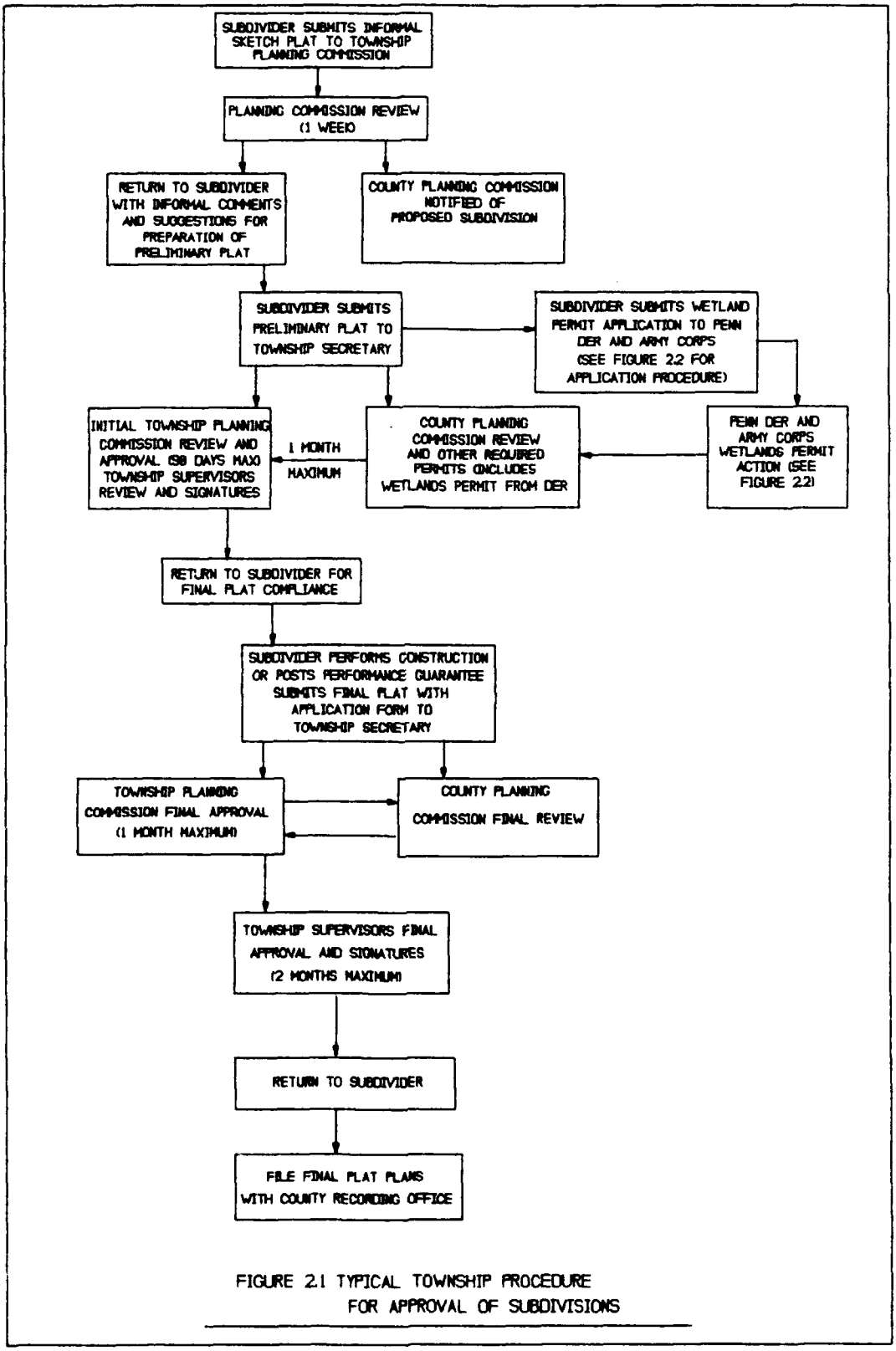

FIGURE 2.1 TYPICAL TOWNSHIP PROCEDURE FOR APPROVAL OF SUBDIVISIONS

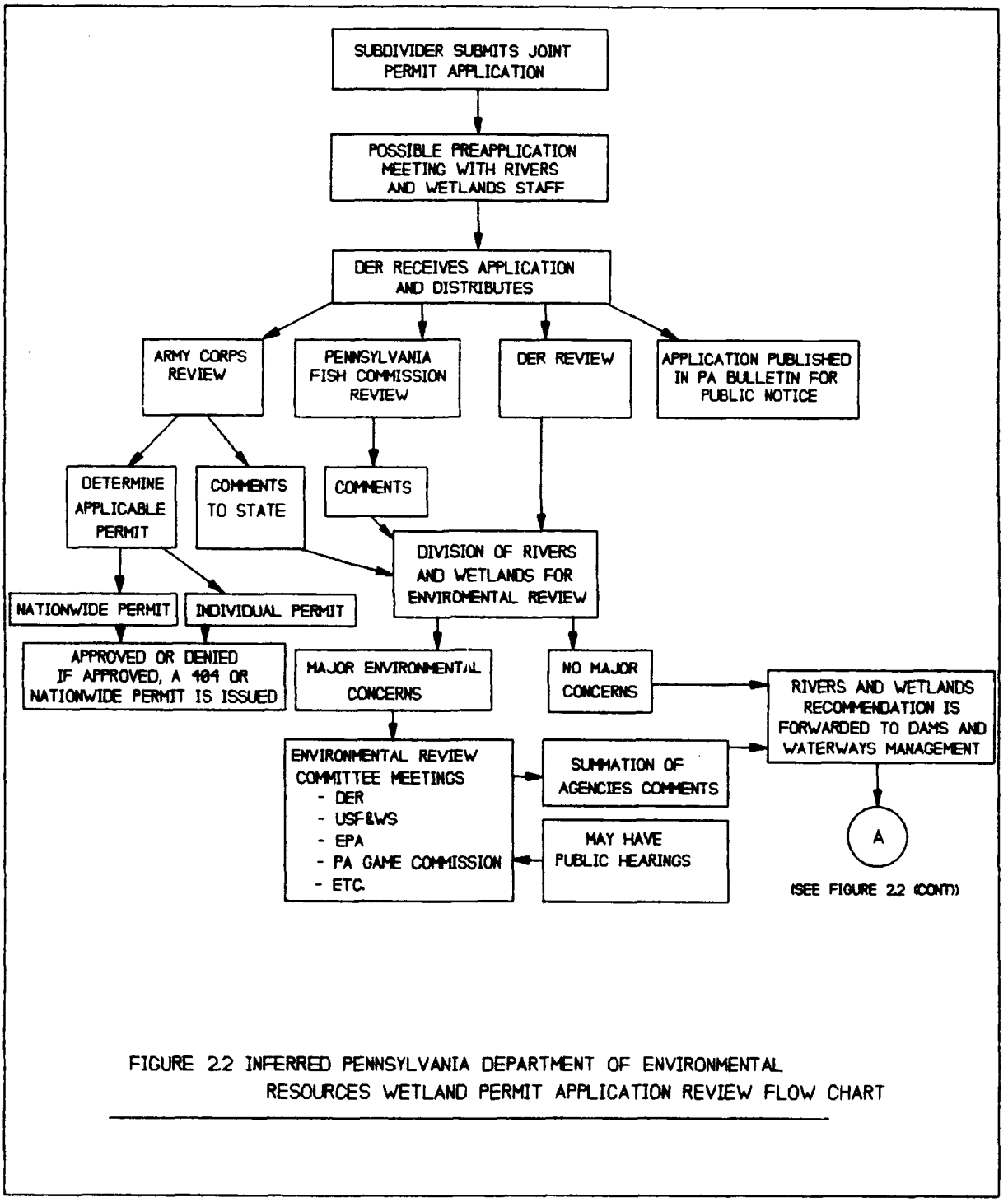

FIGURE 2.2 INFERRED PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES WETLAND PERMIT APPLICATION REVIEW FLOW CHART

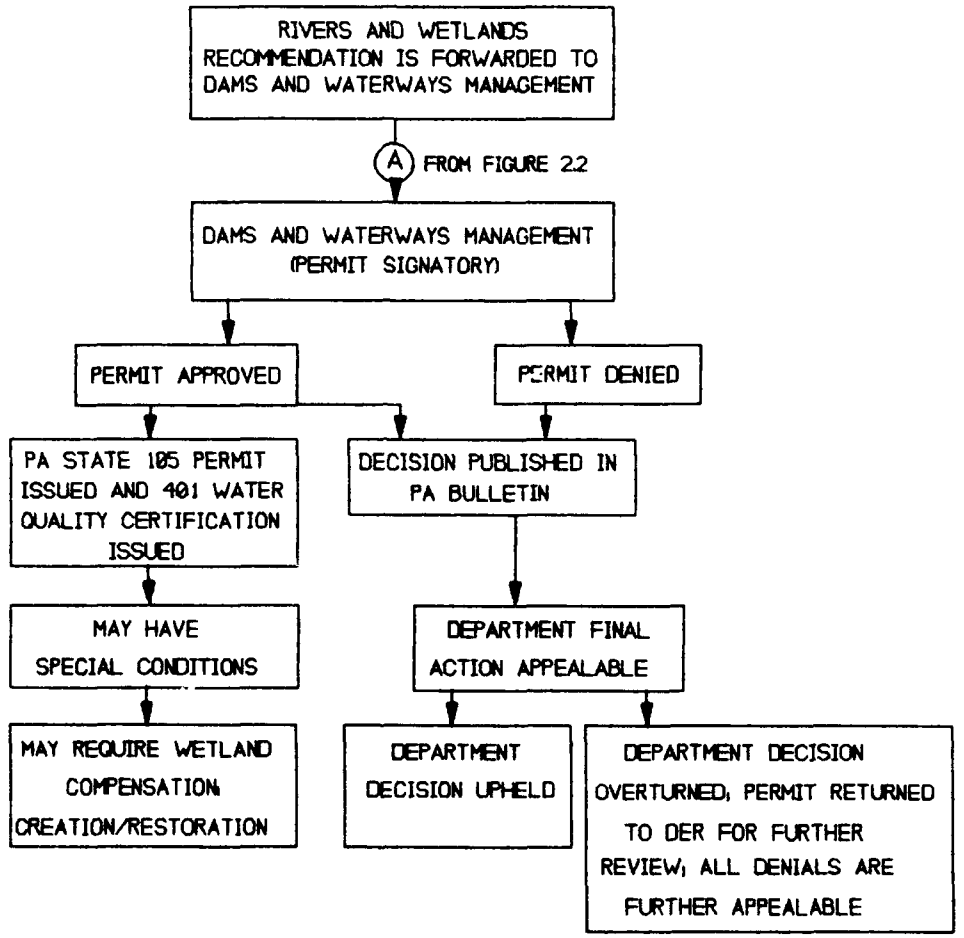

FIGURE 2.2 (CONT) INFERRED PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES WETLAND PERMIT APPLICATION REVIEW FLOW CHART

the decision to obtain the permit lies solely with the owner [5: 9-1]. If the area is determined at a later time to be a wetland, the regulatory agencies may order corrective action and/or recommend prosecution under the law.

If the owner decides to apply for the permit, a standard set of steps must take place during the process. In Pennsylvania, the owner (referred to as the applicant) files a joint permit with the DER. The DER will conduct reviews as necessary to ensure compliance with all requirements of the regulations and forward the documents to the Army Corps noting approval or disapproval. Four different Army Corps district offices (in Baltimore, Buffalo, Philadelphia, and Pittsburgh) serve Pennsylvania. The boundaries for the districts and the offices are provided in Appendix A. The Army Corps administers the day-to-day operations of the Section 404 permit program (dredging and filling). In reviewing permit applications, the Army Corps must comply with environmental guidelines developed by the EPA. The Army Corps reviews Section 404 permit applications in Pennsylvania jointly with DER.

The U.S. EPA also maintains veto authority over any 404 permit issued by the Army Corps when it finds that an activity would cause unacceptable impacts to local water supplies, shellfish beds, fishery areas, wildlife, or recreational areas. EPA also shares enforcing authority with the Army Corps for enforcing against illegal activities. The Fish and Wildlife Service (FWS) and the National Marine Fisheries Service have advisory roles to the Army Corps.

2.3.1 Permit Review Factors

The Army Corps reviews the permits under its cognizance in a "public interest review" process. This process applies a broad-based review test that balances a variety of factors that range from a project's economic viability to its energy consumption. This process must involve at least the following three general factors:

* the relative extent of the public and private need;
* the practicability of alternatives to accomplish project objectives where conflicts over resource uses remain unresolved; and
* the extent and permanence of the beneficial and/or detrimental effects of the project.

The Army Corps' requirements regarding the permit review process are not often as clear and straightforward as it may seem. In some instances, the courts have determined that the Army Corps should not consider the economic impacts the project may have to the community or individuals, and at other times, the courts have found that economic impacts to the community and to the individual developer should be considered [5: 3-1].

2.3.2 Section 404 Permit Processing Steps

In Pennsylvania, the Army Corps' Section 404 permit is a joint document with the Pennsylvania DER's Chapter 105 permit. A copy of this permit is provided in Appendix B. Many of the requirements are the same and the agencies have combined the applications to reduce the duplication of paperwork and review effort. The application is provided as part of an instructional booklet that explains the general guidelines necessary to complete the application.

The following are necessary requirements to obtain a Section 404 permit from the Army Corps through the DER:

* Applicants must prepare a preliminary wetlands assessment delineating possible impacts.
* Applicants must develop an integrated-concept land use plan that tries to avoid and minimize wetlands impacts.
* Applicants must schedule a preapplication meeting with the Army Corps and, possibly, with other federal and state agencies such as the FWS.

* After consulting with the Army Corps and reviewing the regulations, applicants must decide whether the activity is subject to an Army Corps nationwide permit and, if so, whether a predischarge notification (PDN) is required. If so, applicants follow those procedures. If not, they must complete the remaining steps.

* Applicants must submit an individual Section 404 application to the appropriate Army Corps district office. Applications must include:

  - necessary drawings, sketches, or plans sufficient for public notice;
  - the location and purpose of and need for the proposed activity;
  - scheduling of the activity;
  - the names and addresses of adjoining property owners;
  - the locations and dimensions of adjacent structures;
  - a list of authorizations required by other federal, interstate, state, or local agencies for the work, including all approvals or denials already received;
  - a description of the purpose of the discharge of dredged and fill material and the type and quantity of material to be discharged; and
  - additional specific information for activities involving the construction of structures for certain improvements, such as evidence of compliance with dam safety criteria.

* Based upon the above information, the District Engineer (DE) prepares and distributes a public notice within 15 days of receipt of application or determines that applications are incomplete and notifies applicants that additional information is needed.

* The public notice comment period remains in effect for no less than 15 days but not more than 30 days. The DE may extend the public comment period by an additional 30 days, if justified.

* The DE considers all comments, including those submitted by other relevant federal and state resource agencies, and may conduct meetings with applicants, commenters, and agencies.

* Public hearings may be held with or without specific

requests; however, the DE usually grants requests for hearings unless issues can be otherwise resolved. There are no specific criteria for holding hearings.

* A hearing officer designated by the DE presides over informal public hearings. Statements are transcribed and the presiding officer may ask questions. Hearings are nonadversarial and no cross-examination is permitted.

* The DE follows the Army Corps' National Environmental Policy Act (NEPA) procedures on applications and requires either an environmental assessment (EA) or environmental impact statement (EIS), unless the activity is categorically excluded.

* If an EIS is required, the Army Corps issues a notice of intent to prepare an EIS, holds a meeting to "scope" out the issues, prepares and circulates a draft EIS for at least 45 days of public comment, responds to comments, prepares a final EIS, and prepares a record of decision (ROD) that may be combined with the DE's Statement of Findings (SOF). No permit decision can be made until at least 90 days after publication of the notice of availability of a draft EIS or 30 days after publication of the notice of availability of a final EIS.

* Public hearings may be held under NEPA and can be combined with public hearings on the permit application.

* Before any Army Corps permit action, applicants must provide a certification from the relevant state agency that the project complies with state water quality standards as required under Section 401 of Clean Water Act (CWA). If the discharge may effect the quality of the water in any state other than where the discharge will originate, the EPA will notify the affected state which, in turn, has 60 days in which to make a water quality determination. The Army Corps must condition any permit to ensure compliance with any objecting state's water quality standard. A waiver of objection may be assumed if the affected state fails or refuses to act within 60 days of receipt of the notice.

* If proposed applications involve an activity that affects a state's coastal zone, applicants must certify that the activity complies with the state's coastal zone management program. Along with a copy of the public notice, the DE forwards a copy of the certification to the state coastal zone management agency and requests concurrence. If the state agency fails to concur or to object to certification within six months of receipt, agency concurrence is

conclusively presumed.

* The DE decides on all applications within 60 days of receipt of completed applications, unless more time is required to comply with NEPA, Coastal Zone Management Act (CZMA), or Section 401 of CWA; cases are to be referred to the division engineer for various reasons; applicants request the suspension of processing; applicants do not submit information or comments in a timely fashion; or information needed by the DE for a decision cannot be reasonably obtained within the 60-day period.

* The Army Corps grants, denies, or conditions permits in accordance with an evaluation of all the public interest factors and in compliance with the EPA Section 404(b)(1) guidelines.

* The DE adds special conditions to permits where necessary to satisfy legal requirements or otherwise satisfy the public interest review. Any special permit conditions added must be directly related to the proposal's impacts and presumably be enforceable.

* Permits specify time limits for completing the work as well as for other conditions. The Army Corps may grant extensions of time as appropriate and may modify, suspend, or revoke permits as necessary in the public interest.

2.3.2.1 Section 404 Permit Process Highlights

The key item in this section is the requirement that the Army Corps deliver a "decision on a completed application" within 60 days. Chapters 3, 4, and 5 of this report present the actual length of time required to obtain permits by developers and land owners on actual projects. A comparison between the time period proposed by the Army Corps and the actual time experienced is discussed in Chapters 4, 5 and 6. Additionally, the time required to obtain a decision from the Army Corps is discussed in Chapter 6. The Army Corps charges a per application permit fee of $10.00 for private work or activities and $100.00 for commercial activities. These charges are also compared to the time required to obtain the

permit. These fees have been modified recently and the current fee schedule was not available.

2.4 The Role of the Pennsylvania Department of Environmental Resources

The Chapter 105 permit program, which is administered solely by the Pennsylvania DER, is the cornerstone of the state's wetlands protection program. As noted, they have obtained ultimate authority to issue or deny all permits and to enforce infractions. Virtually any activity that would disturb a wetland requires a Chapter 105 permit. DER administers the Chapter 105 permit through the Bureau of Dams and Waterway Management.

Despite the fact that DER does have nearly ultimate authority to issue or deny Chapter 105 permits and to define permit conditions, DER does ask for recommendations from other state and federal agencies when it receives a permit application. These agencies include the Army Corps, EPA, FWS, the Pennsylvania Game Commission, and the Pennsylvania Fish Commission. These agencies will provide specific insight into the values of the area and will provide recommendations concerning the application for development.

Additionally, local governments may play an active role in the permit process as well. DER announces applications for Chapter 105 permits in the *Pennsylvania Bulletin* Local governments may express concerns about the impacts of proposed activities directly to the DER Bureau of Dams and Waterway Management. If a proposed activity violates local regulations, the Bureau will, as a matter of policy, deny the permit. Most importantly, local governments contribute to the enforcement of the Chapter 105 program. Local officials are in a good position to spot activities without permits or activities violating terms of permits that were issued [5: 16-17]. Appendix C contains the listing of offices for DER and illustrates their areas of responsibility.

2.4.1 Permit Review Factors

In reviewing state permit applications, DER considers these factors:

* the effect of the proposed project on the ecology of the water, fish and wildlife, and aquatic habitat;
* the impact on parks, recreation areas, historic sites, landmarks, and refuges;
* consistency with state and local floodplain and stormwater management programs;
* compliance with other state laws;
* the need for the proposed project to be located in or near the water; and
* available alternatives in location, design, or construction to minimize the impact of the project on the environment.

Any proposed activity or facility that DER determines may have a significant impact on the environment requires an environmental assessment. Based on the results of the assessment, DER may require additional information on alternatives to the proposed activity or actions designed to avoid or reduce any adverse impacts.

2.4.2 Chapter 105 Permit Processing Steps

Figure 2.1 illustrates the flow of responsibility for the DER permit as well. The major steps and the responsible parties are set forth in the Pennsylvania Code, Title 25, Environmental Resources. Chapter 105 (wetlands) of Title 25 [27] details the permit application guidelines and fee schedule as provided below:

* Application for permits under this chapter shall be submitted to the Department in writing, upon forms provided by the Department.
* An application for a permit shall be accompanied by a check payable to "Commonwealth of Pennsylvania" in

accordance with the following schedule:

- Water obstructions and encroachments:

Bridges Over 15 Foot Span	$100
Stream Enclosures	$100
Channel Changes	$100
Commercial Dredging	$100
All other Water Obstructions and Encroachments	$50

Some general permits do not require a fee.

* A single application may be submitted or a single permit may be issued for multiple structures and activities which are part of a single project or facility or part of related projects and facilities, located in a single county, constructed, operated or maintained by the same person or persons. When a single application covers multiple structures or activities other than a single structure and related maintenance dredging, the application fee shall be the sum in subsection (b) for the applicable structures and activities but shall not exceed $600. Stream crossings located within a single county for the installation of a public service line shall be treated as a single structure or activity.

* An application for a permit shall be accompanied by information, maps, plans, specifications, design analyses, test reports and other data specifically required and additional information as required by the Department to determine compliance with the Chapter 105 requirements.

* An application for a permit shall be accompanied by an erosion and sedimentation control plan for activities in the stream and earthmoving activities. The plan shall conform to the requirements contained in Chapter 102 and shall include a copy of a letter from the conservation district in the county where the project is located indicating that the district has reviewed the erosion and sediment control plan of the applicant and considered it to be satisfactory.

* An application should be submitted by the persons who own, control, operate, maintain or manage a dam or reservoir, water obstruction or encroachment.

* The Department will publish a notice in the *Pennsylvania Bulletin* upon receipt of a complete application for a permit and again upon the issuance of a permit by the Department.

* No application for a permit is complete until all necessary information and requirements under the act, including financial responsibility, have been

satisfied by the applicant.

* Whenever the Department determines that an application is incomplete or contains insufficient information to determine compliance with the standards, it will notify the applicant in writing. The applicant shall have 60 days to complete his application or the Department will return the application to the applicant as incomplete.

* The Department may grant a permit if it determines that:
(1) The application is complete.
(2) The proposed project or action complies with the standards and criteria of the Dam Safety and Water Management Act and with other laws administered by the Department, the Fish Commission and a river basin commission created by interstate compact.
(3) The proposed project or action will adequately protect public health, safety and the environment.
(4) The proposed project or action is consistent with the environmental rights and values and with the duties of the Commonwealth as trustee to conserve and maintain public natural resources of Pennsylvania.

* The reason for denial of a permit application and appeal procedures shall be communicated in writing to the applicant.

2.4.2.1 Section 105 Permit Process Highlights

The DER regulations do not specifically identify a time limitation to review completed applications. The Army Corps procedures clearly identify 60 days from receipt of a 'completed' application as the deadline for a decision. DER has much greater flexibility in providing a decision since no time limitations are stipulated in the regulations and guidelines. The analysis of the projects provided in Chapters 4, 5 and 6 includes a comparison of the time required to actually obtain the necessary permits and the time recommended in the Department's guidelines.

2.5 Chapter Summary

This chapter provides definitions for the most commonly used terms associated with wetlands and details the requirements of the Army Corps of Engineers and Pennsylvania Department of Environmental Resources regulatory agencies. Figure 2.1 illustrates the flow of information that is required to obtain the necessary permits and identifies the responsible parties. The Army Corps and DER utilize a joint application to reduce the duplication of paperwork and review time.

The Army Corps regulations require a decision to be made within 60 days of receipt of a completed application. The DER regulations do not stipulate a time frame for providing a decision, however, it does recommend that a decision be provided as soon as possible and that it will not provide this decision prior to 60 days since it must publish notice in the *Pennsylvanian Bulletin* and provide written notice to the Army Corps, and other federal agencies [27: 105.446].

CHAPTER 3

SAMPLE PROJECT

3.1 Introduction

This chapter examines the costs for one specific project that was affected by wetlands regulations. The first part of the chapter explains the eight cost items that were identified for wetlands development. The remaining portions of the chapter present and discuss the costs that were provided by the owner's representative.

3.2 Definition of Cost Items

The eight cost items identified for wetlands development are discussed and analyzed in this section. These eight items are offered as those that occur most often due to wetland regulations. These items are based on those major categories of work, both direct and indirect, that must be completed by the developer to obtain the necessary permit and to complete the actual construction. It is important to note that developers do not typically divide their costs into the categories indicated, they were developed by the author to allow comparisons to be made between the projects that were investigated.

3.2.1 Identification and Delineation Report

The first cost item involves the identification and delineation report. Every permit submitted to the Army Corps or DER for a wetlands area must include a delineation report that clearly outlines the boundaries of the wetland area and discusses the methods

utilized to determine this boundary. Since very few construction firms, developers, or owners have the in-house expertise to identify the necessary hydrology, vegetation and soil, the majority of the delineation reports are completed through contracts with environmental consultants. Many environmental firms have expanded their wetland delineation staffs in the recent years due to the increased requirement for these reports. Environmental firms have the necessary expertise on staff (botanists, hydrologic engineers, marine biologists, etc.) to identify the hydrological conditions, prevalent vegetation, and soil conditions that define wetlands. The report details the reasoning behind the location of the wetland by listing the hydrology that is observed, the vegetation that is present, and the soil tests that were performed. The observations are compared to the regulatory requirements to substantiate the accuracy of the boundary. Additionally, existing SCS maps, soil surveys, topographic maps, and other delineation reports that may exist for the area are consulted and referred to in the report. The typical costs for this item are contained in the contract with the environmental firm.

3.2.2 Redesign of Original Project

As a result of the recent changes in the Corps of Engineers regulatory manual, several developers found that areas that were previously outside the wetland boundaries, are now inside the boundary. In nearly every one of these cases, the owner/developer had to perform some redesign to his project to minimize the impact to the wetland. Even if the project is not completely redesigned, the regulatory agencies may still require several alternatives to be presented before a final determination is made. These costs are usually additional overhead costs to the firm if the design was performed in-house, or included in the design contract as a change order for additional work.

3.2.3 Permit Processing

The permitting process usually does not present extremely high direct costs for the developer/owner. However, the time that is required for the process to be performed often causes them more serious financial losses. Some permits have required over two years to process from the initial submission. This can be due to required corrections to the application, requests for additional information by the reviewing committee, mitigation plan development, and/or committee review time and backlog. Additionally, the committee may require more review time if the wetland area is considered sensitive to the local habitat or water supply.

The permit processing costs are set by the reviewing agencies and are relatively low. The Army Corps and Pennsylvania DER permits cost less than $1000.00 each to process. The indirect costs associated with the average eighteen month processing time are not as easily determined. Several factors must be considered when estimating these costs. These factors may include some of the following:

1> Is there an outstanding loan for the project that requires payments to be made prior to completion of the project and the realization of income?

2> Have changes in market conditions caused the project to lose profitability?

3> Have partners/stockholders lost faith in the project and pulled financial or political support for the development?

4> Have prearranged contracts or agreements been cancelled due to the delay?

Any of these factors may "cost" the developer several hundreds of thousands of dollars and may cause the cancellation of the project. For the cases studied, actual situations are discussed and estimated costs are presented. Some factors, such as loss of

political or financial backing, were not estimated or included in the costs due to the difficulty in making such estimates.

3.2.4 Mitigation Plan and Report

The majority of the developers and owners contract with environmental firms for any mitigation plans that are required. These plans discuss the impacts to the wetland that the project cannot avoid and propose alternatives to reduce the impact to the area by developing new wetlands or enhancing neighboring ones. The state and federal regulations and the permit applications are explicit as to the requirements of mitigation plans. The information that must appear on the drawings, the number of drawings required, and the technical limitations for the mitigated area are specifically outlined in the Army Corps and DER regulations. Any errors in this process result in immediate rejection by the review committees.

The plans require a significant amount of research by the consulting environmental firm. The watershed that is involved in the project site must be carefully examined to determine the hydrologic, vegetation, and soil conditions. This usually requires several days of field work to determine the location and/or quantity of vegetation, wildlife, water supply, and soil conditions. Following this field work, a survey crew must map the area based on the notes and markings made by the initial field crew. Once the survey is completed, the findings are transferred to drawings and the design alternatives are addressed. The environmental firm must determine how best to replace any of the wetlands that may be destroyed by the project. The 'best' way must take into account the ability of the non-wetland area to develop into a wetland and to support the habitat of the existing wetland as well as serving the owner's desire for the least costly mitigation project.

Typically, the regulatory agencies require mitigation on a one to one basis. Every acre of wetlands that is destroyed must be replaced with a new acre of wetland of the same quality or better.

Most of the regulations require mitigation regardless of the size of the area destroyed. Even areas as small as 1/4 of an acre may require replacement. Additionally, some regions require construction of the mitigated area and an establishment period prior to construction of the impacted area.

In some instances, the regulatory agencies may require mitigation in excess of the standard one to one basis. Two or three to one replacement may be required under certain circumstances, such as:

- A penalty for developing and impacting an existing wetland without the required permits,
- The impacted wetland is critical to the habitat of the wildlife or to the water supply of the surrounding community, or
- The watershed has suffered numerous problems and the development of new wetlands is essential to the quality of the water and the stability of the wildlife. The local township or the state may require this amount of mitigation for all developments regardless of the status of the permit.

Mitigation planning is not a routine effort. Each watershed and wetland exhibits its own characteristics. Every mitigation plan must determine these characteristics and incorporate these strengths and weaknesses into the final plan.

3.2.5 Mitigation Site Construction

Mitigation area construction can be one of the most costly items that the owner must bare. Very often it involves the removal, relocation and/or grading of thousands of tons of earth in order to expose the watertable. Additionally, hundreds of plants that are prevalent in the wetlands of the area must be planted. Some regulations require an observation period of one to five years for all

new plants. Any new plants that do not survive this period must be replaced.

Many developers perform the necessary earthwork through existing contracts or with their in-house forces since their home building business involves this type of work for roadways, underground utilities and basements. Due to the increase in requirements for monitoring of the plants, many developers are now contracting the planting and monitoring to landscaping or environmental firms.

3.2.6 Company Overhead Expenses

The developers or owners that must obtain wetlands permits can spend a great deal of time and money managing the permit process. Once the permit package is submitted, the regulatory agencies will review it for completeness and accuracy. Any errors that are encountered must be corrected immediately or the package will return to the bottom of the pile of permits awaiting review. The DER regulations note that all corrections must be made within 60 days or the permit will be considered noting denial [26: 105.19].

All comments that are received from the community during the review process must be responded to immediately as well. All objections to the project must be incorporated into the design or arguments must be presented as to why the changes cannot be made. The DER and the Army Corps are very responsive and sensitive to the objections put forth by the community. Any delay in responding to these objections may allow the regulatory agencies to deny the permit application.

Other factors may delay the review process as well. Some of these factors are listed below:

- Each package requires comments from several different agencies and organizations. These reviews may not occur as quickly and efficiently

as desired. The owner can benefit by following up on the reviews with the individual agencies and organizations to ensure that they are completed quickly and that any misunderstandings are clarified prior to the final hearing with DER.

- The DER review involves several different departments and offices as well. Occasionally, the review process may be held up by errors within the office. By ensuring that the application is always at a certain step in the process, and by ensuring that each step is completed, the owner can assist his application to a decision.
- Town hearings may be cancelled or run longer than expected due to other issues, causing the owner's application to be tabled for another month or until the next town or District Engineer hearing. While there is very little that the owner can do to prevent this from happening, he can prepare for this circumstance by requesting that his application be heard earlier on the agenda.

Many other situations may also delay the permit review process. It is in the owner's best interest to have someone in his organization aware of the current status of the permit application at all times. This does, however, cost money. The individual that must spend countless hours on the phone with the agency or on the road personally tracking the application and attending review meetings to discuss possible deficiencies is paid a salary to perform this function. Phone bills, travel expenses, and loss of production on other activities are all costs that the owner must pay to obtain the necessary permits.

3.2.7 Loss of Land Use

Occasionally, the developer may not be able to construct the project in the wetland area regardless of the amount of mitigation that is offered. In this case, the affected area that cannot be developed is wasted land as far as the owner is concerned. A ten

acre subdivision that is reduced to eight acres typically recovers the loss of those two acres by increasing the price of the other lots sold. These impacts are certainly indirect and are not easily determined. For the cases examined, the costs are estimated by the developer's representatives and presented as such.

3.2.8 Extenuating Circumstances

Certain projects seem to catch the public's attention more than others. Hazardous waste sites, chemical plants, power generation stations, and military bases often promote images of poorly planned areas that destroy the local environment and community. When these types of projects are proposed for a certain township or region, the owner/developer must promote the project as beneficial to the common good of the community. Often, expensive advertising campaigns and politicking may take place to convince the community that the project is beneficial. The community on the other hand may use the wetlands regulations to prohibit the owner from developing the project.

Additionally, should a developer be found in violation of the regulations, he may face extensive fines and legal fees that can be attributed to the wetlands.

These costs will be noted in this section where estimates are possible. However, if a project is experiencing these problems, it is likely that the situation is not resolved as of this writing and the final costs may not be available.

3.3 Project Description - Westfield Construction Company

Westfield Construction Inc. is a small construction firm that also operates a firm called Walsh and Associates that acts as their Realtor. Westfield Construction Inc. develops the parcels of land that Walsh and Associates purchases. An interview was conducted

with Edward Walsh on April 17, 1991. Westfield Construction was referred to the author by Walter B. Satterthwaite Associates, Inc.

The specific project examined consisted of 27 lots for single family detached residences in Willistown Township, Pennsylvania on a 65 acre site. The work included a site access road which had to cross a stream and 200 feet of associated wetlands. The original plan included a 64" culvert to cross the stream. After negotiations with the Pennsylvania DER, a permit was issued for the road crossing as long as multiple arched culverts were installed across the entire span of the wetlands. The site layout and wetland boundaries are shown in Appendix D.

3.4 Project Impact Costs - Westfield Construction Company

Most of the costs were estimated by Edward Walsh. Some of the costs were verified by actual contracts with the consultants or subcontractors. The total cost of development of the subdivision is approximately $1,300,000. The determination as to actual cost or estimation is noted for each cost category.

3.4.1 Identification and Delineation Report

Westfield Construction, Inc. contracted with Walter B. Satterthwaite Associates, Inc. for the delineation plan and report. The original cost of the contract was approximately $10,000 for the standard boundary delineation and mitigation plan. Changes to the arched bridge and the addition of monitoring of the mitigated area for two growing seasons resulted in an increase in their contract price to approximately $15,000. No delays were experienced as a direct result of the delineation plan. Ed Walsh personally followed up on the application on a regular basis to ensure that the modifications to the delineation plan and report did not hold up the review process.

3.4.2 Redesign of Original Project

As noted, the project required the addition of several arched culverts as a result of the DER review. All redesigns were completed by the construction arm of the organization for an increase to the original contract. The increase also included the increased construction costs for the arched bridge and the construction of the mitigation area. Since these costs are more extensive than the redesign costs and since the contract modification was based on a lump-sum basis, the total cost is covered under the Mitigation Site Construction category.

3.4.3 Permit Processing

Ed Walsh stated that the Pennsylvania DER and the local township regulatory agencies did not cause many problems with the application. His only concern was that the local township, Willis, had approved the application and issued the permit in April of 1988, yet, DER did not issue a permit until June 1989, nearly 14 months later. Impacts caused by this delay included the following situation:

- the original development plan included three years to sell all the lots in the subdivision. The delay from April 1988 to June 1989 caused the lots to sell much more slowly than expected since the economy experienced a recession and the housing market nearly dried up. The delay in selling the lots and houses caused a longer pay back on the construction loan. The original plan estimated a sellout in three years, and the actual sellout may take five years causing additional interest to accumulate on the construction loan.

Estimates based on this factor were not available for review since all the lots have not been sold as of this writing. The cost of the permit was $100.

3.4.4 Mitigation Plan and Report

The cost for the mitigation plan is included in the contract with Satterthwaite Associates, Inc. for the delineation report and plan. No separate costs were available for this item.

3.4.5 Mitigation Site Construction

The contract with Westfield Construction Inc. included an additional $225,000 for design and construction of the arched bridge, and construction of the mitigated area. The mitigated area construction included all the plants and earthwork necessary to replace the approximately 0.3 acres of impacted wetlands. The additional construction was completed within the original schedule for the development and did not delay the completion of the subdivision.

3.4.6 Company Overhead Expenses

Ed Walsh personally followed up on the status of the permit application for the entire 14 months. He did not keep actual records of the time and costs involved in his efforts, however, he did estimate that approximately five hours per week was spent either on the phone with the agencies, on the road traveling to see the review committees or discussing the situation with the environmental consultant, Satterthwaite Associates. Assuming the following figures, the total expense for overhead associated with this wetland is approximately $10,000:

- 5 Hours per week
- 14 Months @ 4 Weeks per Month
- $30.00 per hour labor charge
- $1,500 Expenses (gas, vehicle wear, etc.).

3.4.7 Loss of Land Use

Since the lot sizes were so large under the original design, and since the amount of affected wetlands was so small in respect to the entire area (<0.5%), the revised plan allowed development of the 27 lots. No loss of land use was experienced since the road was eventually allowed. If the road had not been allowed, there would have been a significant land loss.

3.4.8 Extenuating Circumstances

There were no extenuating circumstances with this project. The project was completed prior to the rise in public concern for wetlands in the Willis Township area. Additionally, since the construction did not start until the permits were approved, no legal fees were necessary to defend against fines or other regulatory problems

3.4.9 Summary of Impact Costs

The Westfield Construction Inc. project was able to complete the permit process without any major problems since the owner, Ed Walsh, continued to follow up on the status of the application. The review process did take approximately 14 months and this did cause some undeterminable impact to the developer. The direct and indirect costs for this project are listed below:

Identification and Delineation Report	$15,000
Redesign of Original Project	$0
Permit Processing	$100 & 14 Months
Mitigation Plan and Report	$0
Mitigation Site Construction	$225,000

Company Overhead Expenses	$10,000
Loss of Land Use	$0
Extenuating Circumstances	$0

Total Direct and Indirect Costs = $250,100 & 14 Months

3.5 Chapter Summary

This chapter provided definitions for eight cost categories developed by the author and presented the actual costs in these categories for a sample project. Chapters 4 and 5 present additional projects that experienced wetland related costs. Comparisons between these costs are made to determine the practicality of utilizing these costs as viable estimates for projects of a similar type.

CHAPTER 4

ADDITIONAL PROJECTS

4.1 Introduction

Chapter 4 presents the wetland related costs experienced by five residential subdivision home builders in Pennsylvania. The builders have varying backgrounds and perform different functions in the housing industry. Some of the firms simply build homes, either for developers or for individual owners. Others develop larger subdivisions and also construct the homes or businesses inside the subdivisions. The background and objectives of each firm are briefly discussed to allow the reader to better understand the purpose and direction of each firm. The similarity between these firms is that they have all experienced additional wetland related costs to their projects.

Some of the projects reviewed were not completed and were still in progress as of this writing. Some were stalled and delayed for various reasons, ie: economic uncertainty due to the added costs related to the wetlands; processing of the necessary permit applications; basic economic uncertainty related to the recessionary trends of the Spring of 1991; etc. The status of each project as of this writing is provided to assist in establishing the differences in cost for the categories developed in Chapter 3 and presented in this chapter. Following the company background and project status, the costs for the work related to the wetlands is categorized according to the outline provided in Chapter 3.

Following the presentation of the costs for each project and the explanation of the possible cost fluctuation factors, all five project cost summaries are analyzed to determine the relationship between the costs. Activities that result in consistent costs may be utilized by the industry as viable estimates for future projects. Those activities that exhibit wide fluctuations in the costs experienced may

require further research and investigation to determine the factors which caused these variations. The wide range of costs for each category may be due to errors and delays in obtaining permits, mistakes in identifying the boundary of the wetland, or loss of use of land previously identified as non-wetland that is now protected under the Joint Federal Agency Delineation Manual [2]. A knowledge of these wide variations will provide the future developer with valuable information about those activities that present the greatest risk for unplanned impact costs due to wetlands.

4.2 Media Real Estate Company

4.2.1 Company Background and Project Status

Media Real Estate Company manages all design, construction and management of properties that it develops. These properties include both residential and commercial developments. The company manages the design and construction through contracts with private contractors and by performing some work with its own staff. The majority of the design work is completed in-house and the majority of the construction is performed by contract. Media Real Estate manages most of the properties that it develops. Some of the residential developments contain units that are for sale, however, Media maintains the common grounds and often acts as the realtor when the units are sold.

The project that experienced the wetland impacts was the Granite Run Townhouse development in Middletown Township, Delaware County, Pennsylvania. Final approval for the development had been granted by the Middletown Township Planning Commission as early as May 1981. No action was taken by the developer until 1985. Prior to this time, the Pennsylvania Department of Environmental Resources (DER) waived the permit

requirements for three box culverts, hook-up to two sanitary sewer lines and a detention basin embankment. Additionally, the Delaware County Conservation District had approved the Erosion and Sediment Control Plan for the development without requiring an earth disturbance permit. No Pennsylvania Department of Transportation permits were required since the roads were existing and being maintained by the Township. Based on these actions, Media Real Estate began construction in the Fall of 1985.

In April of 1988, the U. S. Army Corps of Engineers notified Media that the construction activities at the Granite Run Townhouse development were in violation of Section 301 of the Clean Waters Act. Section 301 regulates the filling and dredging of U.S. waters which includes wetlands. The Army Corps notified Media that the proper permits had to be filed and approved prior to any further disturbance. The developer was initially informed of the possible violations by the U.S. Fish and Wildlife Service in April of 1988 as well. By the time of the notification, the project was 80% complete. Upon notification, Media Real Estate voluntarily halted construction activities in the area of concern and revised their subdivision plan to avoid any further impacts.

4.2.2 Project Impact Costs

A jurisdictional determination was completed in the Spring and Summer of 1988 through a joint effort of the Army Corps and Media's environmental subcontractor, Walter B. Satterthwaite Associates, Inc. (WBSAI). Using aerial photographs, the Army Corps was able to estimate the extent of the wetlands that had existed prior to disturbance, while WBSAI performed a field delineation of the Army Corps jurisdictional boundary. A final report was submitted to the Army Corps in July of 1988. In March of 1989 an on-site meeting between representatives of the Army Corps and WBSAI resolved the discrepancies between the two lines and the Corps accepted the field delineation developed by WBSAI. The limit of the

wetland area and the changes made to the design are shown in Appendix E. This delineation determined that approximately 2.58 acres of wetlands had existed on the 35.78 acre site prior to the initial development activity. Of this 2.58 acres, 0.84 acres had been filled or altered. Of the 0.84 acres impacted, approximately 0.45 acres were filled as a result of the waivered utility line crossings. The remaining impacts were caused by the placement of parking lots, driveways and buildings (0.11 acres) and by general excavation and grading activities (0.28 acres). Therefore, a total of 0.39 acres of wetlands comprised the violation.

Of the total 0.39 acres disturbed, Media was able to restore 0.18 acres to its original condition. The remaining 0.21 acres fell below new buildings and driveways and proved economically unreasonable to restore. As a result, Media requested in their permit application to mitigate this area on a 2:1 basis at a site approximately 1.25 miles to the east of Granite Run. The request was approved and construction was performed in the Spring of 1991. The costs provided in Table 4.1 were obtained from Dennis Slostad who is in charge of engineering at Media Real Estate. The costs are approximate and were rounded to the nearest thousand dollars. The overhead expenses were based on a set percentage applied to all contract work managed by Media's engineering staff.

Table 4.1 Wetland Related Impacts Provided by Media Real Estate Company, Media, PA

Cost Category	Performing Agent	Cost
1. Delineation Plan	Walter B. Satterthwaite Environmental Consultant	$46,000
2. Redesign of Original Project	Media Engineering Staff	$30,000
3. Permit Processing	Pennsylvania DER and Army Corps Fees	$200 & 3 Years
4. Mitigation Plan & Report	Walter B. Satterthwaite Environmental Consultant	Included in #1

5. Site Construction	Media Real Estate Construction	$35,000
6. Company Overhead Expenses		$118,240
7. Loss of Land Use		$0
8. Extenuating Circumstances and Comments	Included are the increased costs of construction following the three year delay caused by the permit process. the cost of completed units that could not be occupied due to the uncertainty of the permit review determination and the cost of the funding that was necessary to begin the project.	$480,000

Total Direct and Indirect Costs = $709,440, 3 Years and Acres Lost.

4.3 The Hankin Group

4.3.1 Company Background and Project Status

The Hankin Group, located in Exton, Pennsylvania, constructs both commercial and residential developments. Some of these are joint use developments that have separate sections reserved for commercial use and residential use. The Hankin Group is presently developing an approximately 100 acre site in Exton for commercial use. The "Eagleview Corporate Center" project has approximately 17 acres of wetlands within the project limits. A site plan for the development, illustrating the limits of the wetlands, is included as Appendix F. Interviews were conducted on February 8, 1991 and April 16, 1991 with Rick Guarini, Vice President of Engineering, to discuss the impact costs that had been experienced for this project and for other recently completed projects.

The South-East corner of the "Eagleview Corporate Center" project is partially completed and occupancy has occurred in several buildings. Many of the buildings that have been built, either

by contract through The Hankin Group or by separate contracts, are occupied at the time of this writing. The remaining portion of the project has been delayed due to wetlands permit problems and due to the economic uncertainty brought on by the Recession of 1991.

The Hankin Group constructs several developments concurrently. Once construction is completed and the buildings are sold or leased, the company proceeds with new developments. The Hankin Group does perform some construction and development for clients at other sites, however, they limit their work to developments which they later plan to manage.

4.3.2 Project Impact Costs

All of the impact costs and time durations shown in Table 4.2 were estimated by Rick Guarini and are based on the costs experienced with the above noted project and other projects containing wetlands which had been recently completed in the past three years.

Table 4.2 Wetland Related Impacts Provided by The Hankin Group, Exton, PA

Cost Category	Performing Agent	Cost
1. Delineation Plan	Contract with Environmental Firm	$4,700
2. Redesign of Original Project	Design Contract with Structural Engineer	$5,000
	Construction Contract for Bridge	$30,000
3. Permit Processing	Pennsylvania DER and Army Corps[1] Fees	$2,000
4&5. Mitigation Plan, Report and Site Construction	Contract to Environmental Firm for all Design and Construction Work	$15,000

6. Company Overhead Expenses	V.President of Engineering[2] $^1/_2$ of Time Working on Permits For 6 Projects In Design	$10,000
7. Loss of Land Use	17 Acres at $150,000 per acre	$2,550,000
8. Extenuating Circumstances	9 Month Delay Costs on Loan (at $1200 per day)	$324,000
	The cost of the wetland area lost is substantial compared to the remaining items. This cost is based on the prevailing rate for commercial property in the Exton area. Since the cost of the land is not a direct result of the wetlands regulations, it is not included in the total direct and indirect costs presented below. The impact will only be noted as 17 of 100 acres lost.	

Total Direct and Indirect Costs = $388,700, 9 Months and 17 of 100 Acres Lost.

[1] Rick Guarini stated that the most lengthy part of the procedure has been related to permit processing. The Section 404 and Chapter 105 Permit review requirements necessitate a period of at least 6 months if no deficiencies are discovered in the application. He strongly recommends revising the system by shortening the processing time to alleviate the most costly impact to developers, the interest due on the project loans.

[2] Rick Guarini stated that in addition to the wetlands permits that are required, authority to build on most subdivision projects requires numerous Township, County, State, Federal and other agencies to review the plans and provide permission to begin work. A list of agencies that The Hankin Group must work with for each project is provided as Appendix G. Rick Guarini stated that the wetlands permit is just one of the numerous requirements that he must personally follow to ensure that no unnecessary delays occur.

4.4 Pinecrest Development Corporation

4.4.1 Company Background and Project Status

Pinecrest Development Corporation, hereinafter designated as PDC, is the developer of a recreational second home community known as Pinecrest Lake Resort, located in the Pocono Plateau region of Tobyhanna Township in Monroe County. Information regarding this project, and other projects owned by PDC, was obtained during an interview with its owner, Ed Carroll, on May 1, 1991.

PDC has been in the forefront of the lobbying effort across the state of Pennsylvania to change the existing wetland regulations and to enact legislation that provides fair, timely decisions regarding wetlands. PDC as a member of the Pennsylvania Partnership, which is a non-profit organization that has provided comments to the proposed wetlands legislation in the Pennsylvania State Senate [12], has provided over $10,000 to assist in the lobbying effort.

Pinecrest Lake Resort is the second major planned residential development undertaken by Ed Carroll, the other being the Snow Ridge Village at Jack Frost Mountain Ski Area. An overall density of one house per two acres was planned for the 2200 acres intended for development. Acquisition and development, not including the cost of housing construction, will be approximately $6,000,000. A site layout is included in Appendix H.

Pinecrest Lake Resort is located on an old resort known as Pocono Crest which began operations in 1882 and continued for almost 90 years. It once included main hotel and support buildings, a boys camp, a girls camp, a sewage treatment plant and a very large 1927 vintage residential subdivision of more than 1000 lots. Most of the subdivision lots were leased under long-term leases that are now in default. The resort eventually failed, fell into disrepair and was ultimately foreclosed by the Philadelphia

National Bank. The Bank tore down the buildings and later sold it to the predecessor of PDC. That land, together with an adjoining parcel to the West known as Lost Lakes, comprises the proposed Pinecrest Lake Resort project. The site contains a substantial number of isolated wetlands and one larger central wetland structure.

To date, PDC has only developed approximately 100 acres. It has constructed and sold 103 up-scale townhouses and has invested approximately $1,300,000 in recreational amenities. It had planned to sell approximately 50 units per year, however, delays in obtaining permits as a result of wetlands within the boundary of the property has stopped the process. The wetland boundaries are illustrated in Appendix H. With many of the amenities built, and construction of the residential units delayed, the cash-flow required to support the project has been cut off. This project has been in the permit process for three years without a determination being made.

The main delay involves the sewage treatment plant. The initial two sections of the planned residential development, which have been completed, have central sewage and water systems. The sewage collection system, however, presently discharges into community sewage beds, not into a treatment plant. These sewers were designed by PDC and approved by Pennsylvania DER several years ago. The preferred long-term method of disposal, however, is a central tertiary treatment sewage plant.

The permit applications for this project have been in process for over three years and have not yet been issued due to the neighboring wetlands. At the time of this writing, the design for the plant has been submitted to the DER and is under review. This plant is critical for any future development of Pinecrest Lake Resort since construction of any of the new lots will require a sewage treatment system. The wetlands have affected both the location of the plant and the location of the point of discharge for its effluent.

The specific costs involved with the project that are associated with the surrounding wetlands are discussed in the next

section. Ed Carroll provided his project files to substantiate the costs reported.

4.4.2 Project Impact Costs

Despite the absence of a requirement in the local zoning ordinances, PDC contracted with the Academy of Natural Science in Philadelphia to conduct the initial environmental evaluation of the discharge scheme to ensure that the review would be as objective and reliable as possible. The initial report that was developed showed that the wetlands can help absorb or release phosphorous and nitrogen from the tertiary treated effluent, would help improve the down stream quality somewhat, and would help reduce the pH (acidity) of the water in Beaver Creek, mitigating some of the effects of natural wetland acids and acid rain.

Unfortunately, use of the discharge location at the East end of the wetlands raised strong objections and continuing requests for additional information from DER. The net result of these concerns caused PDC to move the discharge location to Tamague Lake (shown on the site plan in Appendix H.). They have also sited the treatment plant so there is a distance of at least 150 feet from any wetland in the vicinity of the plant. The delays have been substantial and costly. Approximately $1,800,000 in interest expense and $250,000 for wetlands delineation and verification (which are still not complete as of this writing) have been expended.

A summary of the costs experienced by the Pinecrest Lake Resort are provided in Table 4.3. These costs were obtained through the files that Ed Carroll provided and from the personal interview with Ed Carroll.

Table 4.3 Wetland Related Impacts Provided by Pinecrest Development Corporation, Pocono Pines, PA

Cost Category	Performing Agent	Cost
1. Delineation Plan	Environmental Firm	$250,000
2. Redesign of Original Project	In house Work Performed	$0
3. Permit Processing	Pennsylvania DER and Army Corps Fees	$2,000
4&5. Mitigation Plan, Report and Site Construction	None Performed To Date Since Permit is not Approved	Not Avail
6. Company Overhead Expenses	Legal Fees for Pennsylvania Partnership	>$10,000
	All Redesign and Permit Review Action Expenses	$1,400,000
7. Loss of Land Use	Investment in Property	$3,600,000
8. Extenuating Circumstances and Comments	Interest on Construction Loans	$1,050,000
	Edward Carroll purchased over 2000 acres of land in the Pocono area during the 1970's in anticipation of the rush of individuals that would move to escape the cities of the East Coast. After constructing the amenities (sports and recreation complexes) and partial infrastructure, he learned that his building permits would not be quickly acted upon due to the presence of wetlands on the property. Ed Carroll has invested a considerable amount of money and effort in lobbying for a change to the current regulations to allow development where practicable and also to allow for compensation for land that is condemned as a result of the need to save wetlands.	

Total Direct and Indirect Costs = $6,312,000, Over 3 Years of Delay and an Undetermined number of Acres Lost.

4.4.3 Edward P. Carroll Construction, Ltd. Projects

Edward P. Carroll Construction, Ltd. has also been involved in several other projects. While a detailed analysis of the costs encountered on these projects is not available, Edward Carroll did provide some cost information. Brief project descriptions and related costs are presented below:

* A 400 acre subdivision was stalled for over 18 months due to a 2 acre wetland.
* A 10 acre lot contained 4 acres of wetlands due to a natural swale. PDC was unable to sell property due to the building's proximity to the wetland (75').
* A 20' X 30' area of wetlands on another site forced the relocation of the entrance to the site at a cost of $250,000 in additional construction costs.

4.5 Maleno Developers

4.5 1 Company Background and Project Status

Maleno Developers is a family owned business that specializes in purchasing undeveloped land and constructing subdivisions with full services for custom built homes. Some of the lots that are developed may be sold to individuals who will construct through separate builders, however, many of the homes are custom built for prospective buyers by Maleno Developers.

An interview was conducted with John Maleno on April 29, 1991. John Maleno described the circumstances surrounding a townhouse development the he started late in 1988. The 40 acre site was to be subdivided into 110 townhouse lots. The Army Corps performed the delineation investigation in early 1989 and discovered that less than 1 acre of wetlands was impacted. The Army Corps issued a letter in February of 1989 stating that the

delineated area had been determined. This information was passed along to the Pennsylvania DER and an official of DER stated that as long as Maleno Developers did not disturb the area, no permit was required or would be issued.

In February of 1990, based on an anonymous complaint, the Fish and Wildlife Service performed an inspection of the site and determined that wetlands were affecting 6 of the lots. A work stoppage was recommended to the Army Corps and DER. Of the 6 lots, 2 were completely developed (including the structure) and 4 were developed with services only. One of the undeveloped lots with services had been sold to a separate party and had to be repurchased from the owner. These 6 remaining lots are still the property of Maleno Developers as of this writing.

The necessary wetland permits were filed in August of 1990 and no response had been received as of this writing. The permits include the delineation that was performed by the Army Corps and no other environmental studies or alternative plans for the lots. Maleno Developers has filed a lawsuit against the DER official that provided the guidance to proceed with the project. The project site layout is included as Appendix I. The lots affected by the wetlands are noted on the plan. The delineation plan developed by the Army Corps was not available since it is part of the documents involved in the lawsuit.

4.5.2 Project Impact Costs

The exact costs related to this project are not available since they are under review for the lawsuit. The data in Table 4.4 were provided by the company's owner, John Maleno.

Table 4.4 Wetland Related Impacts Provided by Maleno Developers, Erie, PA

Cost Category	Performing Agent	Cost
1. Delineation Plan	Army Corps	$0
2. Redesign of Original Project	None Planned	$0
3. Permit Processing	Pennsylvania DER and Army Corps Fees	$2,000
4&5. Mitigation Plan, Report and Site Construction	None Planned	$0
6. Company Overhead Expenses	In Dispute - Not Available	$N/A
7. Loss of Land Use	In Dispute - Not Available	$N/A
8. Extenuating Circumstances and Comments	This project proceeded during the changing of the Regulations. Based on the remarks from the interview with John Maleno, areas previously identified as non-wetland became classified as wetland following the inspection by the Fish and Wildlife Service and a review by DER and the Army Corps. Maleno Developers claim that they relied on the guidance provided by a DER "official" to begin construction based on the delineation plan provided by the Army Corps. The cost impacts experienced by Maleno Developers are part of the lawsuit and were not available for this study.	

Total Direct and Indirect Costs = $Not Available, 12 Months To Date and 6 of 110 Lots Lost.

4.6 Sugar Hollow Homes

4.6.1 Company Background and Project Status

Sugar Hollow Homes Inc., located in Reeders, Pennsylvania, constructs residential subdivisions and homes. An interview was conducted with Dean Kresgi, owner of the company, on April 12, 1991. His project involved an 80 acre subdivision with about 60 lots valued at approximately $40,000 each (without any structures). All work allowed under the State and Federal Joint Permit [26] had been completed prior to the change in the regulations in 1989 [2]. Two lots were scheduled to be completed after 1989, however, they were not completed since they were located within the boundaries of the wetland area. Pennsylvania DER recommended the construction of 3 sediment ponds as mitigation. Dean Kresgi estimated that the costs would result in insufficient profits and abandoned the lots.

4.6.2 Project Impact Costs

The costs to Sugar Hollow Homes Inc. were marginal since the majority of the work in the subdivision had been completed prior to the change in the regulations in 1989 [2]. The costs outlined in Table 4.5 were provided by Dean Kresgi. The numbering of the categories follows that outlined in Chapter 3.

Table 4.5 Wetland Related Impacts Provided by Sugar Hollow Homes Inc.

Cost Category	Performing Agent	Cost
1. Delineation Plan	Did not develop.	$0
2. Redesign of Original Project	No redesign accomplished.	$0

3. Permit Processing	Pennsylvania DER and Army Corps Fees	$1,000
4&5. Mitigation Plan. and Construction	Did Not Develop	$0
6. Company Overhead Expenses	None estimated.	$0
7. Loss of Land Use	2 Lots at $40,000	$80,000
8. Extenuating Circumstances and Comments	The impact costs associated with this project are minimal since the majority of the work was completed prior to the enactment of the 1989 regulations. The loss of the 2 lots is a result of the change in the regulations. The new requirements for mitigation did not make the remainder of this project profitable, therefore, it was abandoned.	

Total Direct and Indirect Costs = $81,000, and 2 of 60 Lots lost. No delays since the majority of the project had been completed.

4.7 Comparison of Data

The projects presented in this chapter and in Chapter 3 experienced wetland impact costs to varying degrees. An analysis of these costs and a comparison of them with the cost activities that were developed in Chapter 3 is presented below.

4.7.1 Identification and Delineation Report

Table 4.6 summarizes the Identification and Delineation Report costs experienced by the five residential projects.

Table 4.6 Summary of Identification and Delineation Report Costs

Developer/Project	Performing Agent	Cost
1. Westfield Construction	Walter B. Satterthwaite Inc. Environ. Consultant	$15,000
2. Media Real Estate	Walter B. Satterthwaite Inc. Environ. Consultant	$46,000
3. The Hankin Group	Contract with Environmental Consultant	$4,700
4. Pinecrest Development Corp.	Contract with Environmental Consultant	$250,000
5. Maleno Developers	Army Corps	$0
6. Sugar Hollow Homes	None Developed	$0

It is obvious from the table that the costs for the report varies significantly among the projects. The costs range from the Sugar Hollow Homes project that did not develop a report, since the majority of the construction was completed, and the Maleno Developers project that utilized a now unavailable Army Corps of Engineers delineation, to the Pinecrest Development project that spent $250,000 to delineate an extensive wetland area that contained several sections of valuable land. The costs associated with delineation probably have changed more than any other activity. The guidelines for identification and delineation have become more strict since the enactment of the Federal Manual for Identifying and Delineating Jurisdictional Wetlands was published in 1989 [2]. Additionally, the costs are directly related to the size and complexity of the site. Larger sites, with several pockets of wetlands, will require more time on-site to identify the characteristics of the boundaries and to map these various attributes. This activity may continue to experience a wide range of costs since the regulations will probably continue to be modified as legislatures and environmentalists attempt to further define and protect the wetlands resource.

4.7.2 Redesign of Original Project

Table 4.7 summarizes the costs experienced due to redesign of the project as a result of the wetland identification and impact on the existing project layout.

Table 4.7 Summary of Redesign of Original Project Costs

Developer/Project	Performing Agent	Cost
1. Westfield Construction Inc.	None Performed	$0
2. Media Real Estate	Media Engineering Staff	$30,000
3. The Hankin Group	Design Contract with Structural Engineer	$5,000
	Construction Contract for new Bridge	$30,000
4. Pinecrest Development Corp.	Work Performed in-house	$0
5. Maleno Devel.	None Planned	$0
6. Sugar Hollow Homes	None Accomplished	$0

Only two of the projects experienced redesign costs due to the presence of wetlands. The costs associated with this activity are directly related to the stage the project was in at the time of the wetland delineation. The projects accomplished by Maleno Developers and Sugar Hollow Homes were essentially complete and hence no redesign costs were experienced. The Media Real Estate and Hankin Group projects discovered wetlands prior to the commencement of construction. therefore redesign of the site was possible without major construction costs due to demolition. The projects by Westfield Construction and Pinecrest Development Corp. did not experience redesign costs since the original designs were accomplished in-house and the costs were added to the overhead accounts.

Redesign costs appear to be directly related to the stage the project is in at the time of the delineation. If the construction is mostly completed or the design is not yet finished, redesign costs are minimized. However, if the project is underway and a significant amount of the infrastructure has been designed or constructed, the cost of redesign may prove substantial. It is important to note that the owner must ensure that a detailed site investigation be performed prior to all construction on the site. An engineering firm knowledgable in the wetlands area will protect the owner from the unnecessary delays associated with development adjacent to wetlands.

4.7.3 Permit Processing

Table 4.8 summarizes the costs experienced due to the permit application process. These costs include the actual cost for the application, any contractual costs if performed by an environmental firm and the time involved in obtaining the permits.

Table 4.8 Summary of Permit Processing Costs

Developer/Project	Performing Agent	Cost
1. Westfield Construction Inc.	Pennsylvania DER & Army Corps	$200 & 14 Months
2. Media Real Estate	Pennsylvania DER & Army Corps	$200 & 3 Years
3. The Hankin Group	Pennsylvania DER & Army Corps	$2,000 & 9 Months
4. Pinecrest Development Corp.	Pennsylvania DER & Army Corps	$2,000 & Over 3 Years
5. Maleno Devel.	Pennsylvania DER & Army Corps	$2,000 12 Months
6. Sugar Hollow Homes	Pennsylvania DER & Army Corps	$1,000 No Delay

All the projects experienced reasonable direct costs for the permits. The primary concern of the developers is with the time necessary to obtain the permit. and subsequentially the authority. to proceed with construction. Nearly all of the projects experienced delays exceeding one year and two of the projects were delayed over three years. While the cost of the permit is low, the costs associated with the delay often put the developer in a tough financial situation on the project. These delay associated costs are discussed in more detail in Section 4.7.8.

4.7.4 Mitigation Plan and Report

Table 4.9 summarizes the costs experienced due to the need for a Mitigation Plan and Report. These costs include the actual cost for the plan and report and any contractual costs if performed by an environmental firm.

Table 4.9 Summary of Mitigation Plan and Report Costs

Developer/Project	Performing Agent	Cost
1. Westfield Construction Inc.	Included in Construction Cost	$0
2. Media Real Estate	Included in Delineation Plan & Report	$0
3. The Hankin Group	Contract with Environmental Firm for all Design and Construction	$0
4. Pinecrest Development Corp.	None Performed since Preliminary Plan Not Approved	$0
5. Maleno Devel.	None Planned	$0
6. Sugar Hollow Homes	None Accomplished	$0

Only one of the developers. The Hankin Group. provided a separate cost of $15,000 for this activity. An environmental firm was

engaged for all design and construction work required by mitigation. Most developers add this cost to the cost for the Delineation Report preparation or include it with the Mitigation Site Construction work. This is prepared under the contract with the environmental firm who develops the Delineation Report or by the contractor on the construction contract if it is a design-build project. The Hankin Group cost is therefore reported on the Mitigation Site Construction activity so that a useful comparison with other projects can be made.

4.7.5 Mitigation Site Construction

Table 4.10 summarizes the costs experienced due to Mitigation Site Construction. These costs include the actual cost for the construction and any other contractual costs if the work was performed by a separate firm. Any management costs experienced by the developer are accounted for in the overhead category.

Table 4.10 Summary of Mitigation Site Construction Costs

Developer/Project	Performing Agent	Cost
1. Westfield Construction Inc.	Westfield Construction	$225,000
2. Media Real Estate	Construction Contract	$35,000
3. The Hankin Group	Includes Mitigation Plan as Sub-contract	$15,000
4. Pinecrest Development Corp.	None Performed Since Permit Not Approved	$0
5. Maleno Devel.	None Planned	$0
6. Sugar Hollow Homes	None Accomplished	$0

Three of the projects did not experience Mitigation Site Construction costs because the projects were completed prior to the determination of the wetland area or because the project mitigation report had not yet been approved when the writer met with the firm. For the three projects that did experience impact costs, they varied from $15,000 to $225,000. The reason for this variance is unclear as the acreage of these mitigation areas is relatively equal. The most obvious difference is that the Westfield Construction project required an arched bridge to traverse the wetland area. The owner could not determine if the significant cost difference was due to the bridge or to the wetland area that had to be restored.

4.7.6 Company Overhead Expenses

Table 4.11 summarizes the overhead costs experienced by the developers of the projects. These costs were expended during the management of the Delineation Plan, Mitigation Plan and Site Construction process and because the permits in the application process had to be corrected and tracked.

Table 4.11 Summary of Company Overhead Expenses

Developer/Project	Performing Agent	Cost
1. Westfield Construction Inc.	Westfield Construction	$10,000
2. Media Real Estate	Media Engineering Staff	$118,240
3. The Hankin Group	The Hankin Group	$10,000
4. Pinecrest Development Corp.	Legal Fees for Pennsylvania Partnership	>$10,000
	Permit Review Action Expenses	$1,400,000
5. Maleno Devel.	Not Available	$N/A

6. Sugar Hollow Homes	None Estimated	$0

Most of the developers experienced overhead costs in the $10,000 range. The primary exception was the Pinecrest Development Corporation that has spent over a million dollars in its efforts to obtain the necessary permits to resume construction. The Pennsylvania Partnership, lawyers and environmental firms were consulted and hired to assist in the process. These expenses have resulted in the owner, Ed Carroll, becoming a major voice in the lobbying efforts being conducted with the Pennsylvania State Legislature as the new Wetlands Bill is reviewed and discussed [12]. Media Real Estate's costs include much of the redesign efforts required due to the presence of the wetlands. The redesigns required the company engineer to completely resurvey the area to determine the new location of several buildings. The $10,000 cost level for this activity basically covers the salary of the project manager or engineer who spends one-fifth of his time for one year tracking and correcting the wetland permit application process.

4.7.7 Loss of Land Use

Table 4.12 summarizes the Loss of Land Use costs experienced by the developers of the projects.

Table 4.12 Summary of Loss of Land Use Costs

Developer/Project	Situation	Cost
1. Westfield Construction Inc.	None	$0
2. Media Real Estate	None	$0
3. The Hankin Group	17 Acres at $150,000/Acre	$2,550,000

4. Pinecrest Development Corp.	Investment in Property	$3,600,000
5. Maleno Devel.	Not Available	$N/A
6. Sugar Hollow Homes	2 Lots at $40,000/Lot	$80,000

Loss of Land Use proved the most difficult one to establish with the developers that were interviewed. Sugar Hollow Homes stated that they lost the use of two lots that were valued at $40,000 each. The Hankin Group estimated that 17 acres would prove unusable as a result of the delineation agreed to by the Army Corps. The average rate of $150,000 per acre for commercial property achieves the total loss of $2,550,000. Pinecrest Development Corp. invested $3,600,000 in structural improvements such as roadways and athletic facilities before learning that the areas planned for home building were within the wetland delineated area. Without the construction of the homes, the development will not be economically feasible.

This cost category is also dependent upon the stage of the project during which the wetlands are located. If the project is still in the planning stages, it is often possible to design a layout that obtains maximum density without impacting the wetlands area. If the project is partially completed, it may not be possible to redesign to obtain maximum density. This is where loss of planned land use occurs and where the developers incur large losses.

4.7.8 Extenuating Circumstances

Table 4.13 summarizes the costs for Extenuating Circumstances experienced by the developers of the projects. This category contains the costs for interest on construction loans and increased costs for construction due to delays caused by permit processing and delineation preparation.

Table 4.13 Summary of Extenuating Circumstances and Costs

Developer/Project	Situation	Cost
1. Westfield Construction Inc.	None	$0
2. Media Real Estate	Increased Cost of Construction and Interest on Construction Loan	$480,000
3. The Hankin Group	Delay Costs on Loan	$324,000
4. Pinecrest Development Corp.	Interest on Construction Loan	$1,050,000
5. Maleno Devel.	Not Available	$N/A
6. Sugar Hollow Homes	None Noted	$0

Three of the developers reported expenditures for interest on construction loans, as well as increased costs for the construction, as a result of the delays associated with the permit processing procedure. These costs are substantial in comparison to the other categories and cause the most concern for the developers. Interest costs must be paid, despite the fact that no revenues are collected for the project, until all of the work is accomplished and the homes or buildings are completed and sold.

Normally the developer expects revenues to be collected within a certain time from the start of construction. An estimate of the interest on the construction loan for this period is therefore added to the total project estimate to properly evaluate the potential profit on the project. If the estimate is changed due to unforeseen charges, such as those associated with wetlands, the developer must charge more for the final products or experience a loss in his anticipated profits.

Large expenditures for interest on the construction loans are usually experienced when the project has commenced, but not significantly progressed, and the project is delayed due to the presence of wetlands. The Westfield Construction development did not experience interest costs since the loan had not been activated

at the time when the wetlands were discovered. Similarly, the Sugar Hollow Homes project was nearly completed at the time of the wetlands discovery. most of the homes had been sold. and the loan was nearly repaid.

This category also includes costs that vary according to the stage of completion that the wetlands are discovered. If the construction loan has been made before the wetlands are delineated, then delays are likely to increase the interest costs. A period of one year is the minimum time required to obtain the permits and an additional one year of interest charges may be anticipated.

4.7.9 Total Wetland Related Project Impacts

Table 4.14 summarizes the total wetland related impact costs experienced by the developers for the projects researched. This table contains all the costs, time delays and loss of land use caused by permit processing, delineation and mitigation preparation, and mitigation construction.

Table 4.14 Summary of Total Wetland Related Project Impacts

Developer/Project	Costs	Time Delay
1. Westfield Construction Inc.	$250,000, 0 Acres	14 Months
2. Media Real Estate	$709,440, 0 Acres	Over 3 Years
3. The Hankin Group	$388,700, 17 of 100 Acres	7 Months
4. Pinecrest Devel. Corp.	$6,312,000	Over 3 Years
5. Maleno Devel.	$ Not Available 6 of 110 Lots	12 Months
6. Sugar Hollow Homes	$81,000, 2 of 60 Lots	No Delay

As can be seen, these six projects all experienced significant increases in project costs due to the presence of wetlands. The Sugar Hollow Homes project will lose approximately three percent of its revenues due to the loss of the 2 lots and an additional $81,000. The remaining projects have losses in excess of this three percent figure, based on the total estimated construction figures provided by the developers. The Hankin Group anticipated development costs of over $10,000,000. This provides a markup due to wetlands of about four percent in direct costs and seventeen percent of useable land lost. Media Real Estate experienced costs of over $700,000 on an anticipated total project cost of approximately $10,000,000, or seven percent.

While many of the specific categories did not provide consistent costs due to the presence of wetlands, the total impact costs do prove to be fairly consistent. Additional costs in the range from three to seven percent were experienced by most of these developers. The Maleno Developers project is in litigation at the time of this writing so direct costs were not available. Over five percent of the lots, however, became unusable following identification and delineation of the wetland boundaries.

It appears from this data that the higher percentages are experienced when the wetlands are discovered during the construction process. The interest on the loans most significantly increases the costs that the developers will incur.

4.8 Chapter Summary

This chapter presented the wetland related impact costs experienced by five residential home builders in the Commonwealth of Pennsylvania. The results of the comparison indicate that most of the categories developed in Chapter 3 did not achieve consistent expenditures. The overhead expenses were fairly consistent at $10,000 for one year of permit process management, however, the remaining items varied as a result of the

stage in the project when the wetlands were discovered. If the wetlands were discovered prior to the completion of design and assumption of the construction loan, or after the majority of the construction was completed, the costs were slightly smaller since additional interest was not paid on the construction loan. Those projects that discovered wetlands during the construction stage experienced the largest increase in costs as a result of the higher interest payments made. It would appear that developers would be better protected by more competent engineering firms that are knowledgeable in wetlands identification during the design phase rather than those that may only determine identification during the construction stage.

CHAPTER 5

OTHER INFORMATION SOURCES

5.1 Introduction

The main focus of this report is the determination of the wetland impact costs on residential construction projects. Other sources of information, however, became available to the writer during the research. As a result, two non-residential projects were investigated in detail because they also experienced impacts due to the presence of wetlands within their boundaries. The first involved an aircraft control tower for the U.S. Naval Facilities Engineering Command (NAVFAC) in South Weymouth, Massachusetts. The other was a highway project for the Pennsylvania Department of Transportation (PennDOT). A third residential subdivision project that was completed by the U.S. Navy in Earle, New Jersey is presented as well. It experienced significant impact costs because a great deal of the work was completed prior to the delineation of the wetland area. These projects provide a cost comparison with those presented in Chapter 4. If it can be shown that the costs are predictable, wetland related impact costs can, therefore, be incorporated into the estimates developed by other members of the construction industry.

An environmental firm, BCM Engineers, Inc., also provided a listing of typical wetland project fees that are charged to their customers. These charges are consistent regardless of the type of project planned. Finally, the Pennsylvania Builders Association (PBA) conducted a survey during the months of April and May, 1991 with regard to the impact of wetlands. Some of the responses are also presented in this chapter to provide an additional comparison with the costs presented in Chapters 3 and 4.

5.2 Naval Facilities Engineering Command

The Naval Facilities Engineering Command, NAVFAC, performs all building and land planning, design, construction, maintenance, repair and demolition for the U.S. Navy. This cradle to grave business requires NAVFAC to administer contracts with many engineering, environmental and construction firms to achieve its goals. During the late 1980's, the Navy experienced several wetlands related problems on its projects.

5.2.1 South Weymouth Naval Air Station Control Tower

A Tower and Radar Facility project was planned at the South Weymouth Naval Air Station (NAS) in Massachusetts. The project was originally estimated to cost $1.9 million and was to be completed in 1989. The project was an urgent requirement since the existing facility did not meet the requirements established by the Federal Aviation Administration (FAA). The project has not, however, been completed as of this time, construction, in fact, has not even started. The delay is caused by the fact that the entire area of the NAS lies within the boundaries of a watershed. The wetlands application process has experienced significant delays with respect to the date when construction can commence because the NAS lies within three towns that each require reviews of all wetlands development applications. After one year of delay caused by a debate about who should review and approve the permit, an agreement was reached which designated that the Department of Environmental Planning in Massachusetts would provide the judgement based upon recommendations from the three towns.

The U.S. Navy decided to comply "in comity" (as a courtesy) with the local wetland regulations in 1988 and proceeded to submit the necessary applications in February of 1989. Based on direction from U.S. Navy counsel, NAVFAC reapplied in June of 1989. In July of 1989, the local conservation commission denied the application

since more than 5000 square feet of wetlands would be filled. The U.S. Navy appealed the ruling, however, the $50 fee was misplaced and the application remained untouched until October of 1989. In November of 1989, the Conservation Commission, NAVFAC and the local Department of Environmental Programs (DEP) met on the site to discuss the project. Mitigation requirements were discussed and the U.S. Navy began to prepare the necessary plans. In January of 1990, the mitigation plan was completed. It then took until August of 1990 to provide a completed application to the local Conservation Commission and board of supervisors. The delays were mostly caused by administrative errors. A public hearing was held in September of 1990 and the recommendations were sent to the NAVFAC. By November 1990, the drawings were once again revised and another public hearing was held where the necessary permits were granted. As a result of these delays, NAVFAC does not expect construction to begin prior to the end of October of 1991.

This project experienced significant direct costs due to the requirements for wetland permitting and mitigation. These costs, provided by Nancy Kuntzleman of the Environmental Office of the Northern Division of the Naval Facilities Engineering Command, are summarized in Table 5.1. All costs are actual except for the overhead expense and projected project construction costs which were estimated. No indirect costs due to long term interest charges were included since the U.S. Navy does not borrow money to build their projects. Additionally, the only true "indirect costs" due to the continued operation of the existing Control Tower, which did not meet the FAA regulations, cannot be estimated or determined. No aircraft accidents or other mishaps have yet occurred that can be attributed to the deficiencies of the existing tower.

Table 5.1 Wetland Related Impacts Provided by Northern Division, Naval Facilities Engineering Command, Philadelphia, PA for NAS South Weymouth, MA Control Tower Project

Cost Category	Performing Agent	Cost
1. Delineation Plan	Contract with Environmental Design Firm	$64,000
2. Redesign of Original Project	Modification to Existing Design Contract	$Not Avail
3. Permit Processing	Massachusetts DEP and Army Corps Fees	$1,000
4 Mitigation Plan, & Report	Contract with Soil Conservation Service	$6,000
5. Mitigation Site Construction	Contract with Construction Company - Govt Estimate	$233,820
6. Company Overhead Expenses	NAVFAC Personnel and Administration	$25,000
7. Loss of Land Use	None to Date	$0
8. Extenuating Circumstances and Comments	The existing control tower remained in operation longer than originally planned. Despite the noted deficiencies by the FAA, the runway had to remain operational due to operational requirements. No mishaps occurred during the delay, however, the delay will extend the complete operational availability of the NAS. Another "impact" that may occur is the availability of the Congressionally authorized funds for the project. Projects of this type are funded through Congressional legislation with the requirement that a "commitment" of the money take place within a certain time frame. If a contract is not awarded for the construction, the project loses its authorization and the funds are returned to the U.S. Treasury. Then the entire 2 to 3 year process to reobtain the funds must begin again.	

Total Direct and Indirect Costs = $329,820, Minimum 2 Year Delay and 0 Acres Lost To Date.

5.2.2 Naval Weapons Station Earle, NJ - 200 Unit Housing Construction

During construction of a 200 unit housing project at the Naval Weapons Station Earle (NWS Earle) in Colts Neck, New Jersey, the U.S. Navy discovered that the project was destroying wetlands without having first received the required permits. A follow up site inspection revealed that, indeed, wetlands were present and work was suspended immediately. A total of 3.2 acres of wetlands were destroyed prior to the discovery. Since the existing wetlands were destroyed without the necessary permits, mitigation was recommended for a 10 acre site. Original estimates of this construction were over $500,000. NAVFAC awarded a contract for $228,500 to construct the mitigation site. The final costs for this project were not available for this report. The contract required monitoring for a period of two years by the contractor. The mitigation report required the U.S. Navy, in conjunction with the SCS and the Fish and Wildlife Service, to conduct inspections and to provide reports for a period of fifteen years. An existing interservice support agreement between the Soil Conservation Service (SCS) and NAVFAC was signed providing $5,500 to the SCS for inspection and monitoring services for the mitigation site construction. This was later amended to include an additional $8,000 for the fifteen year monitoring period. Appendix J indicates the location of the project site and the relationship to the watershed and wetland boundary. Table 5.2 summarizes the costs experienced for this project. The delineation and mitigation plan, and NAVFAC's overhead expenses, were not available. In addition, no reasonable estimates for these expenses could be determined since personnel responsible for this project had been reassigned. No redesign costs were experienced for the original project since it proceeded in accordance with the original plan following approval of the mitigation design.

Table 5.2 Wetland Related Impacts Provided by Northern Division,Naval Facilities Engineering Command, Philadelphia, PA for NWS Earle, NJ 200 Unit Housing Project

Cost Category	Performing Agent	Cost
1. Delineation Plan	Part of Mitigation Plan	$0
2. Redesign of Original Project	None Occurred	$0
3. Permit Processing	New Jersey Regulatory and Army Corps Fees	$1,000
4 Mitigation Plan & Report	Soil Conservation Service (SCS)	$50,000
5. Mitigation Site Construction	Contract with Construction Firm	$228,500
6. Company Overhead Expenses	Contract with SCS for Monitoring	$13,500
7. Loss of Land Use	None Occurred.	$0
8. Extenuating Circumstances and Comments	The original project was scheduled to be completed by June of 1989 to provide critical housing for the crews of four ships that were to be assigned to NWS Earle. The project was actually completed in April of 1990. The nonavailability of the houses for 10 months caused great hardship on those sailors that were forced to live on the expensive New Jersey economy or to leave their families in another less costly location.	

Total Direct and Indirect Costs = $293,000, 10 Months and 0 Acres Lost.

5.3 Pennsylvania Department of Transportation

The Pennsylvania Department of Transportation (PennDOT) is responsible for the planning, design, construction, maintenance and repairs of all state roads and highways in the Commonwealth of Pennsylvania. Under this mandate, PennDOT proceeded to upgrade a section of Route 8, North of Interstate Route 80 in

Barkeyville, Pennsylvania. The project involved approximately 3 miles of 4 lane roadway when it was originally planned. An interview was conducted with Ronald Brumagin, who is a biologist with PennDOT's Engineering District 1-0 in Franklin, PA, to discuss the wetland related impacts experienced on this project.

The project had a total wetland impact of approximately 3 acres. During the review and design process, mitigation was recommended and construction proceeded. The design of the mitigation was accomplished in-house by PennDOT's personnel and no estimates were available for this activity. The cost of the mitigation site construction was $54,000 per acre and was accomplished by contract. The total estimated cost for the construction was $130,000. Additionally, redesign of the original project was required. The road width was reduced from 4 lanes to 2 lanes to minimize the impact on the wetlands. The cost of this redesign was not available since it was accomplished by PennDOT's personnel. Some of the overhead expenses were estimated by Ronald Brumagin. Those activities that were accomplished in the Franklin office included one-quarter of the following personnel's time for two years:

- 4 Person Design Team	= ($^1/_4$)($30,000 per person)(4)
- 1 Environmental Manager	= ($^1/_4$)($50,000)
- 1 Plans Engineer	= ($^1/_4$)($40,000)
- 1 Soils Engineer	= ($^1/_4$)($40,000)
- 1 Assistant	= ($^1/_4$)($20,000)

Total Cost = $67,500

The delays to the project related primarily to the review process and redesign periods. The redesign periods were relatively short since the work was performed by PennDOT personnel and are therefore not included in this estimate. The construction of the mitigation site was performed concurrently with the construction of the roadway, therefore no delays were experienced due to this activity.

The review process extended over a period of two years. Three field visits were performed by the Pennsylvania Department of Environmental Resources (DER) over this period. PennDOT enjoyed the ability to attend Environmental Review Committee meetings with DER. Attendance at these meetings allowed PennDOT to correct errors in the application and to keep the process in motion. Ronald Brumagin stated that these meetings saved at least 4 to 6 months in the permit process. A summary of the impact costs experienced by PennDOT, as estimated by Ronald Brumagin, is provided in Table 5.3.

Table 5.3 Wetland Related Impacts Provided by Pennsylvania Department of Transportation. (PennDOT) for State Route 8 Project

Cost Category	Performing Agent	Cost
1. Delineation Plan	PennDOT Personnel	$Not Avail
2. Redesign of Original Project	PennDOT Personnel	$Not Avail
3. Permit Processing	Pennsylvania DER and Army Corps Fees	$1,000 2 Years
4. Mitigation Plan & Report	PennDOT Personnel	$Not Avail
5. Mitigation Site Construction	Contract	$130,000
6. Company Overhead Expenses	Only Includes Franklin Office Personnel	$67,500
7. Loss of Land Use	Lost Two Lanes of Roadway	$Not Avail
8 Extenuating Circumstances and Comments	PennDOT was able to attend several Environmental Review Committee meetings at DER that kept the process from becoming stalled. An additional 4 months may have been lost if this opportunity was not available. No loss of land use information due to the reduction of the roadway from 4 lanes to 2 was available. This will undoubtedly cause "impacts" to the	

traffic through this area and may require a traffic study to determine what the impacts are in terms of the average time delayed and above average number of accidents.

Total Direct and Indirect Costs = $198,500, 2 Years and 2 Lanes of Roadway Lost.

5.4 BCM Engineers,Inc.

BCM Engineers, Inc. performs many of the environmental functions discussed in this report. Delineation plans, permit processing, mitigation plans and mitigation site construction are all performed. A discussion was held with Dr. Steve Jones of BCM on April 16, 1991 with regard to the magnitude of wetland impact costs. While specific projects could not be discussed, some general costs associated with wetlands work were provided.

Delineation costs vary slightly depending on the area of the state involved. In the Poconos area, for instance, charges for a 1500 acre tract will cost approximately $35,000. In the more industrial Bucks County region, costs will be approximately $50,000 per 1500 acres. The variance relates to the time required for the biologist to walk the site and hang flags where specific wetland plants, soils and hydrology are found. The surveying of these flags is relatively consistent.

Permit processing remains under the control of the regulatory agencies. Steve Jones remarked that all Army Corps permits require an average of one year, including returns for corrections and responses to comments. He stated that the cost to perform the permit processing varies depending on the permit type. To process a DER, permit BCM charges approximately $2,500. The processing of an Army Corps permit costs about $10,000. The length of time to receive the permit ranges from 9 months for DER to 12 months for the Army Corps.

Mitigation cost estimates include all design, monitoring and construction. BCM prefers to perform these as a package to ensure complete compliance with the regulations. An average of $40,000 to $60,000 is charged per acre for mitigation design and construction. This can vary depending on the type of wetland. A project to recapture a wetland may require up to 5 years of monitoring and will cost slightly more.

Loss of Land Value could not be estimated by BCM Engineers since it is so closely tied to the specific project. Steve Jones did mention, however, that one project realized over $1,000,000 in loss of land value due to a wetland delineation, and that one developer lost the value of one lot in his subdivision ($36,000) due to wetlands.

These estimates are summarized in Table 5.4. Delineation of a 1500 acre site and mitigation of a 10 acre site were utilized for the estimates. All owner related costs were not included since BCM Engineers could not provide an accurate estimate for these activities.

Table 5.4 Typical Estimates of Wetland Related Impact Fees Provided by BCM Engineers, Inc., Plymouth Meeting, PA

Cost Category	Performing Agent	Cost
1. Delineation Plan	BCM Engineers	$35,000 to $50,000
2. Redesign of Original Project	Owners Cost	$0
3. Permit Processing	Pennsylvania DER and Army Corps Fees	$2,500 to $10,000 and 9 months to 1 Year
4&5. Mitigation Plan, Report and Site Construction	BCM Engineers, Inc. Estimate 10 acre site $50,000 average cost	$40,000 to $60,000 per Acre

6. Company Overhead Expenses	Owners Cost	$N/A
7. Loss of Land Use	Owners Cost	$N/A
8. Extenuating Circumstances and Comments	None Noted	$0

Total Direct and Indirect Costs = $565,500, 12 Months and Undetermined Amount of Acres Lost.

5.5 Pennsylvania Builders Association Survey

The Pennsylvania Builders Association (PBA) distributed a Wetlands Questionnaire in April of 1991 to its members. The questionnaire requested information regarding the wetland permit process for projects that the members had underway. The questionnaire also stated that the information would be utilized for state legislature lobbying efforts in connection with the wetlands bill introduced by Senator Brightbill [12].

The questionnaire requested the following information from the members:

1> Project location,

2> Project description,

3> Describe nature of problem encountered,

4> How long did it take to get a permit?,

5> If your permit was denied, how much was your economic loss?,

6> Did the Chapter 105 program increase your project costs? If so, by how much?,

7> If you did obtain a permit, what changes were you required to make to the land? What were the costs and what was the economic loss?,

8> Did you have to revise your project plans because of the wetlands issue?,

9> What mitigation was required and what did it cost?,

and

10>What loss in local, state and federal tax revenues resulted in the disruption of the project?

Of the responses received by PBA, a total of nine are presented in this section to provide additional wetland impact cost data. These nine responses are all home builder firm related. The remaining responses were from farmers and industrial developers and are not included. Additionally, one response was received that provided an environmentalist view of the wetlands situation. It is included here as well to provide an appropriate contradictory viewpoint.

5.5.1 Summary of Developer Impacts Noted on Pennsylvania Builders Association Questionnaire

A summary of the comments received is provided in the order of the questions noted above:

Project A>

1> Millersville Borough, Lancaster County

2> This project involves a development of 600 to 700 single family dwelling units and an 18 hole golf course.

3> We are receiving conflicting information relative to requirements by each agency (DER and Army Corps). DER has indicated that the proposed plan is approvable, while the COE (Army Corps) has placed further restrictions and requirements on the proposed project...Our consultants have indicated that COE is requiring ten (10) times the area taken by development, to be developed for mitigation purposes...To further complicate matters Pa. DER has required that all permits be issued before a Major Earth Disturbance Permit (EDP) is issued for the project...this will hold up commencement of site improvements until all COE and DER wetlands permits are issued. These permits represent only 3-4% of the total project area. We strongly believe that...the bureaucratic morass of state and federal agencies will cost us in excess of $500,000 due to lack of coordinated efforts...and a total

indifference of agency personnel towards the economics of land development.

4> As of this date (May 6, 1991) we still do not have any of the required permits to begin.

5> Not Applicable

6> To date wetland associated work has costs us $27,440...We believe that our costs could escalate to $65,000 very easily.

7> The revisions to our plans were primarily required by two roads crossing a small stream.

8> Not Applicable

9> Not Applicable

10>We are unable to extrapolate the tax revenue loss due to this situation, however, it would seem reasonable to assume that just the cost of the wetland mitigation will not be reimbursable from the development process. With this in mind, there will be a minimum of $65,000 less profit from this venture due to wetland mitigation. A $500,000 revenue loss from not being open for play in 1992. An operating loss of over $150,000 due to maintenance of the golf course. Certainly, the taxes to be paid on $715,000 taxable income at today's current tax rates is a substantial figure.

Project B>

1> Harrisburg, PA

2> 305 Units on 165 Acres

3> Didn't know wetlands were on the property in 1986. Had to get a permit for 3 lots having a common drive over a stream. 3 lots = 15 acres. Took too long to get the permit. They made us make all crossings for a driveway conform to PennDOT standards. Very Costly.

4> 14 Months

5> Not Applicable

6> Estimated at $15,000 minimum.

7> "Wetlands replacement and we put a pond in. Major over engineering."

8> "No"

9> "Create wetlands - $3000."

10>Not Applicable

Project C>

1> Mountain Top, PA

2> 12 Acre Subdivision

3> Permit has been in process for 6-8 months. Used same consultant who did previous permit, however, DER came back wanting more and more information. Apparently keeping the clock running.

4> Pending DER Approval

5> Not Applicable

6> 60 Lots to 19 Lots

7> Add 1 acre of wetlands - time loss is the most devastating.

8> Yes - Redesigned 5 times to minimize impact on wetlands.

9> 1 acre proposed - project didn't start yet.

10>Not Available

Project D>

1> Chambersburg, PA

2> 200 acre plus golf course and residential community

3> Not being able to advise the developer as to the development potential of the land prior to land purchase or the extent of the wetlands required permits and project costs...If the farmers would stop dumping chemicals onto the land for their profit we wouldn't need as many wetlands to cure the ills they have infected the ground with for years.

4> We've applied early this year - Not even a returned call from DER yet.

5> No Response

6> Yes. $40,000 - $50,000 - It has altered our site such that redesigns were required ($20,000) - and left 30 - 40 % of 200 acres of no value to our client even though he paid money for the property.

7> No Response

8> Yes - Revisions as previously outlined which "took" land away of any use.

9> No Response

10>Being that this was a commercial and residential project, I can only estimate the tax loss to be significant - Particularly to the small municipality where we're located.

Project E>

This response, provided by a large developer/builder in the Eastern part of Pennsylvania, probably indicates the direction that land development is taking because of the wetlands issue. Bruce E. Toll, President and Chief Operating Officer of Toll Brothers, Inc., writes:

"I did not fill out the enclosed questionnaire because one of my associates in our firm has informed me that we do not have any specific problems on wetlands any longer. What we have been doing is taking wetlands into consideration when we buy property, therefore, the person who is getting hurt is the farmer. If the development becomes too costly to build, we do not build it."

Project F>

1> Upper Chichester Township, Delaware Co., PA

2> 95 - 1/4 acre single lots on 42 acres in a fairly well developed suburban area.

3> The property was purchased as a fully approved subdivision, having been approved by the township in 1973. Upon applying for stream crossing permits, we were advised that wetlands approval would be required. It took 2 years and 4 months to get the wetlands and stream crossing approved and included a fully redesigned and approved resubdivision due to street and lot line revisions as a result of wetlands compliance. Six lots were lost and 1 acre of mitigation wetlands were required in the final approval.

4> 2 Years, 4 Months

5> Not Denied

6> Yes - $232,744.00 which is $2,700 per house for $165,000.00 houses or about 2% per house.

7> Six (6) lots were lost. 1 Acre of mitigation wetlands were required. The subdivision was resubmitted as a completely new approval after having been approved in 1973. total economic loss was $232,744.00.

8> Yes - Completely resubdivided with 6 lots lost.

9> 1 acre of mitigation wetlands to be installed at an estimated cost of approximately $35,000.

10>The disruption of the project described above resulted in a loss of $15,000/year in local tax revenues, $18,000/yr in state tax revenues, $36,000/yr in federal tax revenues.
Comments - all of this was to save approximately 1 acre of what I would call, and it was substantiated by the DER inspectors, very negligible wetlands in a close-in, well built suburb. It was ridiculous.

Project G>

1> Honey Brook Township, Chester County, PA

2> 45 lot single family subdivision on 31 acres.

3> Project had conditional final approval from Township Engineer and Board, when County Conservation District asked for a wetlands survey, since the USGS maps showed an intermittent stream on the property.
The wetland survey, however, also found several springs on the property and several areas (<.5 acres), which by the current broad definition of wetlands, resulted in extensive revisions to the plans, in order to obtain culvert crossing waivers for the small "wetland" areas and to satisfy other requirements of Chapter 105.

4> Waiver was granted about 30 days after submittal of data.

5> No response

6> $50,000

7> We were able to obtain a waiver since the area of encroachment was less than 0.1 acres.

8> Several roads had to be redesigned, one lot was lost. Several lots were redefined. Stormwater facilities and calculations had to be revised. Four culvert crossings had to be added.

9> No mitigation or fees were required.

10>Project delayed one year.

Project H>

1> Berks County, PA

2> 360 unit Planned Unit Development on 76 acres

3> Purchased property in 1978. Unaware wetlands were an issue. We inadvertently created an isolated wetland (0.8acres) in 1981 by stripping topsoil. In 1987 we

redesigned the project to accommodate the major wetland (6 acres), thus losing over 80 units.

4> No Permit

5> My losses exceed $1,000,000 since 1987 and are increasing at $10,000 / month.

6> No Response

7> No Response

8> Yes. had to redesign 80% of the site including roads, sewers, etc., losing over 80 dwelling units in the process.

9> I'll gladly mitigate, just give me the damn permit.

10>The disruption of the project described above resulted in a loss of $500,000 in local tax revenues, $500,000 in state tax revenues, $1,375,000 in federal tax revenues and $150,000 in other revenues.
They can't do any more damage to me than they have already.

Project I>

1> Dillsburg, PA

2> 14 lot subdivision on 20 acres of woodland

3> Started subdivision through Carroll Township. Comments from York County Planning Commission noted possible wetland. Our engineer said, "Don't worry about it". We started to install road bed on his advice. When we were again told to address our wetland, we had to call Army Corps personally as our engineer would not do it. Army Corps made a site inspection and gave us a Cease and Desist Order. They told us to have the roadway removed immediately. That was in 1990. At present, we have about one quarter removed with no funds to do any more.

4> We have yet to apply.

5> Currently $250,000

6> We have currently started re-subdivision of what we have left. Our loss was 15 acres + or -.

7> We understand it to be a no win situation. Currently we will remove road and try to subdivide around it.

8> Yes. It is too soon to know what we will have left.

9> We must restore wetlands regardless. We are told we have the highest and best wetlands. Wooded wetlands.

10>Total taxes for original layout 1200 per unit X 14 units = $16,800.

5.5.2 Opposing Response to Pennsylvania Builders Association Questionnaire

One opposing response that was received was signed "A Member of PBA." This signature may show that the issue is becoming so important and so heated that many opposing views are left unsaid by even their own members. A few of the comments in this response are provided below:

"If you want horror stories how about this one. A flock of 300 geese head north as their ancestors have done for hundreds of years. When they reach the area where they know they will find food, rest and nesting areas they run into bulldozers, concrete, humans and other forms of garbage. The geese are exhausted and they have no place to land. How many die? How many more are unable to mate? How many offspring can't be provided for? How many generations are diminished?"

"If your organization spent its efforts on creative thinking and rehabilitating existing land and structures we would not be in danger of destroying our planet an acre at a time. I know birds don't pay taxes. They don't build malls and they don't keep us working, but they CANNOT be replaced!"

"The time has come for you to back off. We don't want to line our pockets with money earned by destroying wetlands. We want our grandchildren to say "It must be spring there go the geese" not "look Grandpa another apartment building."

5.6 Comparison of Data

The sources presented in this chapter provided wetland impact costs similar to those discussed in Chapter 4. The

comparison of these costs is completed in the same fashion as that of Chapter 4. The comparison is completed for each cost category and then for each source as a whole. Although the comparison of each cost category in Chapter 4 did not provide any consistent similarities, the individual costs for the sources in this chapter are compared to those in Chapter 4. In addition, the total costs are compared so the reader can appreciate the extent of the impacts.

5.6.1 Identification and Delineation Report

Table 5.5 summarizes the Identification and Delineation report costs provided by the four sources of information presented in this chapter.

Table 5.5 Summary of Identification and Delineation Report Costs From Other Than Residential Home Builders

Project/Source	Performing Agent	Cost
1. Control Tower NAS S.Weymouth, MA	Contract with Environmental Consultant	$64,000
2. 200 Unit Housing NWS Earle, NJ	Included in Mitigation Plan & Report	$0
3. State Route 8 Penn. DOT	PennDOT Personnel	$N/A
4. BCM Engineers Environ. Consultant	Typical Fee Charged to Customers	$35,000 to $50,000

The project that experienced a cost for the delineation report was the Control Tower at the Naval Air Station (NAS) in South Weymouth, Massachusetts. The cost is slightly higher than the costs provided by the developers in Chapter 4 and that provided by the environmental firm, BCM Engineers. The Navy did, however, have three towns to consider in the plan and the Report had to be revised several times. The estimated cost provided by BCM Engineers is

probably a reasonable estimate for an average size project of ten to twenty acres.

5.6.2 Redesign of Original Project

Table 5.6 summarizes the costs provided by the sources in this chapter for redesign of the original project as a result of the wetland identification and impact with the existing project layout.

Table 5.6 Summary of Redesign of Original Project Costs From Other Than Residential Home Builders

Project/Source	Performing Agent	Cost
1. Control Tower NAS S.Weymouth, MA	Modification to Original Design Contract	$Not Avail
2. 200 Unit Housing NWS Earle, NJ	None Occurred	$0
3. State Route 8	PennDOT Personnel	$Not Avail
4. BCM Engineers	Owners Cost	$0

The projects that did experience redesign costs could not provide an accurate assessment of the amount since it was included in the overall overhead charges to the project. As was the case in Chapter 4, no useful information is provided by this cost category.

5.6.3 Permit Processing

Table 5.7 provides a summary of the costs experienced due to permit application processing. These costs include the actual cost for the application, any contractual costs if performed by an environmental firm and the time involved in obtaining the permits. All interest charges accumulated due to the time delay to obtain the

permits and to proceed with construction of the project are included in the category titled Extenuating Circumstances. This category only includes those direct costs associated with the permit review process.

Table 5.7 Summary of Permit Processing Costs From Other Than Residential Home Builders

Project/Source	Performing Agent	Cost
1. Control Tower NAS S.Weymouth, MA	Massachusetts DEP & Army Corps	$1,000 & 2 Years
2. 200 Unit Housing NWS Earle, NJ	New Jersey Regulatory & Army Corps	$1,000 & 10 Months
3. State Route 8 PennDOT	Pennsylvania DER & Army Corps	$1,000 & 2 Years
4. BCM Engineers Environmental Consultant	BCM Engineers Penn DER & Army Corps Permits	$2,500 to $10,000 & 9 Months to 1 Year

The three projects experienced costs for permit fees in line with those experienced by the residential home builders in Chapter 4. The time required to obtain the permits also is consistent with the times experienced by the home builders. The difference between one and two years appears to be caused by the amount of corrections required by the reviewing agencies and the level of enforcement that was applied. Those agencies that apply a lot of emphasis on the wetlands protection policies generally take more time to issue the permits.

5.6.4 Mitigation Plan and Report

Table 5.8 summarizes the costs experienced due to the need for a Mitigation Plan and Report. These costs include the actual cost for the report and any contractual costs if performed by an

environmental contractor. In some cases, mitigation was not required. If the project does not impact any of the designated or delineated wetlands, the developer may not be required to provide new wetlands as mitigation.

Table 5.8 Summary of Mitigation Plan and Report Costs From Other Than Residential Home Builders

Project/Source	Performing Agent	Cost
1. Control Tower NAS S.Weymouth, MA	Contract With Soil Conservation Service	$6,000
2. 200 Unit Housing NWS Earle, NJ	Contract With Soil Conservation Service	$50,000
3. State Route 8	PennDOT Personnel	$Not Avail
4. BCM Engineers Environmental Consultant	BCM Engineers	$40,000 to $60,000 per acre

As noted in Chapter 4, this charge is often added to the cost for the Delineation Plan and Report or is included as a part of the Mitigation Site Construction. The two Navy projects noted above separated the costs and they appear to be in line with the estimate provided by BCM Engineers. The Control Tower project had less than one acre of mitigation and the 200 Units of Housing mitigated nearly ten acres of wetlands.

5.6.5 Mitigation Site Construction

Table 5.9 summarizes the costs experienced from Mitigation Site Construction. These costs include the actual cost for construction of the mitigated area and any contractual costs if they were performed by a separate firm. Any management costs experienced by the owner are accounted for in the Overhead category.

Table 5.9 Summary of Mitigation Site Construction Costs From Other Than Residential Home Builders

Project/Source	Performing Agent	Cost
1. Control Tower NAS S.Weymouth, MA	Contract with Separate Contractor Gov't Estimate - 1 Acre	$233,820
2. 200 Unit Housing NWS Earle, NJ	Contract with Separate Contractor - 10 Acres	$228,500
3. State Route 8 PennDOT	Contract with Separate Contractor - 3 Acres	$130,000
4. BCM Engineers	Included in the Cost for the Mitigation Plan and Report	$50,000 per Acre

Aside from the Control Tower project, the costs experienced by the other two projects seem to agree with the estimate provided by the environmental firm, BCM Engineers. The Control Tower project may have experienced a higher than average cost due to the three towns that were associated with the mitigation. The new wetland site was extremely restricted and the monitoring required by the contract was extensive. The costs from Chapter 4 do not agree with these costs because mitigation was not required for all the projects and the extent of the sites varied significantly.

5.6.6 Company Overhead Expenses

Table 5.10 summarizes the overhead costs experienced by the sources presented in this chapter. These costs were incurred as a result of managing the Delineation Plan, Mitigation Plan and Site Construction process and because the permits in the application process had to be tracked and corrected.

Table 5.10 Summary of Company Overhead Expenses From Other Than Residential Home Builders

Project/Source	Performing Agent	Cost
1. Control Tower NAS S.Weymouth, MA	NAVFAC Personnel and Administration	$25,000
2. 200 Unit Housing NWS Earle, NJ	Contract with Soil Conservation Service for Monitoring	$13,500
3. State Route 8 PennDOT	Only Includes Franklin Office Personnel	$67,500
4. BCM Engineers Environmental Cons.	Owners Cost	$0

The costs provided by the sources in this chapter exceed most of the costs experienced by the home builders in Chapter 4. The reason for this is related to the length of time these projects needed to obtain the permits. Those residential projects that took approximately one year to obtain the permits accumulated costs of about $10,000, and those that exceeded one year experienced far greater costs due to redesign and corrections to the application and reapplication. It appears that the data from the non-residential projects supports this finding. Those projects that exceed the one year permit processing time experience significantly higher costs.

5.6.7 Loss of Land Use

Loss of Land Use costs for the non-residential projects were not provided. The U.S. Navy and the Pennsylvania Department of Transportation do not obtain land for profitable purposes and cannot, therefore, estimate the loss of any land required for mitigation or unavailable for development. The loss of the use of the land and delays to the projects caused hardships to the project's customers, however, these hardships could not be easily estimated.

5.6.8 Extenuating Circumstances

The projects evaluated in this chapter did not experience additional costs due to increased interest on construction loans since the agencies do not borrow the funds for the projects, they receive appropriations for the projects from the federal and state legislatures and are provided the money once the project is authorized. If the project is delayed for a length of time and the construction costs increase, the legislatures may commit additional funds as necessary. These projects did not experience this situation. The true loss for this category is the unavailability of the desired product that the agencies provide. These losses, as stated above, cannot be easily estimated.

5.6.9 Total Wetland Related Project Impacts

Table 5.11 summarizes the total wetland related impact costs provided by the sources presented in this chapter. This table contains all the costs, time delays and loss of land use caused by the permit processing, delineation and mitigation preparation, and mitigation construction that occurred. These costs do not include any estimates for the loss of use of the projects due to the delays caused by the necessity to obtain authorization to proceed with the construction. These "costs" are realized by the owners yet they cannot be easily estimated.

Table 5.11 Summary of Total Wetland Related Project Impacts From Other Than Residential Home Builders

Project/Source	Costs	Time Delay
1. Control Tower NAS S.Weymouth, MA	$329,820, 0 Acres	2 Years

2. 200 Unit Housing NWS Earle, NJ	$293,000, 0 Acres	10 Months
3. State Route 8 PennDOT	$198,500, 2 of 4 Lanes	2 Years
4. BCM Engineers Environmental Cons.	$565,500	12 Months

The total costs due to the impact of wetlands do provide a usable reference for developers since the costs experienced by the non-residential projects closely mirror the costs experienced by the residential home builders. The main observations from the costs include:

- Of the nine projects presented, five experienced costs from $200,000 to $400,000.
- The remaining projects varied according to the stage the project was in at the time of the wetland identification.
- The discovery of significant wetlands has caused the regulatory agencies to extensively review the permit application to ensure proper protection of the wetlands.
- Media Real Estate realized over $700,000 in impacts since the delay was for over three years. The interest charges on the outstanding construction loan added significantly to the total cost.
- BCM Engineers estimate exceeds the $200,000-400,000 range yet their estimate was for a mitigation site of ten acres. The average mitigation site constructed by the projects researched, not including the Pinecrest Development, is approximately three to four acres.

5.6.10 Pennsylvania Builders Association Survey

The responses to the survey provided little quantitative information to back up their total wetlands impact costs. Table 5.12 provides a summary of the total costs provided.

Table 5.12 Summary of Total Wetland Related Project Impacts Provided By The Pennsylvania Builders Association Survey

Project/Source	Costs	Time Delay
1. 600 to 700 Housing Units Millersville Boro.	$27,440 to $65,000	Unknown
2. 305 Housing Units Harrisburg	$15,000 Minimum	14 Months
3. 12 Acre Subdivision Mountain Top	$Unknown 60 Lots to 19 Lots	6-8 Months So Far
4. 200 Acre Golf Course and Housing Chambersburg	$40 to 50,000	6-8 Months So Far
5. 95 Housing Units Delaware Co.	$232,744, 6 Lots Lost	28 Months
6. 45 Housing Units Honey Brook	$50,000	1 Year
7. 360 Housing Units Berks County	>$1,000,000 80 Units lost	Over 3 Years
8. 14 Lot Subdivision Dillsburg	$250,000 Lost 15 of 20 Acres	1 year

Of the eight projects that reported losses, three estimated their losses to be under $100,000. The projects were not completed as of the survey submission, and it appears from the responses that additional expenses may be necessary. Two of the responses reported losses of over $200,000 and these also expect additional wetland related costs. The most vocal response reported expenditures of over $1,000,000 with an additional $10,000 per month in interest charges accumulating. It is obvious from these responses, and from the other projects researched, that wetland related costs can be significant. Of the seventeen projects with wetland related costs, nine report expenditures in excess of $250,000. In some cases the expenditures reach five to seven percent of the original project budget. If typical project profits are estimated to be in the range from ten to fifteen percent, wetland expenditures place many projects close to the unprofitable range.

5.7 Chapter Summary

This chapter provides the wetland related cost data for several non-residential home building projects. The costs are compared to those from the residential home building projects discussed in Chapters 3 and 4. While many of the categories developed in Chapter 3 do not provide consistent costs, the total wetland related impact costs do average around $200,000 to $400,000 per project. It should be noted that the permit application process causes most of the additional costs by requiring the developers to carry their construction loans beyond the time originally anticipated. This is made more significant when the process extends beyond the minimum one year review period. The overhead costs also grow significantly when the permit review extends beyond this one year time frame. This may be attributed to the fact that many corrections are required to the wetlands permit application, causing additional delays beyond the 'normal' review time.

The main concern of many developers is that their wetland related expenditures are hard to determine prior to the beginning of construction. Again, the permit processing procedure causes most of the uncertainty as the interest on the loans for land purchase and construction accrues longer than anticipated. The developer from Berks County may have summed up the frustrations of many developers when he said "I'll gladly mitigate, just give me the damn permit."

The Pennsylvania Builders Association Survey responses provide some insight into the attitudes of the developers as they attempt to deal with the cumbersome wetlands protection regulations. Many of the responses suggest that the procedures need to be revised to allow fair and equitable treatment of the developer's applications. The permit review process provides the most discomfort to the developers since the process is so long and the requirements are so uncertain. The requirements for Delineation and Mitigation are clearly understood by the

environmental community and the developers have learned how to obtain this necessary documentation. The permit review process has changed so extensively during the past few years that the developers are uncertain about what is actually required. It often appears that one project obtains a permit with certain criteria met and the next project, with the same criteria, is disapproved. The regulatory agencies should establish criteria that are clear, understandable and enforceable and provide education to the developers so that the uncertainty can be eliminated.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

6.1 Conclusions

6.1.1 Summary

The purpose of this report was to determine if consistent costs could be identified for various wetland impacts. If consistent costs could be determined, developers and owners could include these figures in their project estimates for wetlands located on the site.

Chapter 2 described the current regulations governing wetland protection at the federal and Pennsylvania state level. The regulations are explained to provide project managers with a basic understanding of the requirements for development adjacent to existing wetlands.

The impacts were divided into the following eight categories and described in detail in Chapter 3:

- Identification and Delineation Plan and Report
- Redesign of Original Project
- Permit Processing
- Mitigation Plan and Report
- Mitigation Site Construction
- Company Overhead Expenses
- Loss of Land Use and
- Extenuating Circumstances.

These impact cost categories were explained to developers and project managers by the author and actual or estimated costs were

then obtained from the project records and responsible managers. Unfortunately, many of the projects had been completed or were close to completion at the time of the investigation and separating the costs according to these categories proved nearly impossible due to lump sum figures for items such as mitigation and delineation, redesign and overhead expenditures, etc. The cases that contained these lump sum figures are noted in the summary charts.

Chapters 3 and 4 present costs from six residential home builder projects in Pennsylvania that experienced impacts due to wetlands on their sites. Additionally, costs from two non-residential projects, one residential project in New Jersey and from an environmental consulting firm in Pennsylvania are presented in Chapter 5 to provide a comparison with the residential projects. Responses to a survey established by the Pennsylvania Builders Association are also included to provide additional cost data.

The cost data comparisons provided wide ranges of impacts for all the projects researched, both residential and non-residential. A summary of the results is provided below.

6.1.2 Identification and Delineation Report

The projects and sources of information researched provided costs from $0 up to $250,000 for this category. Most of the costs were approximately $50,000. The impacts varied significantly due to the stage the project was in at the time of wetland discovery. If the project was nearly complete when the wetlands were discovered, the developers did not have to produce a complete delineation plan for the entire project, thereby reducing the cost of the report. If the project impacted a minor area, the delineation requirement could be waived altogether. Those projects that delay construction and develop a complete delineation plan find that the size of the site causes significant differences in the cost of the plan. The $250,000

delineation plan mentioned was for an extensive wetland area that contained several environmentally valuable sites.

6.1.3 Redesign of Original Project

Redesign costs were difficult to compare. Several of the projects required redesign, however, the costs were not separated and reported as redesign costs, they were often included as overhead expenses or as changes to existing contracts. In all, five of the nine projects researched were redesigned. Two of these reported costs of approximately $30,000. Neither project required extensive changes to the layout of the development, however, one project did have to relocate an entrance that reduced the number of usable lots that could be developed. These costs are contained in a separate category.

6.1.4 Permit Processing

Permit Processing provided the most consistent data. Costs varied from $200 to $2,000 for all nine projects. The time required to obtain the permit proved to be the most troubling for the developers as it ranged from a low of nine months to over three years and still counting at the time this report is being written. Many of the developers stated that the direct cost of the permit was *not* a concern at all. The length of time necessary to obtain the permit proved to be the cause of the greatest concern and, most often, the greatest cost. Accrued interest on construction loans during the permit review process created substantial costs for some of the developers interviewed. These costs are covered under the category entitled Extenuating Circumstances.

The permit proces also proved to be the most confusing for the developers. The regulations concerning the proper application procedures appear to change frequently. Some of the developers

complained that one of their projects would pass the review with certain criteria established and the next would not. The utilization of the wetland as a tertiary filtration system was recommended at one time and is now forbidden. The buffer zones surrounding wetlands continue to be a subject of controversy. The argument regarding the classification of a wetland, as critical or environmentally important, designates the zone as 50' or 100'. This additional 50' around a wetland area can consume a significant amount of land.

6.1.5 Mitigation Plan and Report

As noted with regard to the Delineation Plan, the Mitigation Plan costs for many of the projects were combined into other categories. Once the need for the Mitigation Plan was established, the developers typically added the necessary work to the existing contract for the Delineation Plan. Two of the non-residential developers reported costs from $6,000 to $50,000 for this plan. The environmental consulting firm estimated the cost for a Mitigation Plan at $40,000 to $60,000 per acre. It appears from the the data collected on two projects that this cost is probably accurate.

6.1.6 Mitigation Site Construction

Construction of a mitigation area was accomplished by six of the nine developers. Their costs ranged from $15,000 to $250,000. The differences are attributed to the area of mitigation required and the length of monitoring required by the regulatory agencies. The costs were also impacted by the amount of additional supervision that was performed by the local regulatory agencies during the construction.

6.1.7. Company Overhead Expenses

All of the nine projects researched reported added overhead expenses due to the presence of wetlands. The costs range from $10,000 to over $1,400,000. Those projects that experienced costs of approximately $10,000 were usually able to obtain the required permits within one year of submission. Some of the projects may have included redesign costs in this category which therefore caused this cost category to be inflated. The project that experienced over $1,400,000 in expenses is an extensive resort community underway in the Pocono Mountains. The developer has invested a significant amount of money in the development and has spent a great deal of legal and technical effort in trying to obtain the necessary permits to resume construction of the housing units and athletic facilities. The permits have been "in process" for over three years, adding to the expenses for the developer.

Under normal circumstances, assuming that: (1) the permits can be obtained within one year after submission, (2) the wetland area is not environmentally significant and (3) the local township requirements are not too strict, developers should be able to restrict additional overhead expenses to $15,000 for wetland related actions.

6.1.8 Loss of Land Use

This category proved to be one of the most difficult to determine. Several of the non-residential projects were government funded and loss of land for wetland protection was not realized. Three of the residential projects did estimate losses based on the total area that had to be reserved for wetlands. These losses range from two lots at the Sugar Hollow Homes development ($80,000) to over $3,600,000 for improvements already installed at the Pinecrest Development. The owner considers these to be losses until the

revised design is approved because if he is not allowed to continue improvements he will not realize a profit on the project.

Loss of Land Use depends solely on the amount of wetlands contained within the boundaries of the project site and the amount of wetlands that the regulatory agencies will allow to be filled or destroyed.

6.1.9 Extenuating Circumstances

This category lists all reasons for variances of the reported costs for the projects studied. Additionally, any other costs not associated with the seven noted categories are included in this section. The primary costs that are included are for interest on construction loans and increased cost of construction due to the delays associated with the permit process. Three of the nine projects reported costs for additional interest on the construction loans and increases in the amount of the construction contracts due to the delays with the permits. The additional expenditures range from a low of $324,000 to over $1,000,000. Obviously, the amount of additional expense depends directly on the amount of the construction loan or contract. The larger projects will experience significantly higher expenses in this category and those projects delayed the longest will also incur the largest expenses. Developers should estimate these added expenses based solely on the particular situations involving their projects.

6.1.10 Total Wetland Related Project Impacts

All of the projects researched experienced wetland related impacts. The impacts varied from $81,000 for the Sugar Hollow Homes project to over $6,000,000 for the Pinecrest Development. Other than the Pinecrest Development project, the majority of the projects reported expenditures within three to seven percent of the

original project budget despite the differences in (1) the stage of construction that the project was in, (2) the wetland characteristics that existed, (3) the regulatory and local agencies that were involved, and (4) the type of project (residential vs. non-residential).

Larger mark-ups can be attributed to the following characteristics that increase the costs to developers:

- delays to active construction contracts
- extended payment on construction loans due to delayed completion of the project
- extensive legal and technical expenses required for environmentally sensitive wetlands, and
- permit processing in excess of the standard one year period.

These four situations provide the largest expenses to the developer. Actively planning to avoid these situations will reduce the amount of impacts paid due to wetlands. Delineation, Mitigation and Overhead charges have become fairly consistent and can be readily estimated. Many environmental firms have become familiar with the regulatory requirements and can produce the necessary documentation within a reasonable period for fairly consistent prices.

6.2 Recommendations for Further Research

In order to determine the extent of the impacts due to wetlands that were experienced by residential home builders, the regulatory requirements were examined to provide an understanding of the steps necessary to develop a project adjacent to an existing wetland. The research discovered that the permit application review process provided the most problems for the developer. If the review process extended the project completion and subsequently the use of the facility, significant costs were experienced by the developers for additional interest charges and

delay costs. This process varies, often significantly, from project to project and state to state. The application process should be standardized to enable developers and land owners to better understand the process. To standardize the process, the federal regulatory agencies, in conjunction with the state and local agencies, must develop and institute legislation that establishes these regulations as law. Only then can all parties fairly coexist with the need for wetland protection. The following section provides recommendations for further research that could assist in this process.

1> This research provided some insight into the legislative actions in process at the time of this writing. Research should be conducted in conjunction with these agencies to determine the exact level of protection of wetlands that is required to ensure that this valuable resource is available for the next generation. More specifically, a better understanding of the value of wetlands must be established. Certain wetland areas provide significantly more benefits than others. Some areas of the country have more than enough wetlands to support man and wildlife, and others need to strongly protect those that are left. The value of various wetlands must be determined and catalogued to ensure that those that are the most valuable and necessary are protected.

2> The permit review stage involves a lengthy, cumbersome and bureaucratic process that tests the wills of developers and environmentalists alike. Research should be undertaken to determine how this process can be shortened and simplified. Many developers have noted that higher permit fees would be acceptable if the review time could be limited to six months or a year. With all the entities that must review the application, an extensive administrative system would be required to guarantee this time limitation. With higher permit fees provided directly to the regulatory

agency primarily responsible for the application, expanded staffs could be dedicated to handle these permits. The research should identify the various steps in the review process and determine potential time savings and costs associated with the process. One such situation exists in regard to the number of reviewing agencies. The federal government allows several regulatory agencies to review wetland permits. This situation extends the review process unnecessarily. One of the federal agencies should be tasked with regulation and be responsible for all facets of this task. Additional research into the actual responsibilities of these agencies may determine how best to combine authorities to better serve the developers and to protect the wetlands.

3> Many lawsuits have been filed that may reshape the regulations protecting wetlands. The courts will decide if federal and state protection of wetlands on private property constitutes a 'takings' that would entitle the owner to just compensation. If this occurs, the price to protect these wetlands may become too expensive to continue. Research into the results of these cases is necessary to understand the economic impacts to wetland protection.

4> Developers will continue to purchase lands that contain wetland areas. As the regulations become clearer, developers will better understand the costs associated with development adjacent to wetlands. One of these costs, interest expenses, varies greatly with the circumstances surrounding the project site. Items such as (1) the environmental importance of the wetlands, (2) the agencies reporting jurisdiction over the wetlands, (3) the public image of the project and (4) the total amount of money to be borrowed to construct the project are a few of the many factors that may influence the review time for the permit application and ultimately the cost of borrowing the necessary construction funds. A mathematical cost model, describing these many factors and allowing for various weights of each category depending on its characteristics, would enable the developers to clearly understand the risks and costs associated with a potential development.

6.3 Final Comment

Wetlands will continue to be a major source of public debate as the environmental decade continues. More and more of the population will continue to move to less populated areas. These areas undoubtedly will contain wetland areas. Due to the significant engineering achievements of the last few decades, wet areas can be developed very profitably. Those that envisioned this trend and purchased these wet areas at relatively low prices are suddenly realizing that their investments may not be profitable due to the realization that these areas are valuable to the ecological cycle. As these cases continue, the federal, state and local governments must prepare regulations to deal with the differences that will occur. Only through a combined effort of the environmental and development communities will this issue be resolved to the satisfaction of all concerned.

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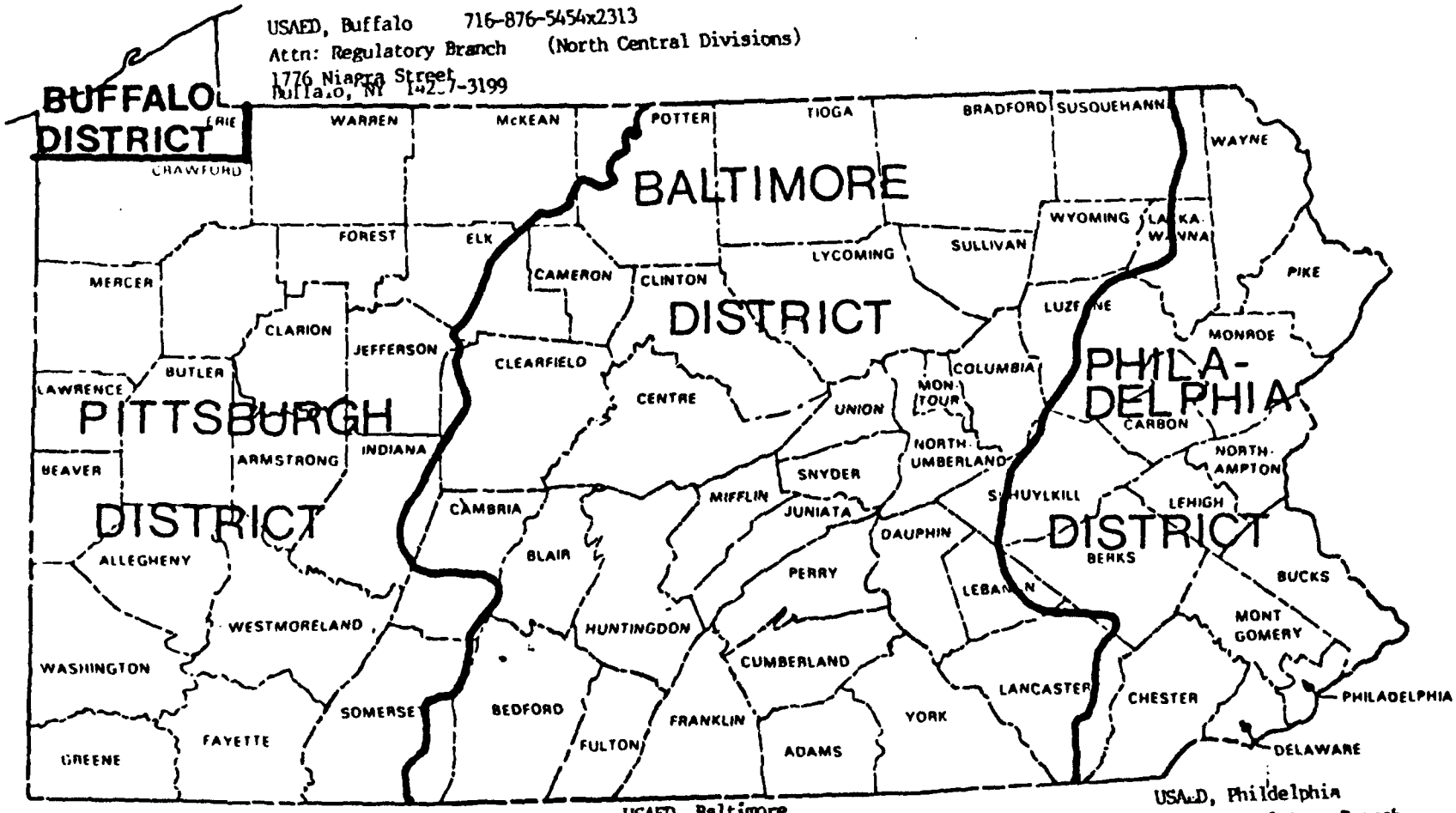
Appendix A

ARMY CORPS OF ENGINEERS DISTRICT OFFICES IN THE COMMONWEALTH OF PENNSYLVANIA

STATE OF PENNSYLVANIA



USAED, Buffalo 716-876-5454x2313
Attn: Regulatory Branch (North Central Divisions)
1776 Niagra Street
Buffalo, NY 14207-3199

USAED, Pittsburgh
Attn: Regulatory Branch
Federal Building
1000 Liberty Ave.
Pittsburgh, PA 15222-4186
-412-644-4204
(Ohio River Division)

USAED, Baltimore
Attn: Regulatory Branch
P.O Box 1715
Baltimore, MD 21203-1715
-301-962-3670
(North Atlantic Division)

USAED, Philadelphia
Attn: Regulatory Branch
U.S. Customs House
2nd & Chestnut St.
Philadelphia, PA 19106-2991
(North Atlantic Division)

Appendix B

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES AND THE U.S. ARMY CORPS OF ENGINEERS JOINT PERMIT APPLICATION

ER–DWM–31: 8/85

JOINT PERMIT APPLICATION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF DAMS AND WATERWAY MANAGEMENT

DEPARTMENT OF ARMY
(Baltimore, Buffalo, Philadelphia, Pittsburgh Districts)
Corps of Engineers

Agency Use Only
Application # _____
Fee _____

If additional space is needed to complete application, use plain bond paper and attach to application. Reference section and item number for all information.

SECTION I-A Registration

1. This application shall be completed in triplicate (3 copies) and forwarded to the Department of Environmental Resources, Bureau of Dams and Waterway Management, P.O. Box 8554, Harrisburg, PA 17105-8554, for processing and disposition. **Three complete applications with 3 copies of all supporting documents required on the application form must be submitted or the application will be returned as incomplete.** (One copy for each: Pennsylvania Fish Commission, Department of Environmental Resources, and Army Corps of Engineers).

2. Owner/applicant name, address and telephone number
(Type or Print)

3. Name and title of authorized agent/preparer, address and telephone number is designated and authorized to act in my behalf as my agent in the processing of this permit application and to furnish, upon requests, supplemental information in support of the application.

4. Type of Ownership– ☐ Privately owned ☐ Corporation ☐ Government Agency ☐ Partnership

Identify municipality (township, borough, city) and county where project is located.
Municipality _____ County _____

6. Identify name of stream or body of water with which project is associated. _____

7. Attach evidence of municipal and county notification. (See instruction booklet).

8. Sketch plan and detail plans [Army Corps and State.] (See instruction booklet and Appendix III)

9. Check the corps district where your activity will occur. (See instruction booklet)
☐ Baltimore ☐ Philadelphia ☐ Pittsburgh ☐ Buffalo

10. Is any portion of the activity for which authorization is sought now complete? ☐ Yes ☐ No
If answer is "Yes" give reasons, month and year the activity was complete. Indicate the existing work on drawings or plans.

11. Narrative of Project (include detailed description, necessity and purpose–see example in instruction booklet)

12. List all approvals or certifications and denials received from other federal, interstate, state or local agencies for any structures, construction, discharges or other activities described in this application.

13. Attach a copy of the Erosion and Sedimentation Control Plan and letter of review by the County Conservation District.

14. State Fees and Regulatory Authority:

In compliance with the provisions of the Act of November 26, 1978, P.L. 1375, as amended (32 P.S. §693.1 *et seq.*) known as the "Dam Safety and Encroachments Act"; Act of October 4, 1978, P.L. 851 (32 P.S. §679.101 *et seq.*), known as the "Flood Plain Management Act"; and the Administrative Code, Act of April 9, 1929, P.L. 177, as amended, the Department of Environmental Resources is empowered to exercise certain powers and perform certain duties by law vested in and imposed upon the Water Supply Commission of Pennsylvania and the Water Power Resources Board. These State Acts cover broad areas and items such as stream encroachments, riprap, etc. which require consent or permit of the Department of Environmental Resources. These Acts include but are not limited to water obstructions such as any dike, bridge abutment or other structures located in, along, across or projecting into any watercourse, floodway, or body of water.

Effective September 27, 1980, all applications for Department of Environmental Resources permits, except those submitted by federal, state, county or municipal agencies, must be accompanied by a check payable to the "Commonwealth of Pennsylvania" in accordance with the following schedule:

Bridge Over 15 Foot Span	$100
Enclosures	$100
Channel Changes	$100
Commercial Dredging	$100
All Others	$ 50

A single application may be submitted or a single permit may be issued for multiple structures and activities which are part of a single project or facility or part of related projects and facilities, located in a single county, constructed, operated, or maintained by the same person or persons. Where a single application covers multiple structures or activities other than a single structure and related maintenance dredging, the application fee shall be the sum of fees set forth above for the applicable structures and activities but shall not exceed $600. All stream crossings located within a single county for the installation of a public service line shall be treated as a single structure or activity.

Enclosed is _____ dollars as fee for the proposed project.

15. Federal Fees and Regulatory Authority:

The Department of the Army (Corps of Engineers) permit program is authorized by Sections 9 and 10 of the River and Harbor Act of 1899 (33 U.S.C. 401 and 33 U.S.C. 403), Section 404 of the Clean Water Act (33 U.S.C. 1344), and Section 103 f the Marine Protection Research and Sanctuaries Act of 1972 (33 U.S.C. 1413). These laws require permits authorizing structures and work in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and transportation of dredged material for the purpose of dumping it into ocean waters. Information provided in this form will be used in evaluating the application for a permit. Information in the application is made a matter of public record through issuance of a public notice. Disclosure of the information requested is voluntary; however, the data requested is necessary in order to communicate with the applicant and to evaluate the permit application. If the necessary information is not provided, the permit application cannot be processed nor can a permit be issued. An application that is not completed in full will be withdrawn.

Do not send a pemit processing fee with the copy of the application to be forwarded to the District Engineer of the Department of Army. An additional fee will be assessed when the corps is ready to issue the permit. No fee will be charged for pe its issued to federal, state, county or municipal agencies.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jursidiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

This application, together with all maps, plans, profiles and specifications, and all papers, information and data filed in connection therewith, will remain on file in the Department of Environmental Resources and with the U.S. Army Corps of Engineers.

16. Certification

A. The application must be signed by the applicant. If privately owned, the individual owner(s) must sign. For partnerships, one or more members authorized to sign on behalf of the entire partnership must sign. Signatures of the president, vice president, secretary or treasurer are required for corporations, and the corporate seal shall be affixed. For political subdivision, we require signatures of the officer or officers empowered to sign for the subdivision with the political subdivision's seal affixed and attested by the clerk. Signatures other than above must be accompanied by a power of attorney or other document indicating authorization.

B. Application is hereby made for a permit to authorize the activities described herein. I certify I am familiar with the information contained in this application, and to the best of my knowledge and belief such information is true, complete and accurate, I further certify I possess the authority to undertake the proposed activities.

C. I certify that the project proposed in this application complies with and will be conducted in a manner that is consistent with the approved Coastal Zone Management program of the Commonwealth of Pennsylvania. (Only portions of Erie, Bucks, Philadelphia, Delaware, and Chester Counties, are in the Coastal Zone, see instruction booklet for specific detail)

By: _____
(Print Name)

_____
(Signature) (Date)

SEAL

_____
(Title)

Witness: _____
(Date)

SECTION I-B General Information

1. All projects require 3 sets of plans. For complex project (e.g. highways, housing projects...etc.) one set of full size drawings with sufficient detail to understand and evaluate the project shall also be submitted. (See instruction booklet Appendix III and applicable Subchapter of Chapter 105, Dam Safety and Waterway Management Rules and Regulations.)

2. Names, addresses and telephone numbers of property owners, lessees, etc. whose property adjoins body of water adjacent to project area.

_____

_____

_____

_____

3. Identify type activity
   Check the appropriate block below that best describes your project and complete the requirements of the applicable subchapter noted and contained in Chapter 105. Dam Safety and Waterway Management rules and regulations.

   - ☐ Culverts And Bridges (Subchapter C)
   - ☐ Stream Enclosures (Subchapter D)
   - ☐ Channel Changes And Dredging For Facility Construction And Maintenance (Subchapter E)
   - ☐ Fills, Levees, Floodwall And Streambank Retaining Devices (Subchapter F)
   - ☐ Stream Crossings, Outfalls And Headwalls (Subchapter G)
   - ☐ Docks, Wharves, And Bulkheads (Subchapter H)
   - ☐ Commercial Dredging (Subchapter I)
   - ☐ Discharges Of Dredged Or Fill Material (Subchapter J)

4. What is the maximum acreage that will have its original vegetative ground cover disturbed in acres _____

5. Does proposed project impact wetlands? ☐ yes ☐ no If yes # of acres to be filled _____ ; # of acres to be impacted.

SECTION II Site Location

1. Provide written location of project site by noting distance from stream/road and/or nearest road intersection — *example* (north side of Route 96, 6 miles east of the intersection of route 96 and L.R. 25220 or east side of Slippery Creek, 1000 ft. north of the intersection of Slippery Creek and PA Rte. 33)

_____

_____

2. Location map identification of proposed activities.
   A. Topographic map coordinates
      1. Lat. & Long. _____
      2. Identify U.S.G.S. 7.5 minute quadrangle _____
   B. Attach U.S.G.S. Topographic map, or copy thereof or other similar mapping, indicating project location *(note: all maps submitted are to be 8½" x 11" in size or folded to this size)*

3. Attach copy of floodway boundaries as indicated on maps from flood insurance studies provided by municipality (fema mapping) (if applicable)

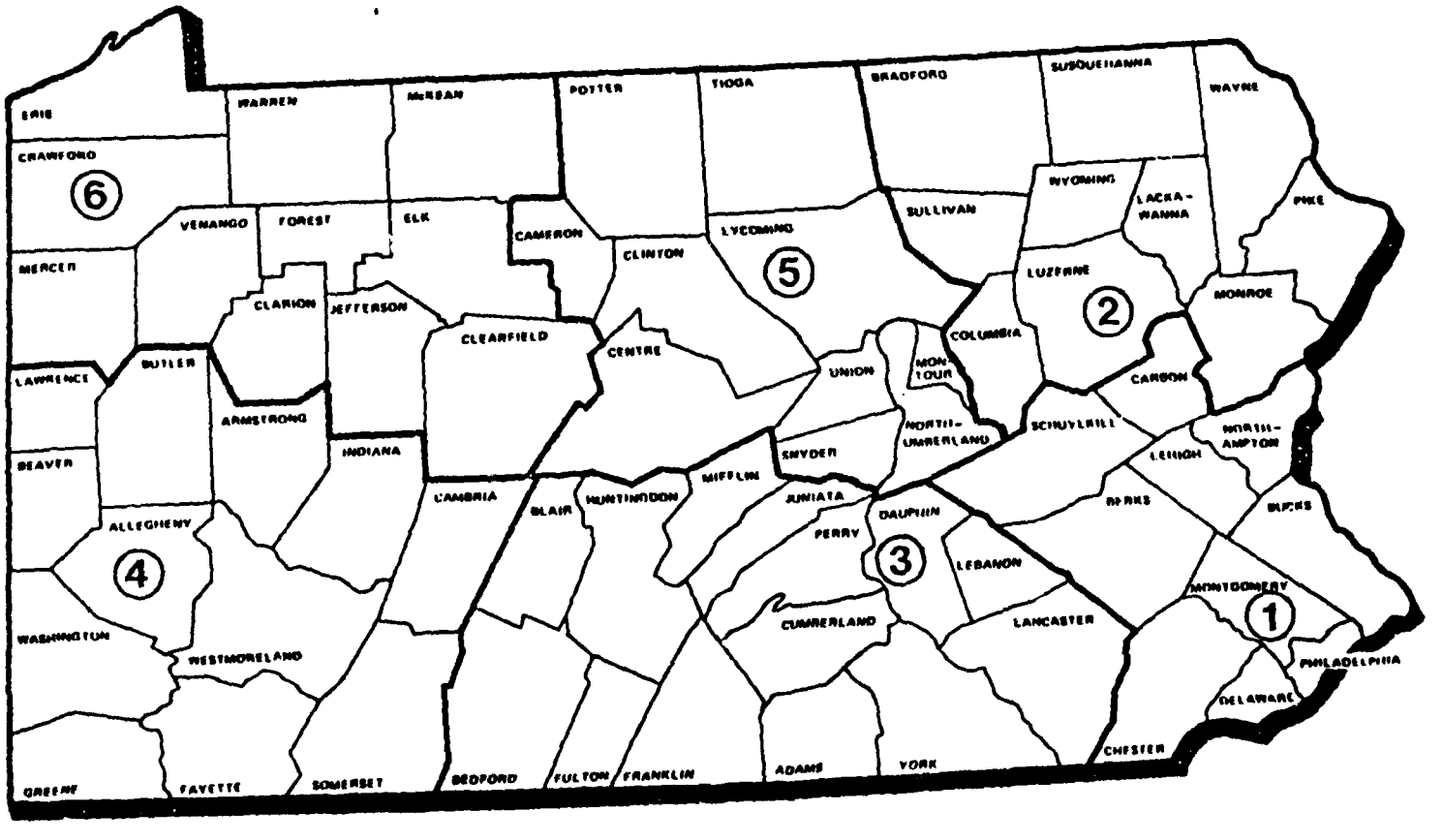
4. Is the project located in a watershed with an approved storm water management plan? ☐ yes ☐ no

5. Any project which crosses a stream or body of water involving a pipeline, aerial crossing, road...etc., a point to point map identifying where construction of the project begins and ends must be submitted with the permit application. The map should be a 7.5 minute U.S.G.S. topographic map or copy thereof with the quadrangle name.

Appendix C

DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF DAMS AND WATERWAY MANAGEMENT
DIVISION OF FIELD OPERATIONS
AREA OFFICES

DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF DAMS AND WATERWAY MANAGEMENT
DIVISION OF FIELD OPERATIONS
AREA OFFICES



AREA OFFICES

(1) SOUTHEAST
(2) NORTHEAST
(3) SOUTHCENTRAL
(4) SOUTHWEST
(5) NORTHCENTRAL
(6) NORTHWEST

—— Area boundary

DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF DAMS AND WATERWAY MANAGEMENT

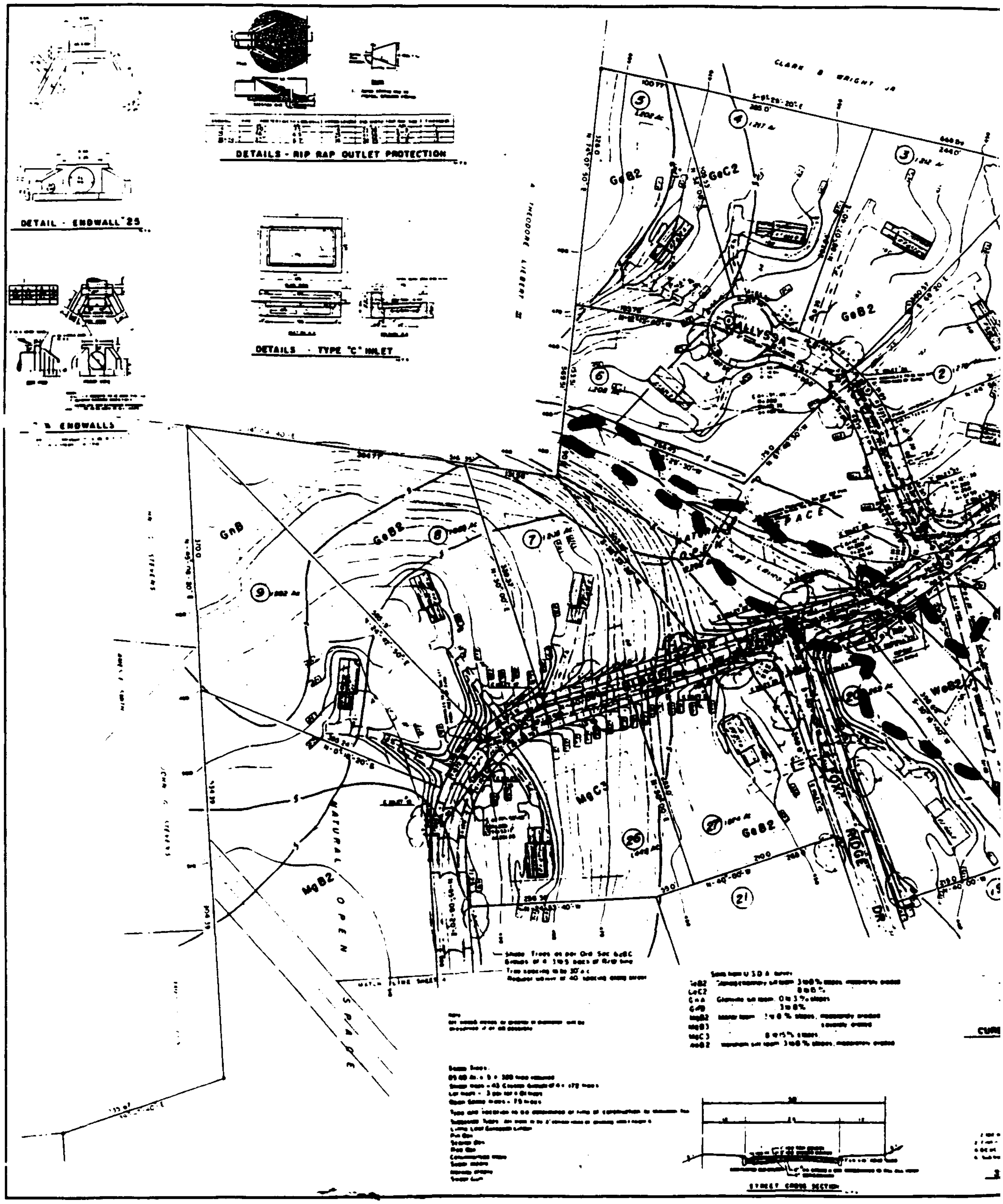
Area Office	County Responsibility
Southcentral Area Office 116 Executive House P. O. Box 2357 Harrisburg, PA 17120 717-783-9726	Adams, Bedford, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry and York
Southeast Area Office 3661 Skippack Pike Harleysville, PA 19438 215-584-5566	Berks, Bucks, Carbon, Chester, Delaware, Lehigh, Northampton, Montgomery, Philadelphia and Schyulkill
Southwest Area Office R.D. #1, Box 120A Clinton, PA 15026 412-899-2377	Allegheny, Armstrong, Beaver, Butler, Cambria, Fayette, Greene, Indiana, Lawrence, Somerset, Washington and Westmorland
Northwest Area Office 190 Adams Road Jamestown, PA 16134 412-932-5269	Clarion, Clearfield, Crawford, Elk, Erie, Forest, Jefferson, McKean, Mercer, Venango and Warren
Northeast Area Office 93-95 North State Street Wilkes-Barre, PA 18701 717-826-2371	Bradford, Columbia, Lackawanna, Luzerne, Monroe, Pike, Sullivan, Susquehanna, Wayne and Wyoming
Northcentral Area Office 200 Pine Street Williamsport, PA 17701 717-327-3574	Cameron, Centre, Clinton, Lycoming, Montour, Northumberland, Potter, Snyder, Tioga and Union

BUREAU OF DAMS AND WATERWAY MANAGEMENT CENTRAL OFFICE
P. O. Box 2357
Harrisburg, PA 17120
717-783-1384

Appendix D

WESTFIELD CONSTRUCTION INC.
PROJECT SITE LAYOUT AND WETLAND BOUNDARIES

Appendix D contains two sheets of the construction plans for the Fox Ridge Farm project built by the Westfield Construction Company. The plans were developed by the firm of G.D. Houtman & Sons, Inc. The sheets, numbered 3 and 4 of 8, show the location of the wetlands and the area where the wetlands affected the road crossing at Fox Ridge Drive. The wetlands are annotated and bordered by a dashed line.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DETAIL - ENDWALL 25
DETAILS - TYPE "C" INLET
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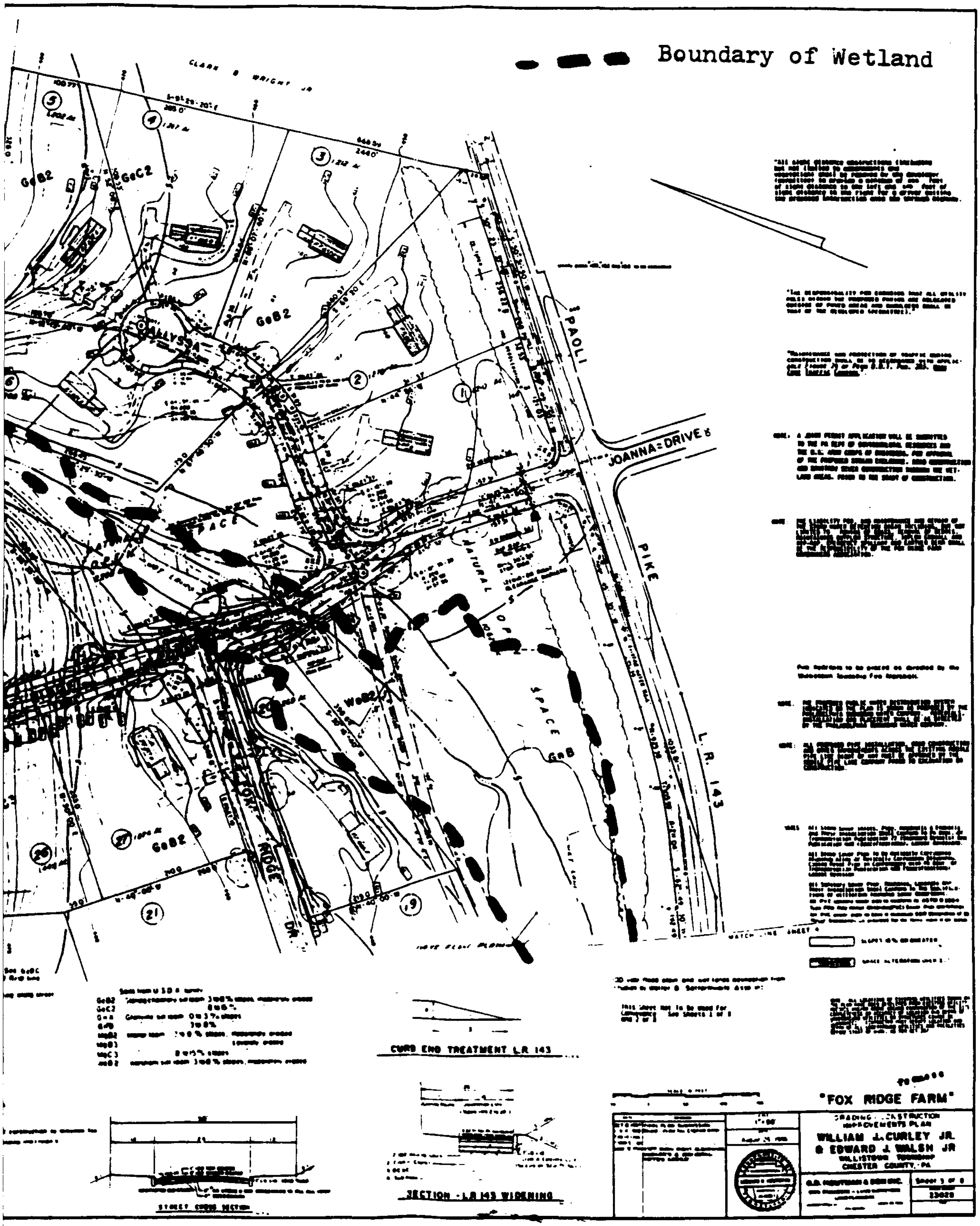
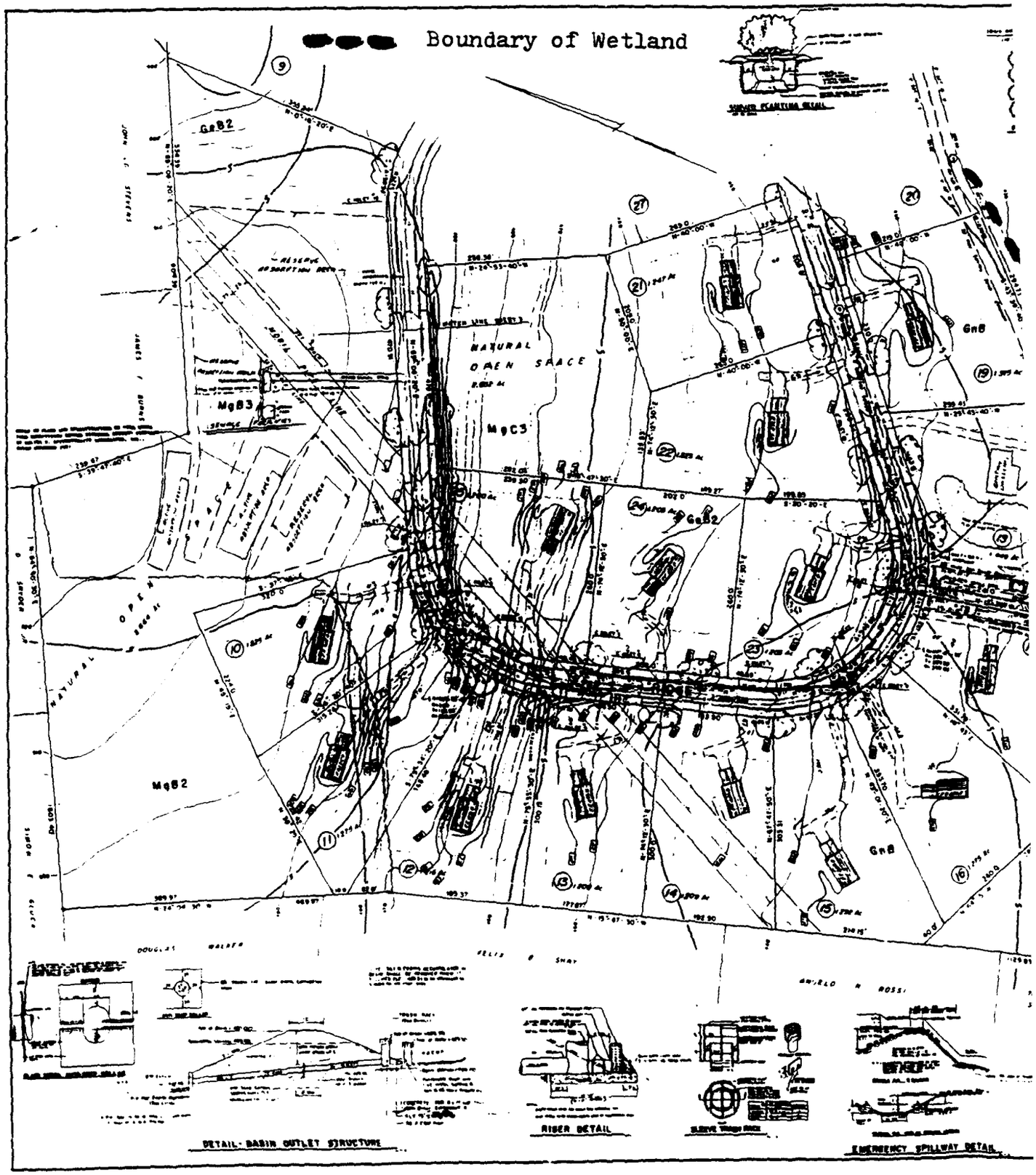
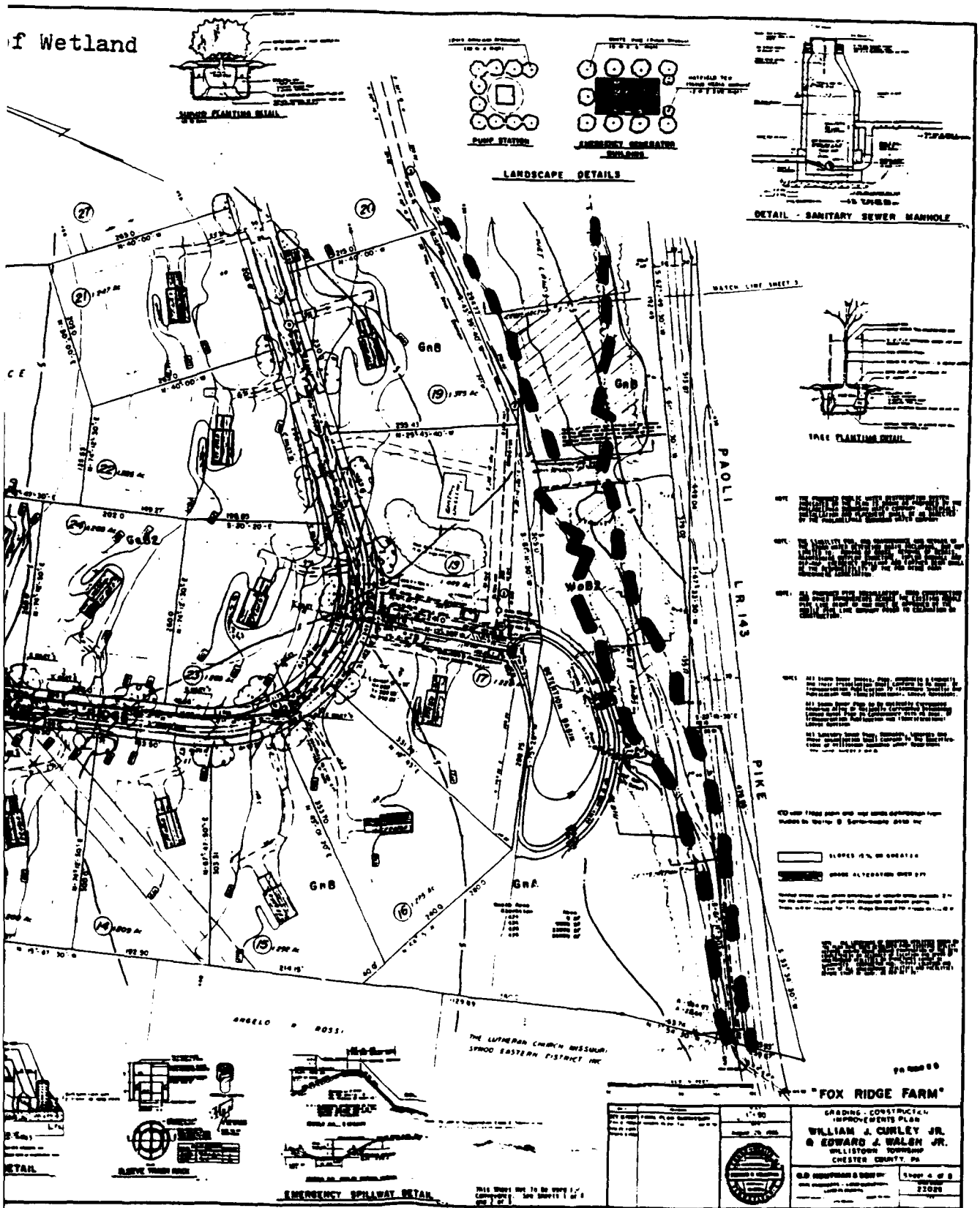
CLARK B WRIGHT JR
GeB2
GeC2
GnB
MgB2
MeC3
NATURAL OPEN SPACE
RIDGE DR
STREET CROSS SECTION


Boundary of Wetland
PAOLI
PIKE
JOANNA DRIVE
L.R. 143
GeB2
GeC2
WeB2
GeB
CURB END TREATMENT L.R 143
SECTION - L.R 143 WIDENING
"FOX RIDGE FARM"
WILLIAM J. CURLEY JR.
& EDWARD J. WALSH JR
CHESTER COUNTY, PA

2


Boundary of Wetland
GaB2
MgB3
MgC3
MgB2
GnB
NATURAL OPEN SPACE
DETAIL - BASIN OUTLET STRUCTURE
RISER DETAIL
EMERGENCY SPILLWAY DETAIL


f Wetland
LANDSCAPE DETAILS
DETAIL - SANITARY SEWER MANHOLE
TREE PLANTING DETAIL
PAOLI PIKE
LR 143
GnB
GnA
GnB2
WoB2
"FOX RIDGE FARM"
WILLIAM J. CURLEY JR.
& EDWARD J. WALSH JR.
EMERGENCY SPILLWAY DETAIL

2

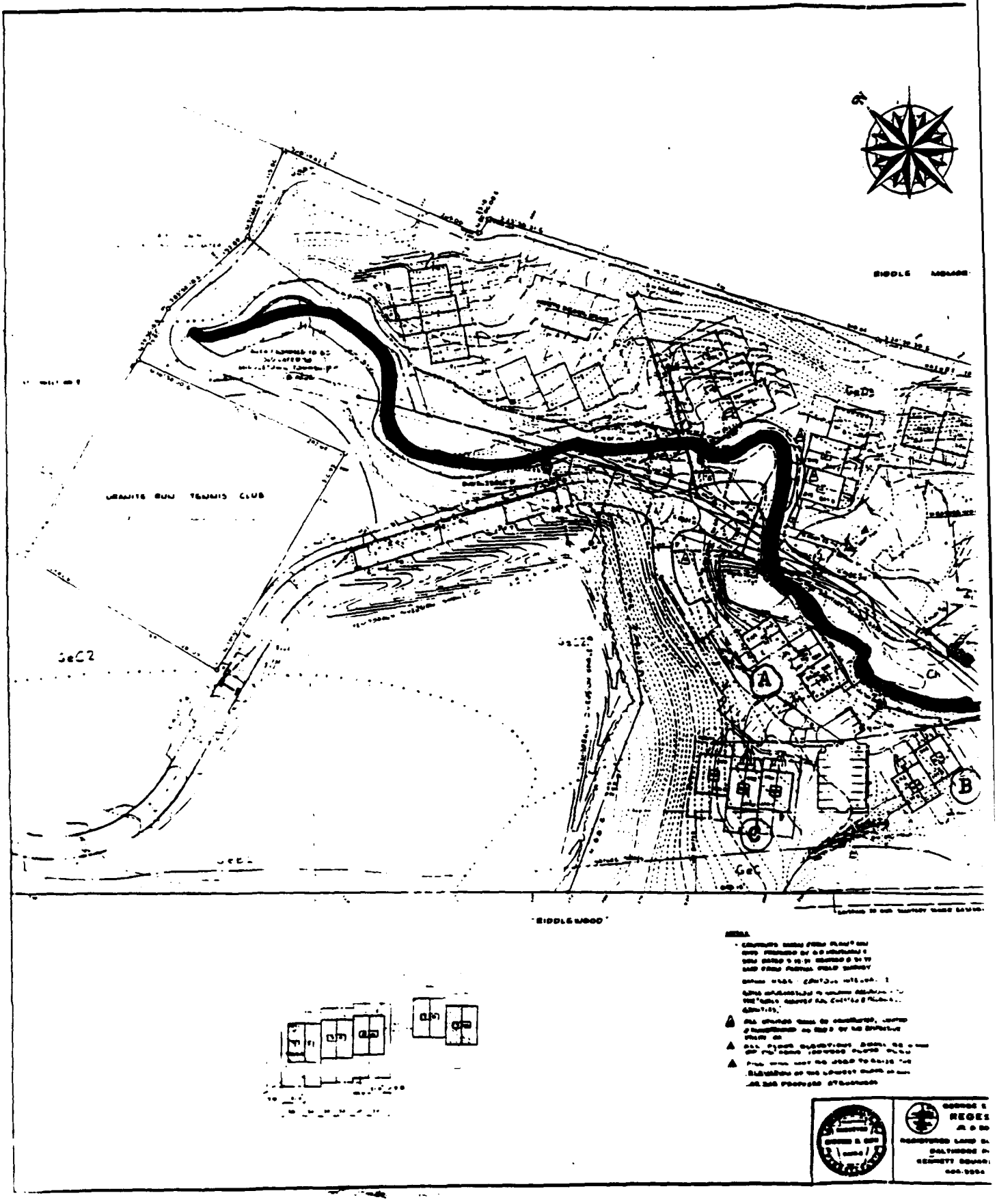
Appendix E

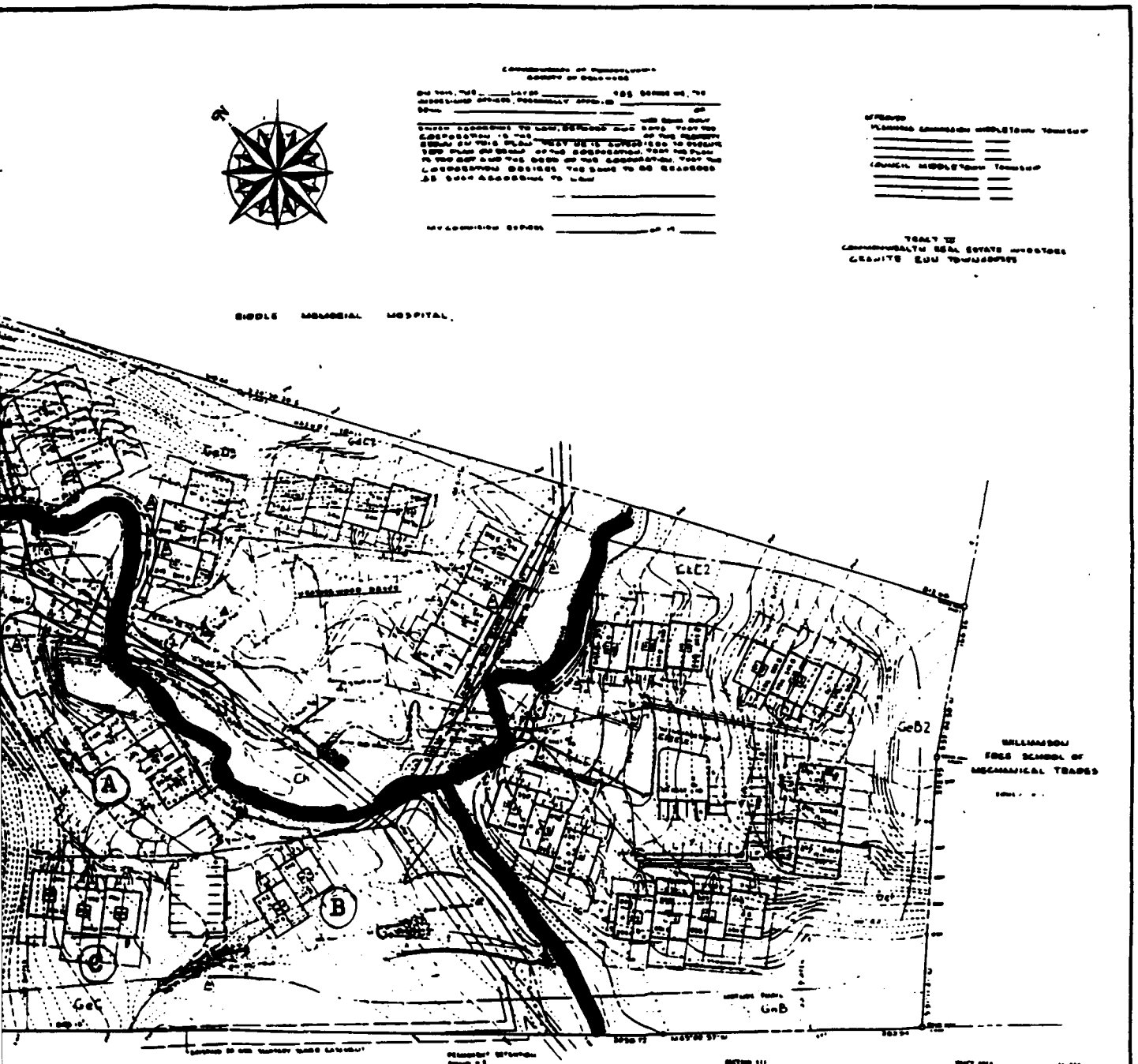
MEDIA REAL ESTATE
PROJECT SITE LAYOUT AND WETLAND BOUNDARIES

Appendix E contains two sheets of the construction plans for the Granite Run Townhouses project built by the Media Real Estate Company. The plans were developed by the firms of George E Regester Jr. & Sons Inc. and Lee Casaccio & Associates. The sheets, numbered 1 and P-2, show the change in location of several buildings due to the presence of wetlands.

Sheet 1 was developed in 1981 and approved by the Middletown Township Planning Commission in 1982. Media Real Estate began construction and was forced to halt all work due to the wetlands located adjacent to the Granite Run and Chrome Run Rivers. The dark, solid lines running through the project site are the rivers. Granite Run River enters the site near the Granite Run Tennis Club in the northern corner of the site and runs into the Chrome Run River which runs nearly north to south in the southern corner of the site.

Sheet number P-2 was developed following the discovery of the wetlands. The redesign required the removal of unfinished buildings from the wetland area and the buffer zone. The buildings marked A on the drawings were relocated to the south side of the roadway in order to avoid the wetland area. The new site required extensive earthwork since the site was a steep sloped embankment. The contour lines can be seen on sheet number 1. The buildings marked B on the drawings had to be modified by relocating one of the units to the building marked C. Several of the buildings that were completed impacted the wetland area. The regulatory agencies allowed these units to remain, however, mitigation at a two to one ratio was required at an off-site location.


GRANITE RUN TENNIS CLUB
SeC2
GeC
A
B
C



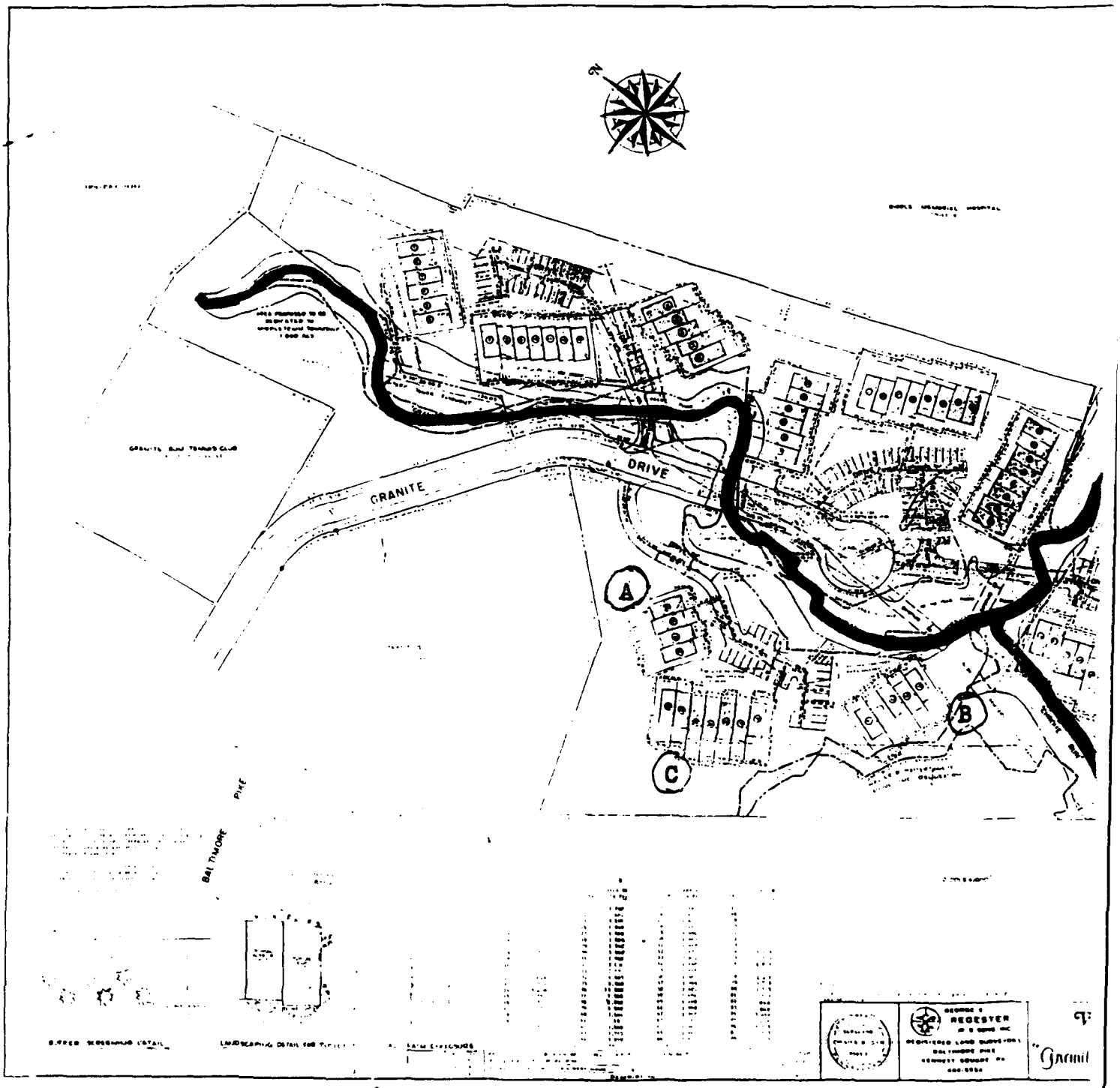
REGESTER
REGISTERED LAND SURVEYORS

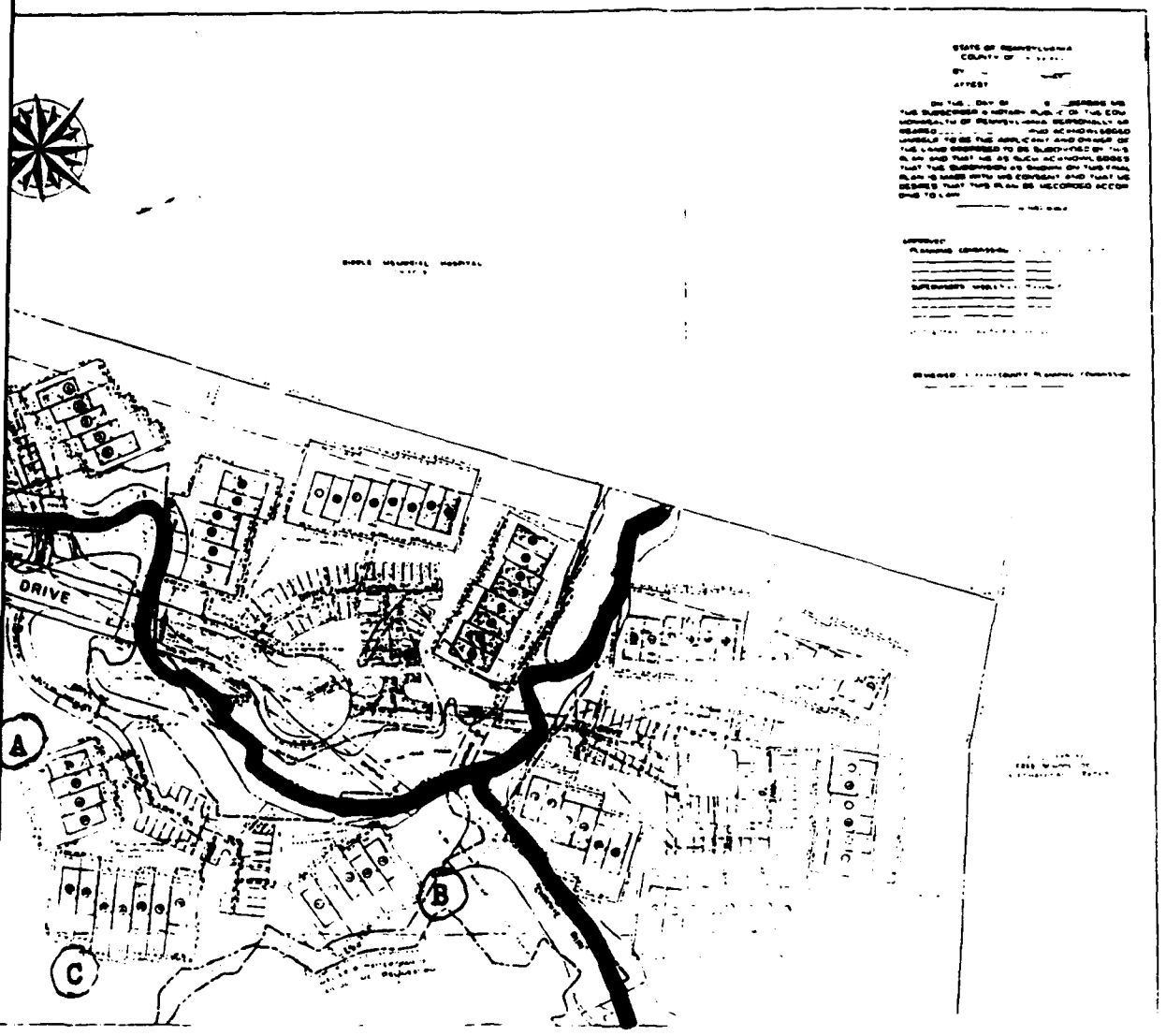
LEE CASACCIO & ASSOC
architects · planners

FINAL PLAN
GRANITE RUN TOWNHOUSES
MEDIA REAL ESTATE CO

1

2


GRANITE
DRIVE
A
B
C
BALTIMORE PIKE
REGESTER



Wetlands Map
of
"Granite Run Townhouses"

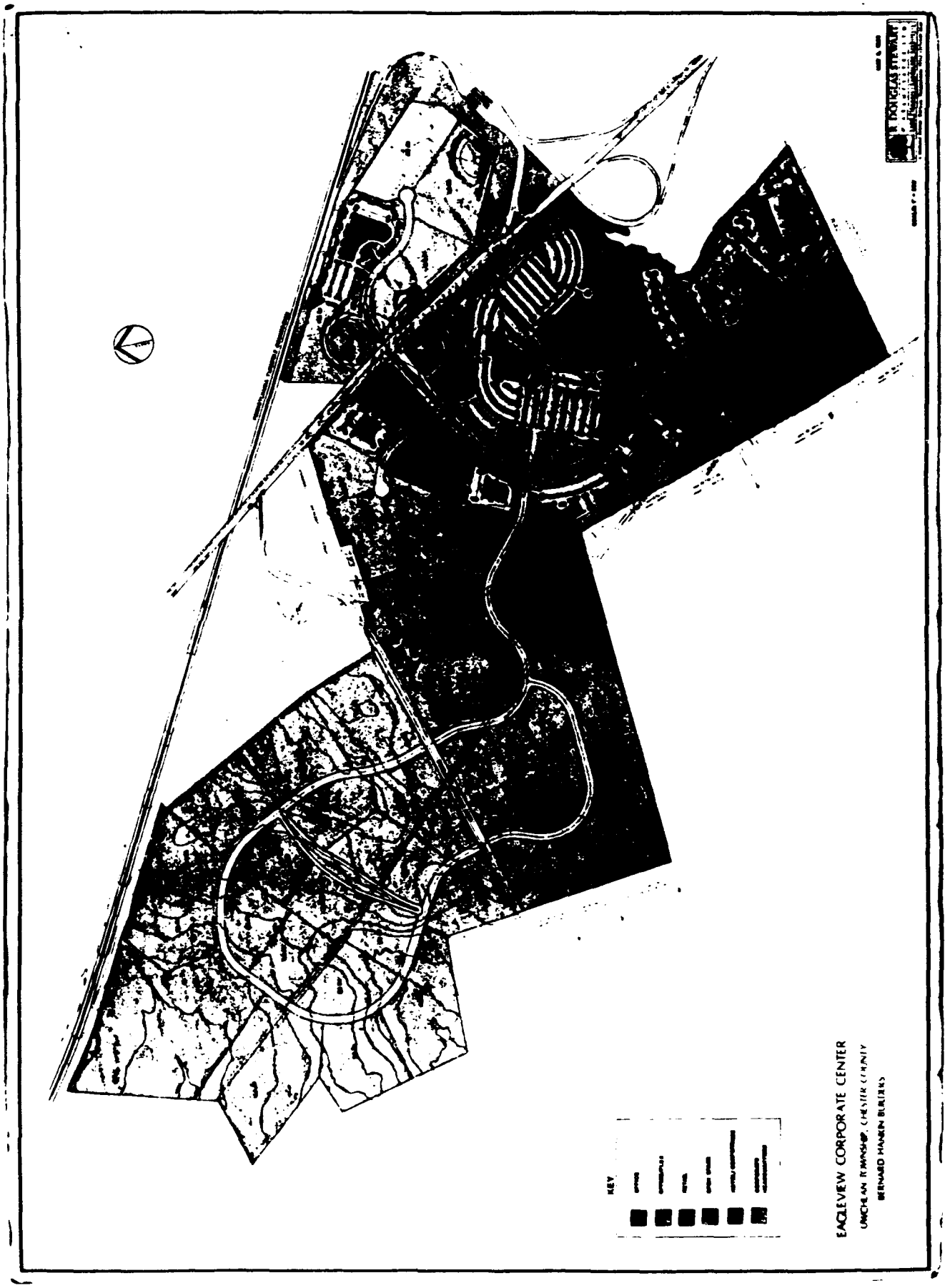
P-2
A

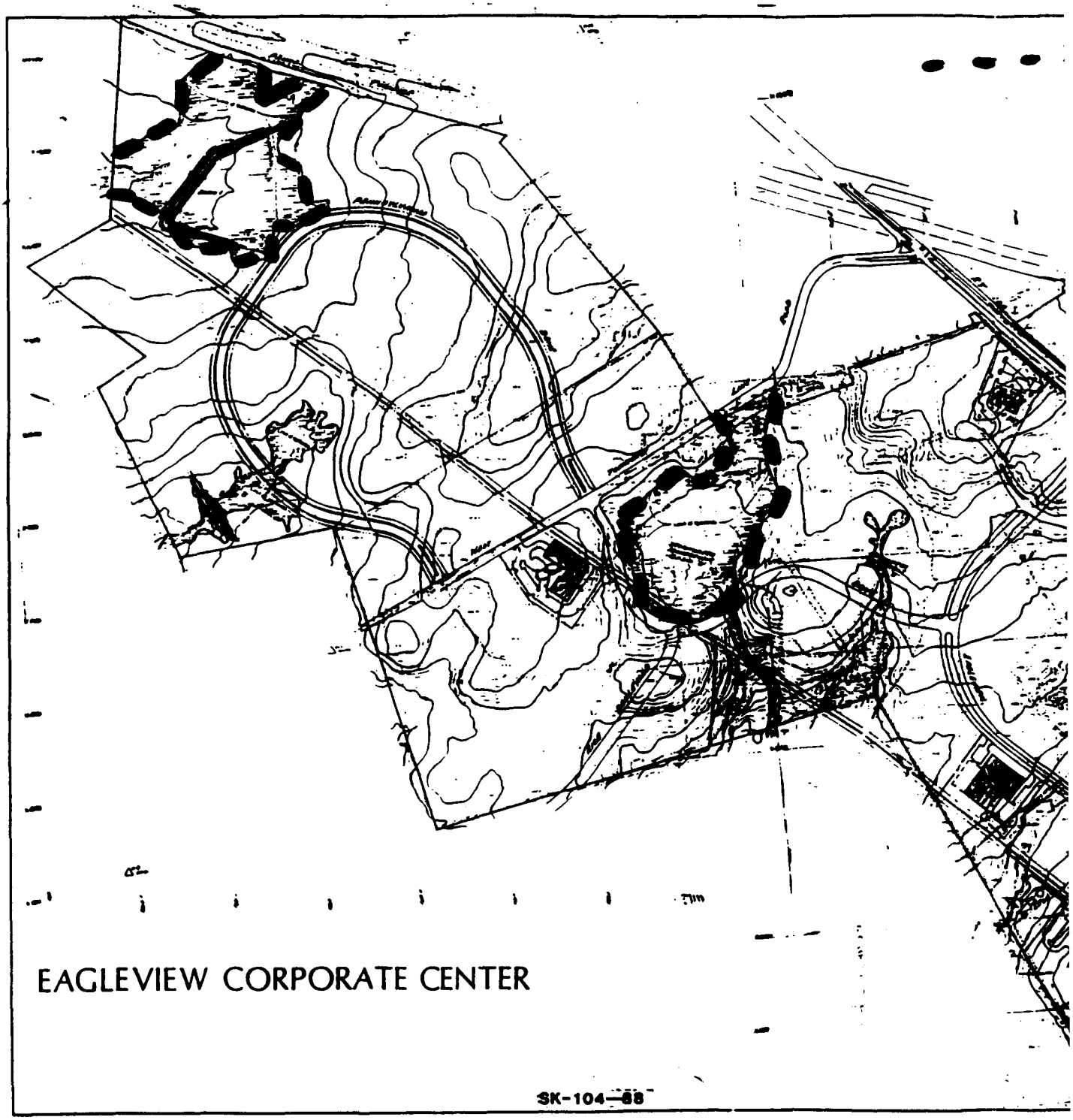
2

Appendix F

THE HANKIN GROUP - "EAGLEVIEW CORPORATE CENTER" PROJECT SITE LAYOUT AND WETLAND BOUNDARIES

Appendix F contains two sheets which indicate the project site layout and wetland boundaries for the Eagleview Corporate Center project developed by the Hankin Group. The plans were developed by the firm of R. Douglas Stewart & Associates. The first sheet shows the location of the existing buildings and the layout of the proposed sites for further expansion. The second sheet, number SK-104-88, shows the boundaries of the wetlands. The wetlands are annotated and bordered by a dashed line.


EAGLEVIEW CORPORATE CENTER
UWCHLAN TOWNSHIP, CHESTER COUNTY
BERNARD HANEN BERLIN'S
KEY



EAGLEVIEW CORPORATE CENTER

SK-104—88

2

Appendix G

LIST OF GOVERNMENT REVIEWING AGENCIES AND REQUIRED PERMITS AS PROVIDED BY THE HANKIN GROUP

Township Reviewing Agencies:

1. Planning Commission
2. Municipal Authority
3. Park and Recreation Commission
4. Building Inspector
5. Engineer
6. Planning Engineer
7. Municipal Authority Engineer
8. Historic Society
9. Fire Department
10. Police Department
11. Traffic Study
12. Zoning Officer
13. Supervisors

County Reviewing Agencies:

1. Planning Commission
2. Health Department
3. Conservation District
   Storm Water Management

State Reviewing Agencies and Required Permits:

1. Sedimentation Control and Storm Water Management
2. Sewer Planning Module
3. Sewer Construction Module
4. Stream Encroachment Permit
5. Dam Permits - over 500 acre water shed
6. Wetlands
7. Pennsylvania Fish Commission
8. Burning Permit
9. PennDOT

Federal Reviewing Agencies and Required Permits:

1. Wetlands - Army Corps of Engineers
2. Federal Emergency Management Agency - Flood Plain

Other Reviewing Agencies:

1. Pipeline Companies
2. Railroads
3. Turnpike Commission
4. Federal Aviation Administration

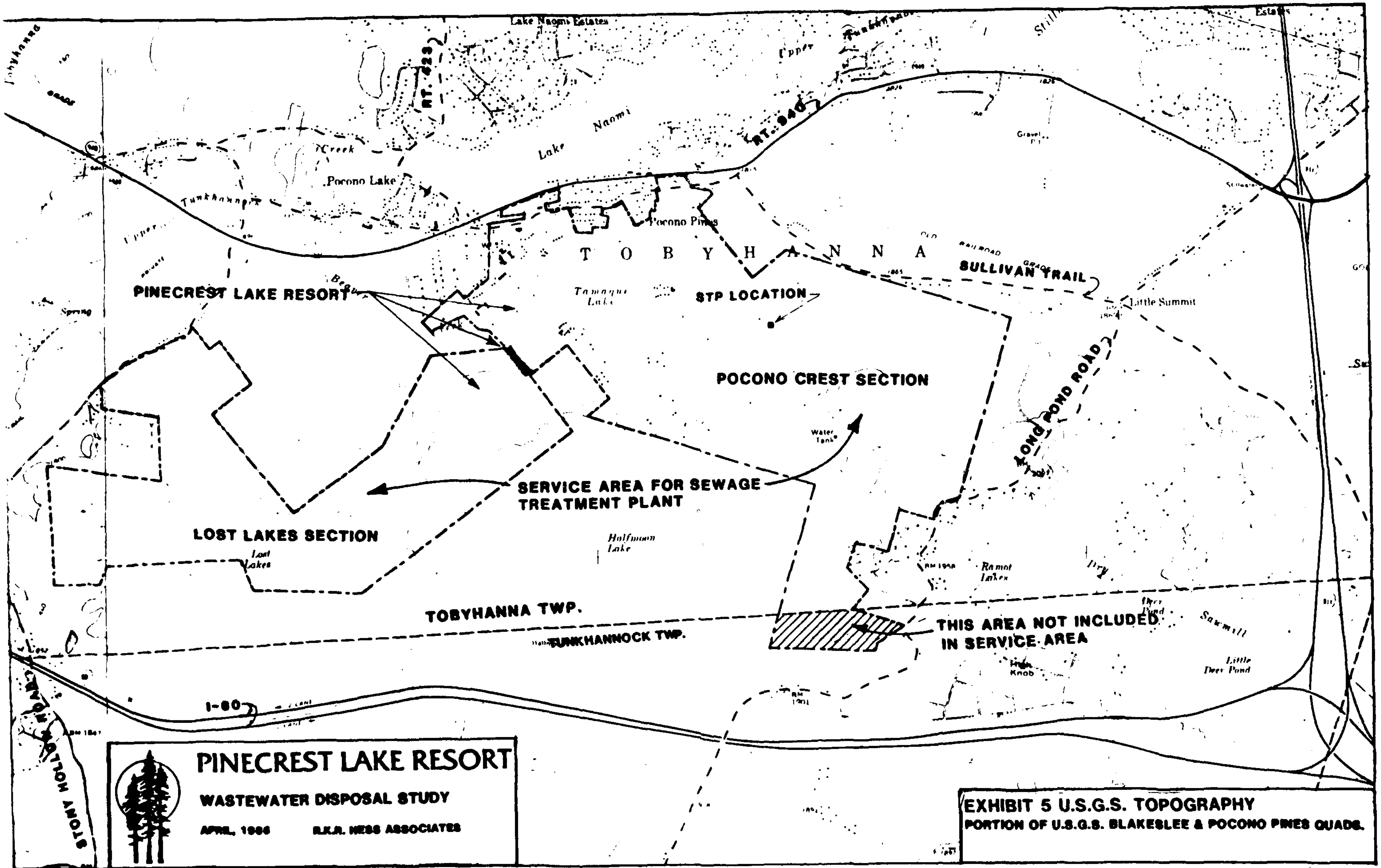
New Permits Expected For:

1. Hazardous Waste
2. Radon

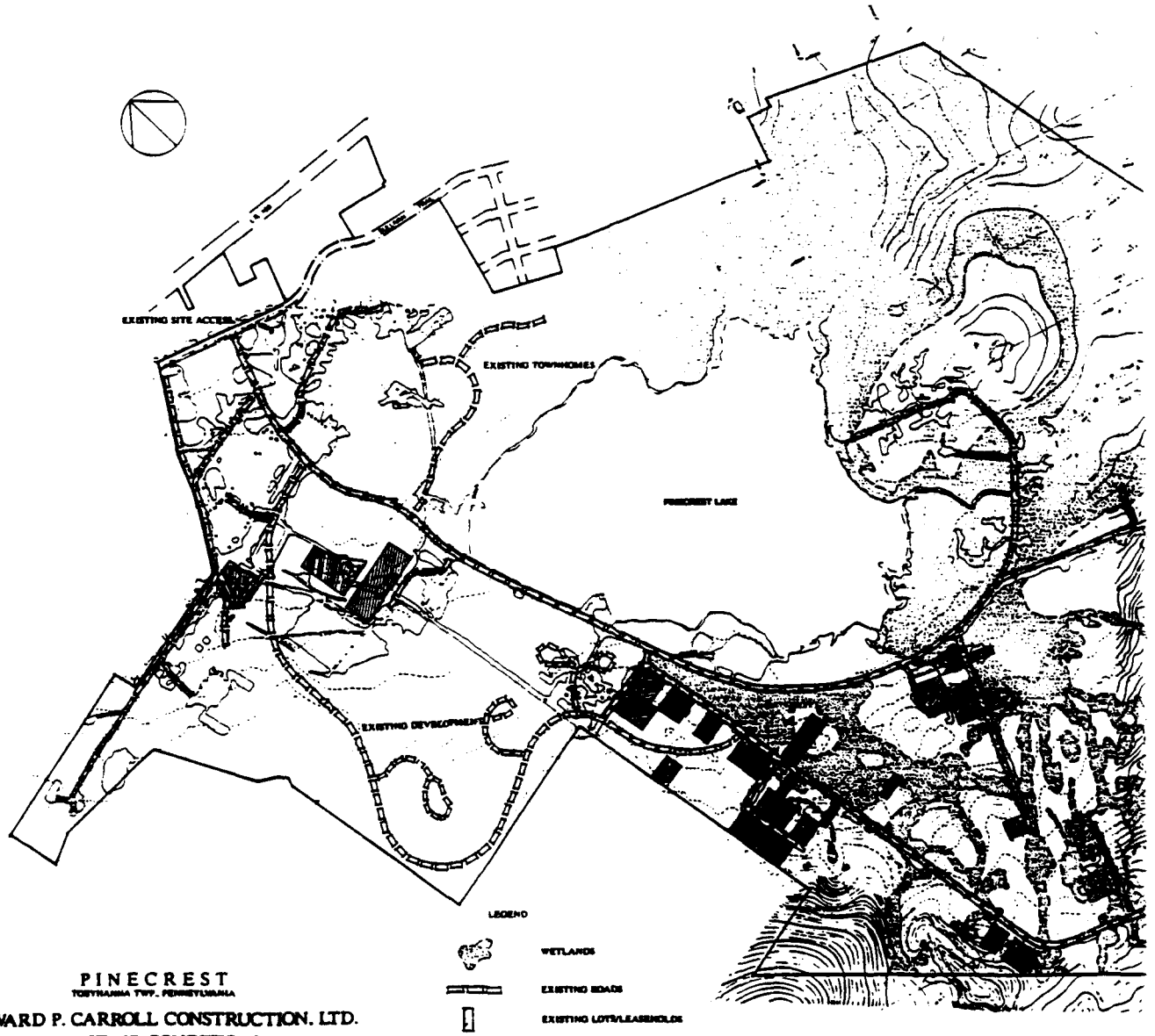
Appendix H

CARROLL CONSTRUCTION COMPANY
"PINE CREST DEVELOPMENT"
PROJECT SITE LAYOUT AND WETLAND BOUNDARIES

Appendix H contains three sheets which indicate the different sections of the project site, the project site layout and wetland boundaries for the Pine Crest Lake Resort project developed by the company Edward P. Carroll Construction, Ltd. The plans were developed by the firm of Berkus Group Architects. The first sheet, titled the Wastewater Disposal Study, shows the outline of the parcels that make up the total Pinecrest Lake Resort complex, Tamague Lake and the township lines. The second sheet shows the existing conditions which include the boundaries of the wetlands, and the third sheet shows the conceptual development plan.


Lake Naomi Estates
RT. 423
RT. 940
Lake Naomi
Pocono Lake
Creek
Tunkhannock
Upper
Pocono Pines
T O B Y H A N N A
OLD RAILROAD GRADE
SULLIVAN TRAIL
Little Summit
LONG POND ROAD
PINECREST LAKE RESORT
STP LOCATION
Tamaque Lake
POCONO CREST SECTION
Water Tank
SERVICE AREA FOR SEWAGE
TREATMENT PLANT
LOST LAKES SECTION
Lost Lakes
Halfmoon Lake
Ramot Lakes
TOBYHANNA TWP.
TUNKHANNOCK TWP.
THIS AREA NOT INCLUDED
IN SERVICE AREA
Sawmill
Little Deer Pond
I-80
STONY HOLLOW ROAD
Spring
Tobyhanna
Estates
PINECREST LAKE RESORT
WASTEWATER DISPOSAL STUDY
APRIL, 1986
R.K.R. HESS ASSOCIATES
EXHIBIT 5 U.S.G.S. TOPOGRAPHY
PORTION OF U.S.G.S. BLAKESLEE & POCONO PINES QUADS.

1-15-165A



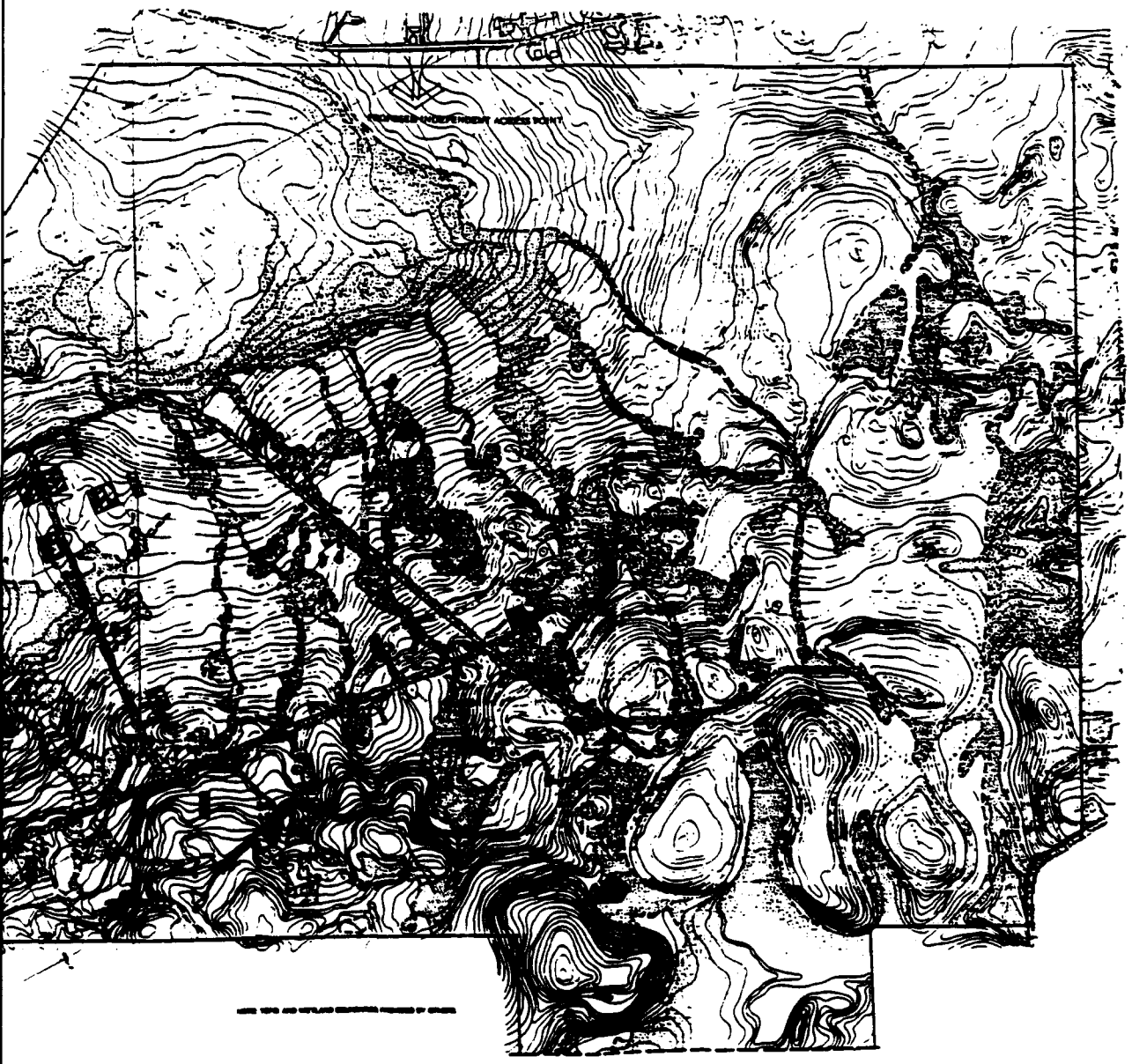
PINECREST

TOBYHANNA TWP., PENNSYLVANIA

EDWARD P. CARROLL CONSTRUCTION, LTD.

EXISTING CONDITIONS


PROPOSED ROAD/DRIVEWAY ACCESS POINT
WETLANDS
EXISTING ROADS
EXISTING LOTS/LEASEHOLDS
EXISTING TRAILS



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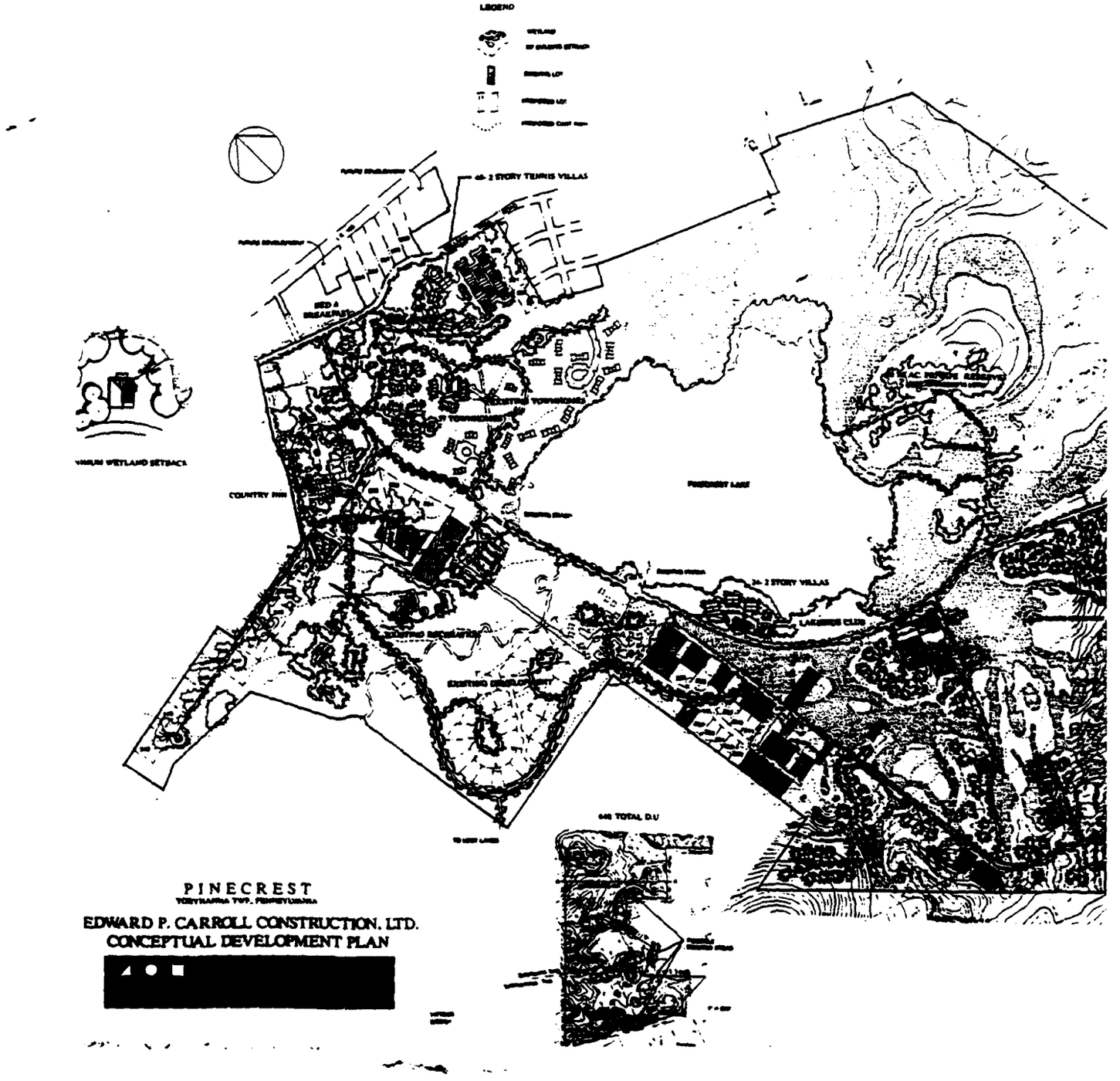
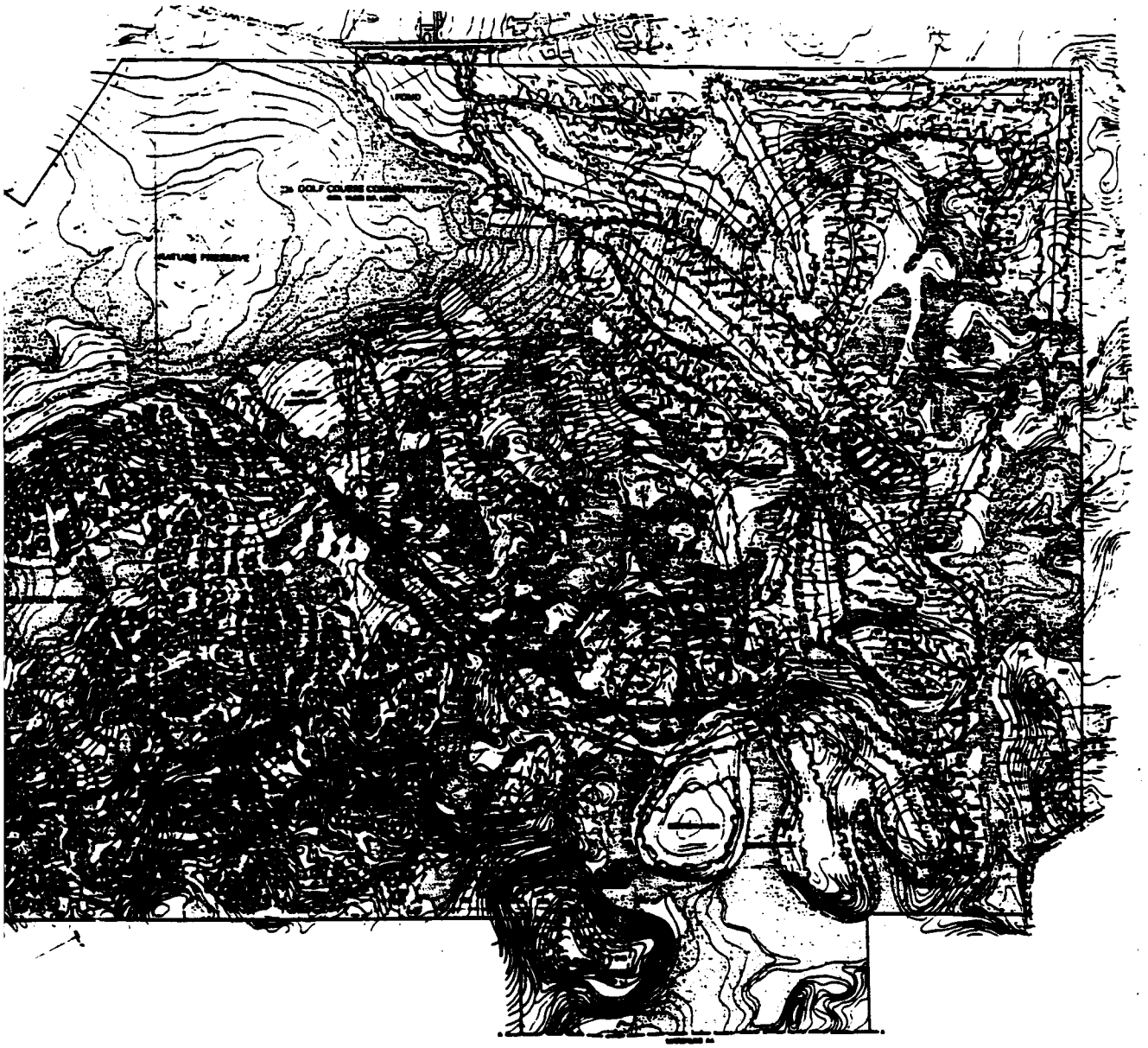

LEGEND
PINECREST
EDWARD P. CARROLL CONSTRUCTION, LTD.
CONCEPTUAL DEVELOPMENT PLAN


POND
NATURE PRESERVE
LAKEVIEW CLUB



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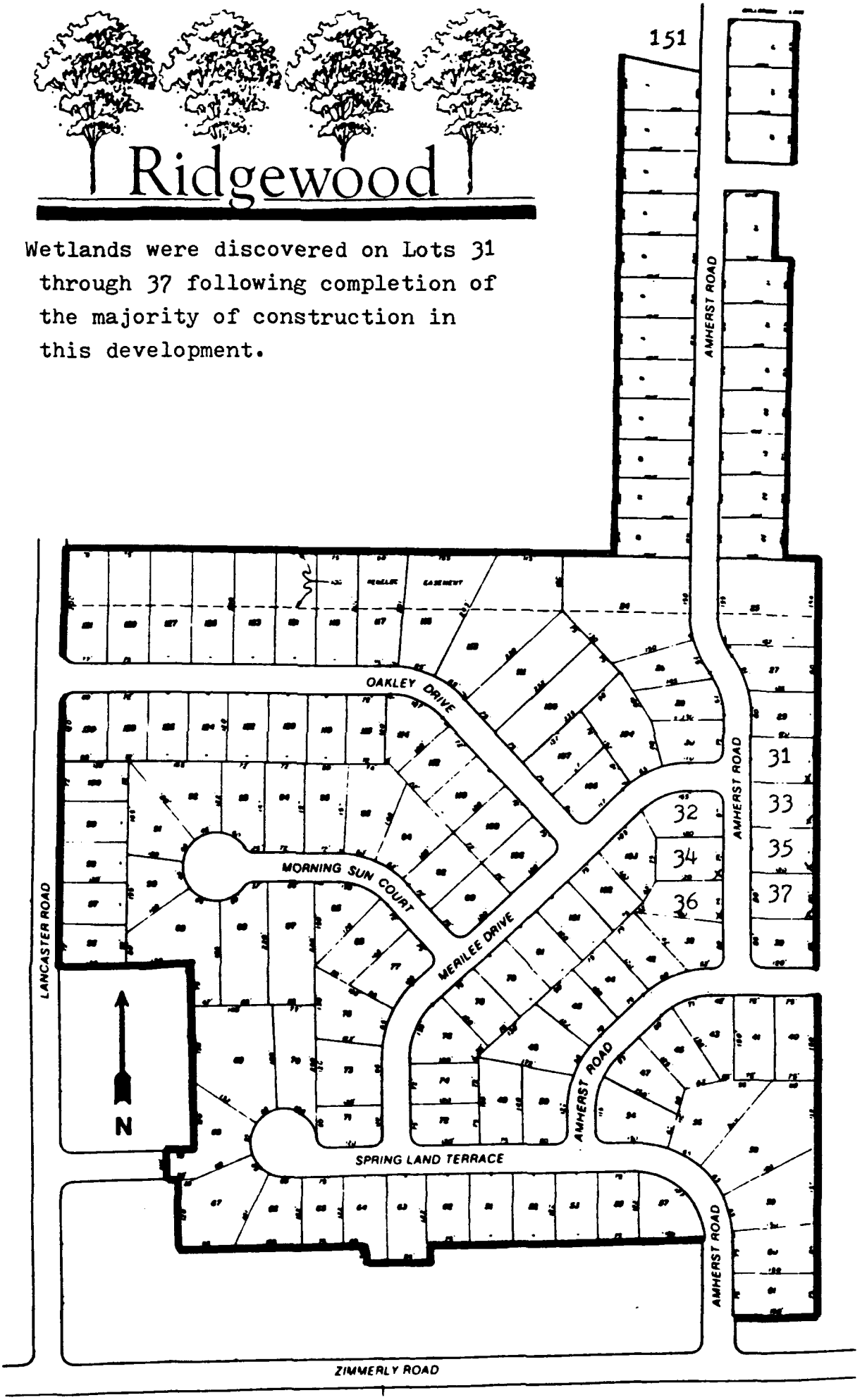
Appendix I

MALENO DEVELOPERS TOWNHOUSE PROJECT
SITE LAYOUT AND WETLAND AFFECTED LOTS

Ridgewood

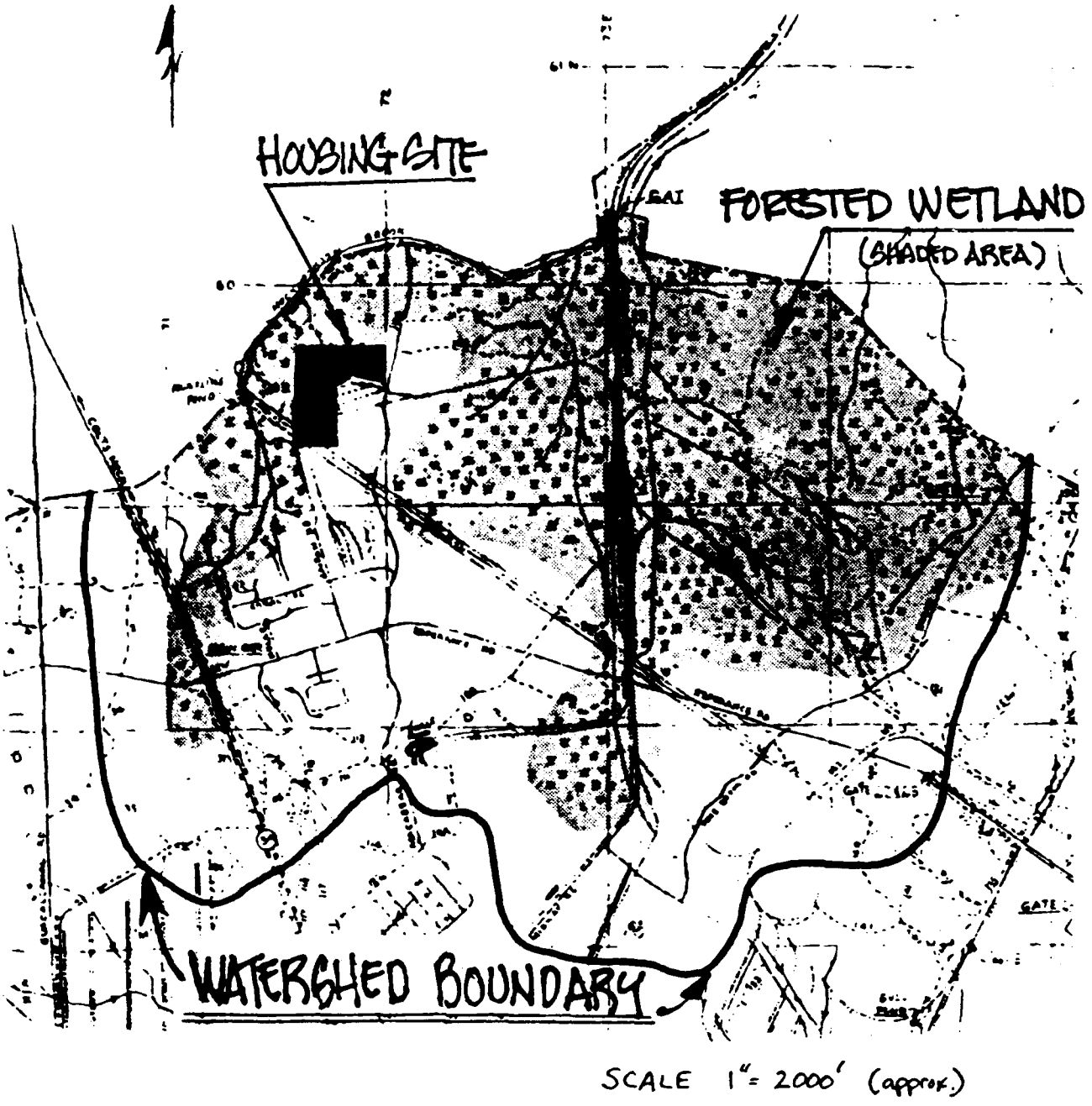
Wetlands were discovered on Lots 31 through 37 following completion of the majority of construction in this development.



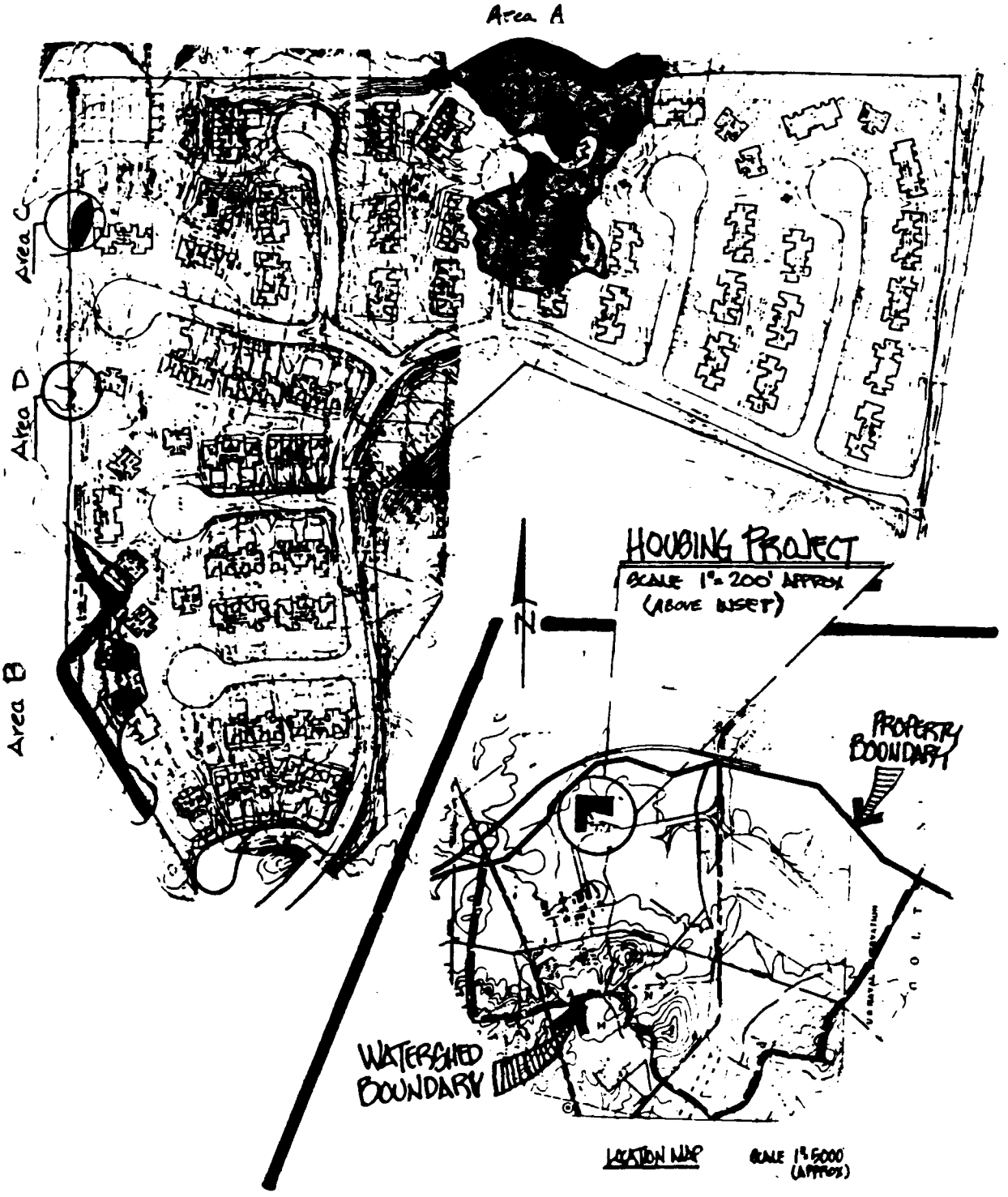
Appendix J

NAVAL FACILITIES ENGINEERING COMMAND
200 UNIT HOUSING PROJECT AT
NAVAL WEAPONS STATION, EARLE, NJ
PROJECT SITE LAYOUT AND WETLAND BOUNDARIES

Appendix J contains two sheets that indicate the layout of the Naval Weapons Station, Earle, N.J. housing project developed by the Northern Division of the Naval Facilities Engineering Command. The first sheet indicates the location of the project site within the borders of the Hockhockson Watershed. Additionally, the location of the forested wetland are shaded. A site layout showing the areas that the wetlands impact the site is included as the second sheet. Four areas impacted the site. Area A impacted the largest area and caused the most extensive cost increases and delays.



Forested Wetland on Earle NWS Within Hockhockson Watershed.



Housing Site as Designed.