

MASTER PLAN

UNION BAY

TEACHING/
RESEARCH
ARBORETUM

UNIVERSITY of WASHINGTON, November 1, 1976

JONES & JONES

ARCHITECTS and LANDSCAPE ARCHITECTS



ACKNOWLEDGEMENT

Research, planning and conceptual design documented in this Master Plan were made possible by a donation from the NORTHWEST ORNAMENTAL HORTICULTURAL SOCIETY, without whose support the feasibility of a teaching and research arboretum at Union Bay would remain untested.

This Master Plan would not have been possible without the foresight and leadership displayed by the University of Washington, particularly: Dr. Dale Cole, Chairman, University Advisory Committee on Arboreta
Dr. Richard Walker, Chairman, East Campus Arboretum Subcommittee
Sedge Thompson, Director of Facilities Planning and Construction
Rolfe Kellor, Campus Planning Officer

Special mention must be made of the dedication and guidance of:

Joseph A. Witt, Plant Curator, University of Washington Arboretum

Particular thanks are due to the many members of the NORTHWEST ORNAMENTAL HORTICULTURAL SOCIETY and the ARBORETUM FOUNDATION who shared their time and ideas.

Individuals from five nationally prominent arboreta provided technical support and encouragement: Richard A. Howard, Director of the Arnold Arboretum; Francis Ching, Director of the Los Angeles State and County Arboretum; Francis de Vos, Director of the Chicago Botanical Garden; Charles Lewis, Horticulturist at the Morton Arboretum; Henry Norweb, Director of the Holden Arboretum; Thomas Elias, Assistant Director of the Carv Arboretum.

105 SOUTH MAIN STREET

JONES
&
JONES

SEATTLE 98104, 624-5702

27 October 1976

Dr. Dale W. Cole, Chairman
University Advisory Committee on Arboreta, and
Mr. Rolfe Kellor
Campus Planning Officer
University of Washington
Seattle, Washington 98195

Gentlemen:

It is with great pleasure that we transmit the Master Plan for the Union Bay Teaching and Research Arboretum.

The plan documents our research findings and the planning process we used to take creative advantage of problems as well as to maximize opportunities at this unique and active site. It also explains the design synthesis we achieved by optimizing all four goals for the University Arboretum: Teaching, Research, Public Service/Display, and Stewardship.

As such, I believe the master plan is a complete solution to the requirements of the Preliminary Concept Plan adopted in July 1974 by the University Advisory Committee on Arboreta, and to the goals of the metropolitan community, accommodating all necessary program elements without disproportion.

As the site is evolving toward diversity, the plan works with the dynamics of the site; it has the built-in flexibility to adapt to the land's changing moods while it regains its composure. In fact, over time the plan should become more and more valid, both scientifically and aesthetically, while offering almost unlimited opportunities for research and teaching.

Certain of the unique resources at Union Bay require enhancement, protection and management; while the opportunity exists to resurrect and convert the site into a facility of international significance -- a *laboratory on a landfill*. To have such an asset owned by a university, for conducting research and monitoring change over the years, is not just feasible to attain; it already exists, a great potential benefit to our ability to re-make a healthy urban habitat for man.

I take this opportunity to thank all concerned for allowing us to contribute toward this challenging prospect.

Respectfully submitted,



Grant R. Jones
Partner-in-Charge
JONES & JONES

GRJ:ds

LANDSCAPE ARCHITECTURE

ENVIRONMENTAL PLANNING

URBAN DESIGN

ARCHITECTURE

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

College of Forest Resources

1 November 1976

Dr. John R. Hogness, President
Office of the President
301 Administration
University of Washington AH-30
Seattle, Washington 98195

Dear Dr. Hogness:

I am pleased to submit to you the Master Plan for the proposed Arboretum at Union Bay. This plan has been developed by the firm of Jones & Jones, Landscape Planners and Architects, working closely with the University Advisory Committee on Arboreta. When this Committee was first appointed in 1974 by Dr. Phillip Cartwright, then the Acting President of the University, it was specifically instructed to explore the feasibility of developing an arboretum at this site.

An arboretum program worthy of a great University and meeting the program needs of its faculty, students and the community must have at least four basic functions: teaching, research, public service and display, and stewardship. It was recognized at the time that this Committee was appointed, that the University Arboretum at Washington Park could not by itself provide these functions and it should be supplemented by additional facilities and sites. It is the opinion of this Committee that the Master Plan proposed for the Union Bay site will provide the missing program elements that our Arboretum program urgently needs. It will also provide the basic facilities for managing the total Arboretum program, facilities that have never been available at Washington Park or are now so deteriorated that they no longer satisfactorily serve the needs of the program.

Dean James S. Bethel first suggested in January 1974 that this area of some one hundred plus acres on the East Campus might be used for arboretum purposes. The area had been studied previously by the Ad Hoc Study Committee for East Campus Development, Professor Richard B. Walker, Chairman, whose report of April 3, 1972 suggested the site be used for, among other things, an all-University greenhouse complex, an ecological demonstration area, recreational facilities and open space. A subcommittee of the University Advisory Committee on Arboreta was appointed to further explore this idea, and in July 1974 presented to the full Arboretum Committee a preliminary concept plan prepared with the help of the Facilities Planning Office. In December 1974, the University Architectural Commission approved of the concept as had the University Advisory Committee on Landscape and Planning on October 31, 1974.

In the meantime, the Northwest Ornamental Horticultural Society offered \$35,000 to be used to engage a firm of land-use planners to prepare a master plan for development of an arboretum on the East Campus site. This gift was accepted by the Regents on February 28, 1975. The firm of Jones & Jones was awarded the contract to produce the master plan and its accompanying impact assessment data. A Progress Report was given to the Capital Construction Board at their August 25, 1975 meeting and the Jones & Jones Master Plan was shown to the Architectural Commission March 30, 1976 at which time it was unanimously approved. The same plan was also presented to the Faculty Councils on Facilities and Services and Community Affairs. The plans for an arboretum on the Union Bay site are now incorporated in the General Physical Development Plans awaiting the Regents' action.

Concurrent with exposure of the concept to the University community, a concerted effort was made to acquaint neighboring communities and other interested groups with the plans. A tape-slide show which has had wide exposure was prepared with additional funds from the Northwest Ornamental Horticultural Society. Articles have been written for the Arboretum Foundation Bulletin and publicity on the new proposal has appeared in local newspapers. On November 18, 1975 in Kane Hall, staff members from Jones & Jones gave a well-attended public presentation of their plans for the Arboretum development.

One question which has been asked time and again concerning the proposed plan for the Union Bay Teaching and Research Arboretum is its relationship to other arboretum sites and what will be the future of the present Arboretum in Washington Park. It should be understood at the outset that the new development will be completely different from that in Washington Park and the two areas will be complementary, not competitive. Union Bay is planned to be the research and teaching arm of the Arboretum program. The restrictions which hamper development of these programs at Washington Park will not affect activities at Union Bay. Our plans call for it to be the center for all Arboretum activities including administration and propagation with research and teaching facilities. Public service and display will be minor phases of its functions since these will largely be centered at the traditional Washington Park site. The Macbride Arboretum at Charles Lathrop Pack Forest will be primarily an auxiliary teaching collection for students resident at that facility. In addition, specialized research collections will be developed for which that site is uniquely suited. Stewardship and emphasis on certain kinds of ecological and environmental studies now appear to be the role developing for the Bloedel Reserve, while other such studies will take place at Union Bay.

The development of an arboretum facility as presented in this Master Plan will obviously take many years of dedicated effort by the University and its faculty. It is proposed that this development should proceed in a series of well-organized phases, the first of which has already been submitted to the Capital Construction Board in a letter of June 24, 1976 from James S. Bethel, Dean of the College of Forest Resources.

The need for this facility as outlined in this Master Plan has been extensively documented and is long overdue. The facilities at the Arboretum at Washington Park are not only old and dilapidated, but they are also grossly inadequate to meet current program needs. The faculty and students in Forest Resources, Landscape Architecture, and Botany, long traditional users of the Arboretum and its plant collections, have all worked closely with the consulting firm to create this Master Plan. It is our opinion that this plan will not only meet the current program needs of the University in this important area of the biological sciences, but has the vision and potential of satisfying future requirements as well.

The development of this facility also has the enthusiastic support of the lay organizations who have traditionally supported the University in its overall Arboretum efforts. It is clear that these organizations will provide much of the needed support for the development of this facility just as they have already provided for the funding of this Master Plan.

It is for these reasons that we hope the University will rapidly proceed with its implementation.

Sincerely,


Dale W. Cole, Director
Center for Ecosystem Studies

cc: James S. Bethel, Dean
College of Forest Resources

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

College of Forest Resources

1 November 1976

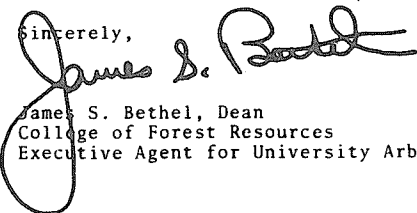
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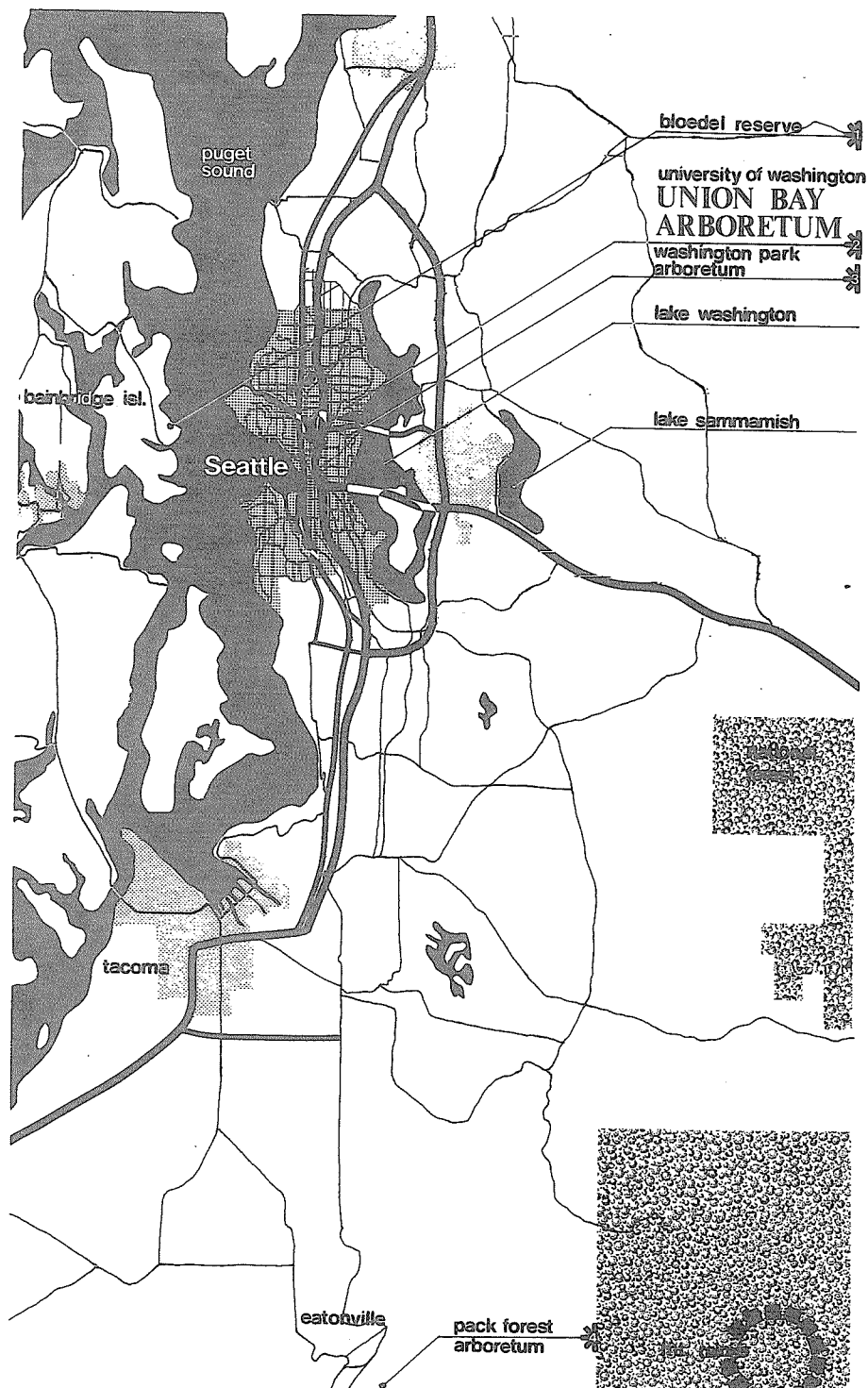
Dear Dr. Hogness:

I have read with interest the report of the University Advisory Committee on Arboreta and the Master Plan developed for the Committee by Jones & Jones.

I commend the Committee for the quality of its planning and concur in its recommendations as embodied in this report.

Sincerely,


James S. Bethel, Dean
College of Forest Resources
Executive Agent for University Arboreta



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UNION BAY

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THE UNIVERSITY of WASHINGTON ARBORETUM IS: PLANTS

An arboretum is a collection of woody plants. Some are common ornamentals and others are known only by specialists. Large and small, native and introduced, they exist in the ground, in the greenhouse or in the mind's eye.



PLACES

The Arboretum consists of four separate sites, encompassing the range of teaching and research appropriate to an institution of regional importance. Washington Park contains the familiar mature display collections and is not able to accommodate other necessary programs. New facilities at Union Bay near the campus, and Pack Forest in Eatonville, currently being planned, opportunities easily available to students and faculty. The Bloedel Reserve on Bainbridge Island, so newly a part of the Arboretum that no formal plans exist for its use, will possibly become a permanent ecological demonstration site.

PEOPLE

The Arboretum exists for the use and enjoyment of people. Scientists, amateurs, specialist gardeners, students and casual visitors all come to the Arboretum with a different point of view. The people who make the Arboretum work—the curators, staff, scientists, teachers and gardeners—maintain, improve and interpret the collection, while furthering our basic understanding of plants.

Support for this exhibit was provided by the Arboretum Foundation
Design: Jones & Jones, Landscape Architects and Architects
Photography: Garrie Quistlund Construction: Arboretum Staff

THE UNIVERSITY of WASHINGTON ARBORETUM IS PROGRAMS: TEACHING

The Arboretum is a place to learn about plants. You learn from the plants themselves (with the help of people), and whether your interest is in rediscovering forgotten favorites, learning new ones, or building a basis for professional work in the plant sciences, you learn by looking and listening, touching, smelling and doing.

RESEARCH

The large variety of plants and sites in the Arboretum provide many opportunities for botanical research. Such projects may include the ways in which individual plants grow, their relationships to other plants around them, and their future form or usefulness. Complimentary research efforts in soils, microclimate, ecology and hydrology may be undertaken at the same time.

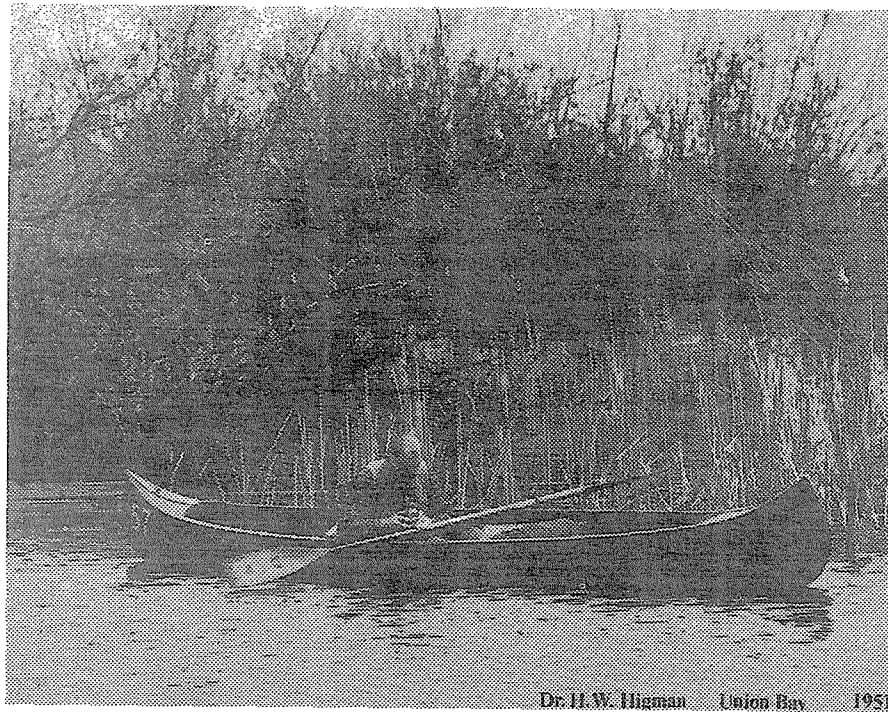
PUBLIC SERVICE & DISPLAY

The Arboretum serves the public by providing demonstrations and classes in good gardening techniques and answering plant-related questions. Plantings arranged as displays make even a casual observer's visit to the Arboretum a pleasant experience. Plant introduction programs make plant materials available to local gardeners.

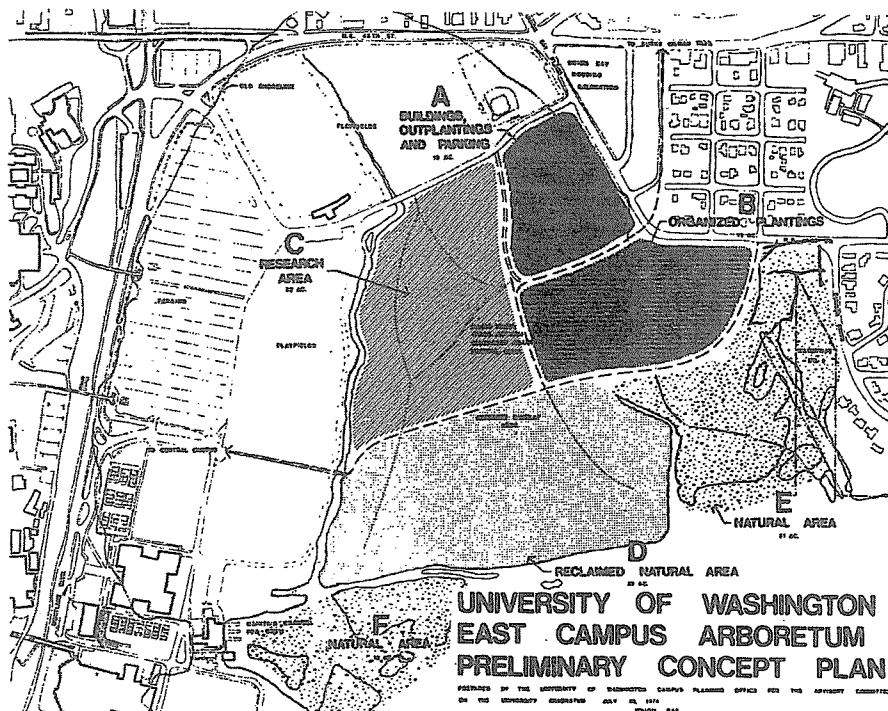
STEWARDSHIP

Under human influence, many plants and animals perish. The Arboretum serves a two-fold role as steward: first, by showing us the diversity and beauty of all plants; second, as a final desperate measure to preserve some individuals from permanent loss.

INTRODUCTION



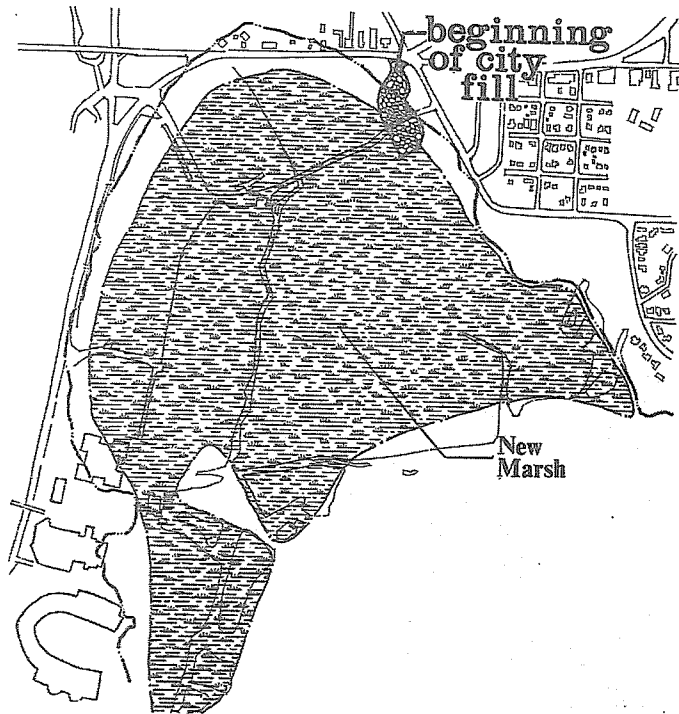
The University of Washington Arboretum Program has, for several years, felt the increasing constraints of its facilities in Washington Park. Inflexible and outdated buildings, lack of security, and the absence of any research space conspire to hold back the growth of an important regional resource. As a result of University and citizen efforts, a site on the eastern edge of the Campus was selected for expansion in the areas of teaching and research. Students today are too young to remember the Montlake Dump which flourished on the marsh north of Husky Stadium until 1966, but the central portion of this area (about 115 acres) was the site chosen for the Union Bay Teaching and Research Arboretum.



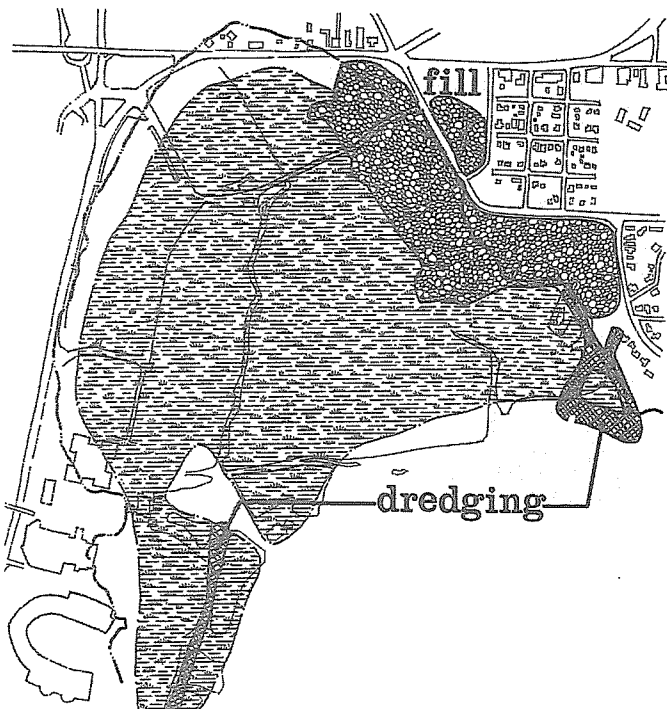
A short walk from the center of the campus and a pleasant paddle from the Arboretum in Washington Park to the south across Union Bay, the site is a mix of natural order and man-made confusion. As the underlying refuse decomposes, it generates methane gas, and the combined effects of compaction, settling and decomposition have caused parts of the site to sink several feet as the landfill seeks its equilibrium.

This, then, is the site selected by the University Advisory Committee on Arboreta in 1971. This complex and puzzling piece of land, it was hoped, could join Pack Forest Arboretum, the Arboretum in Washington Park and the Bloedel Reserve as an integral part of the University of Washington Arboretum. The Preliminary Concept Plan produced by that committee was the far-seeing forerunner of the Master Plan presented here. This report reconciles the conflicts within the site, and illustrates the steps that were taken from Concept to Master Plan.

HISTORY



1926



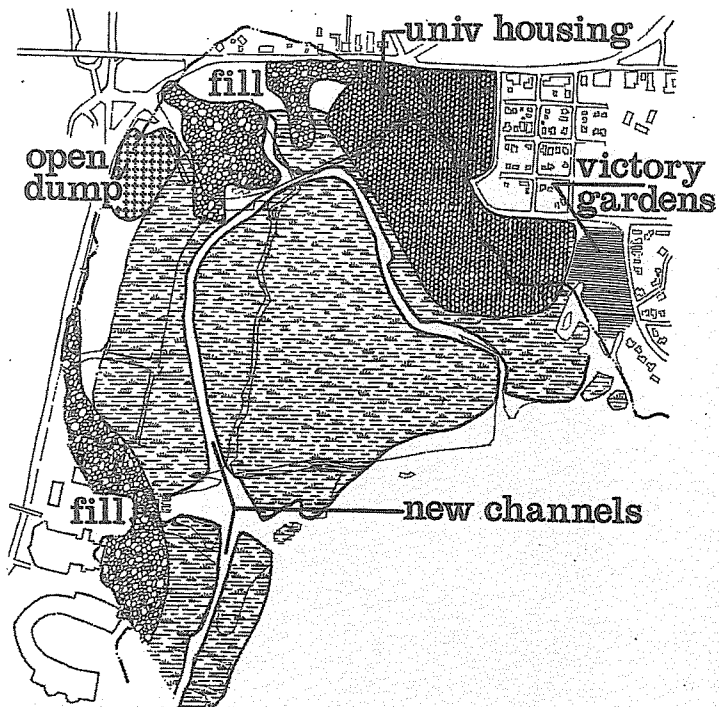
1938

Prior to 1916 most of the East Campus of the University of Washington was covered by the waters of Union Bay, concealing the deepest peat deposit in the State. The shoreline lay directly adjacent to Husky Stadium, covering most of the site of the present Intramural Activities Building and closely paralleling Montlake Boulevard on the west. To the north it extended across N.E. 45th into the present site of University Village and roughly paralleled Union Bay Place, N.E. 41st and Surber Drive on the east. With completion of the Hiram M. Chittenden locks at Ballard in 1916 the surface of Lake Washington was lowered nine feet (at high water) and from the northern inlet of Union Bay emerged a vast cattail marsh bounded loosely by the former shoreline.

In 1926 the City of Seattle began its rubbish and fill operations at the northeast corner of the former inlet; starting from "Five Corners" (the intersection of N.E. 45th and Union Bay Place), the original fill site extended south to the location of the present "Fire Arts" building.

The 1938 illustration shows the Five Corners fill site at its greatest active extent. Substantial new dredging in the east marsh increased its amount of open water surface, while to the southwest the dredging of the old "Crew House Point" channel carved away the first large island of the present-day island chain familiar to recreational boaters. University housing was built in "The Triangle" in 1946, and the original Five Corners fill site was regraded in preparation for the construction of additional housing. The open dump site near the present north pedestrian bridge expanded and rubbish filling covered large portions of the present driving range.

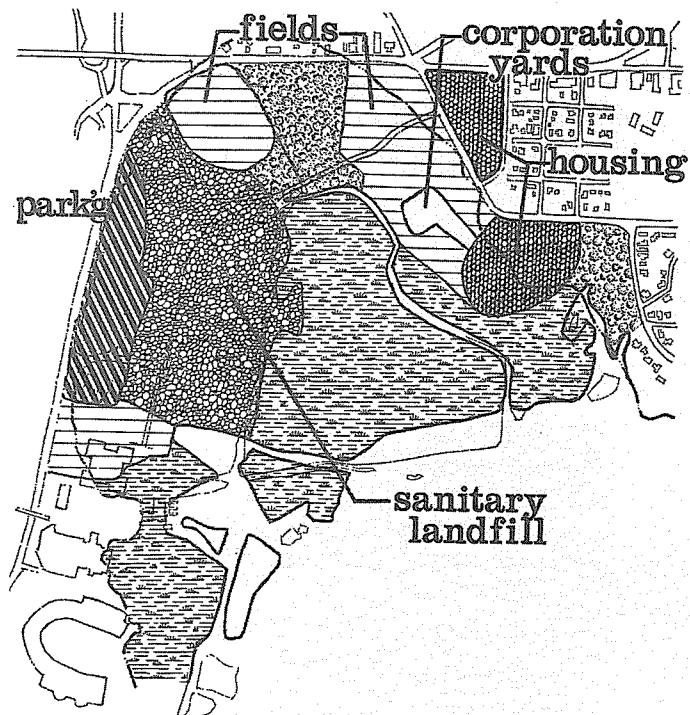
The 1949 illustration shows a sudden increase of filling to the southwest along Montlake Boulevard. At this time a 60 inch storm



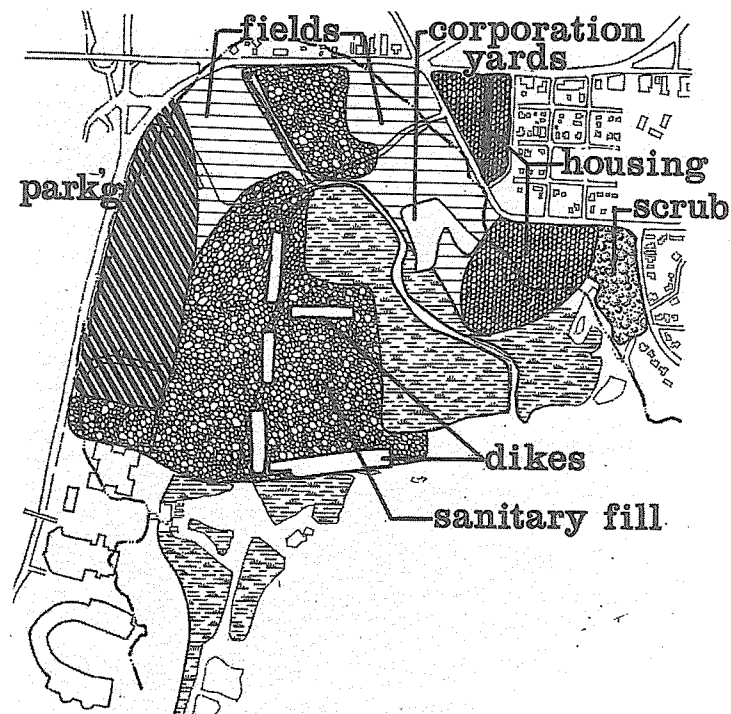
1949

drain from Laurelhurst was introduced from the east, and a loop channel was dredged through the interior of the marsh to dewater it. In 1954 increasing public pressure halted the open burning, and later, "modern" sanitary landfill methods were initiated, requiring nightly covering of the day's fill with a layer of earth. This change in landfill policy and practices, coupled with an expanding amount of refuse from Seattle's growing population, quickly increased the rate of marsh reclamation by landfill. By late 1956 the western portion of the interior perimeter-loop channel had been covered over by refuse and the first Montlake parking lot was completed.

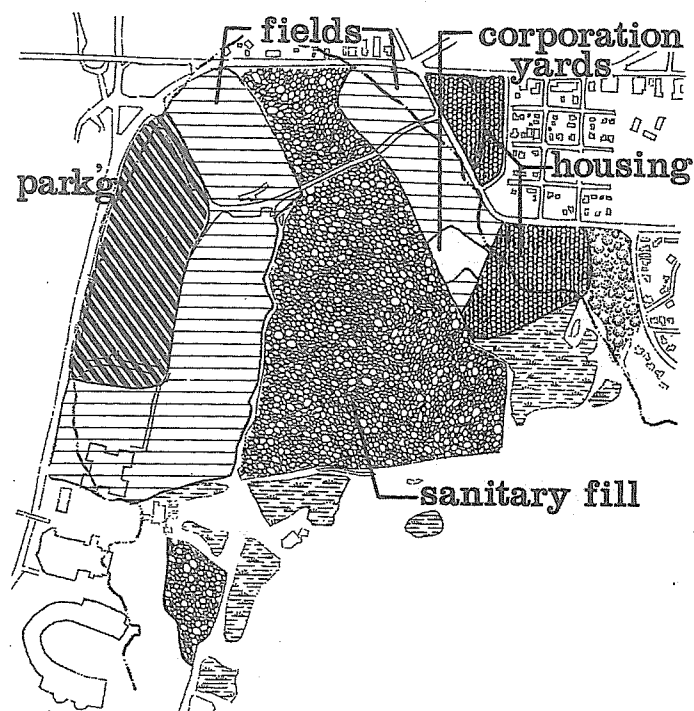
The 1959 illustration shows a major portion of the housing removed and recreation fields on former fill areas. An advanced filling program was instituted during this time at the advice of University Professor Walter Dunn. To keep the peat from squeezing out from under the landfill edge and into the bay, dikes of



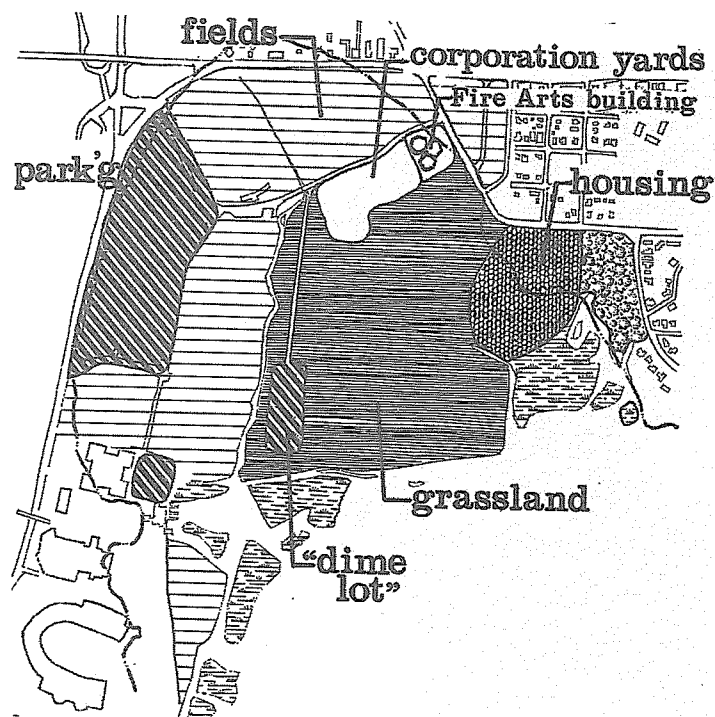
1959



1962



1964



1974

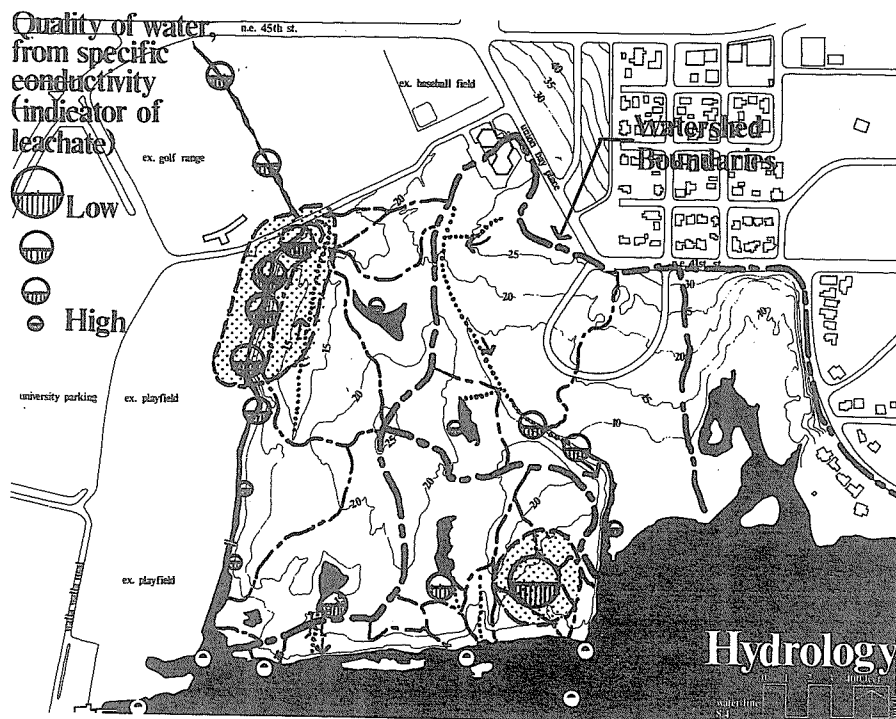
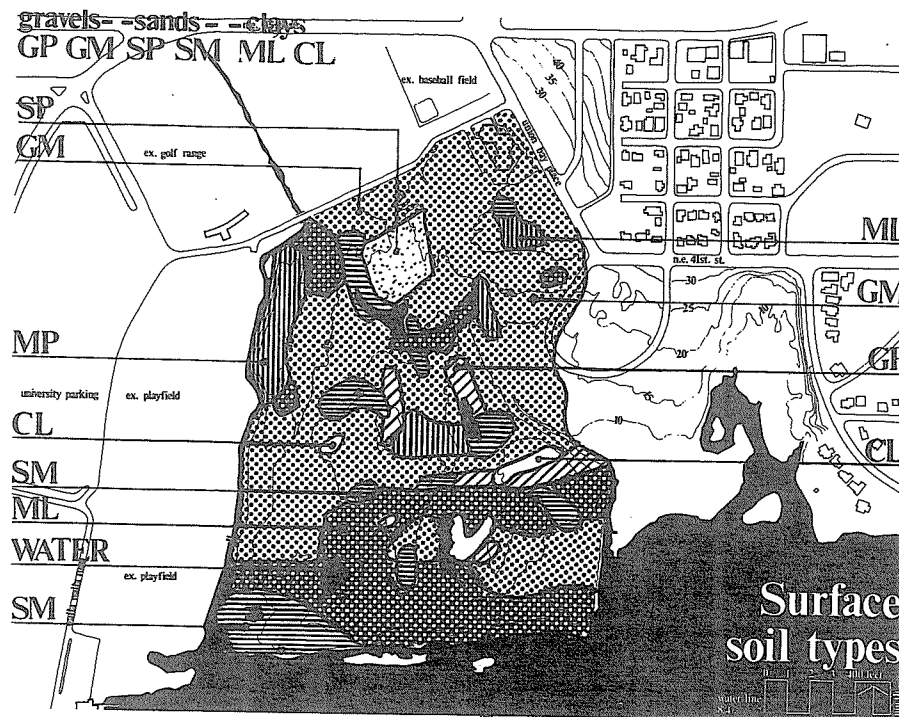
timber and rubble were placed to form large "cells" or compartments to contain the fill and stabilize the underlying edges of peat.

This diking method allowed rapid expansion of the fill area. Fields and parking lots continued to utilize the outer edges of the previously completed fill. The diking and filling activities actually extended beyond the shoreline and entered Union Bay at this time, and the increased weighting of the peat by diking and filling forced up several small new peat islands in Union Bay.

The remaining (eastern) segment of the interior perimeter-loop channel system was filled over in 1964 as the landfill extended toward its most eastern limit, pushing further outward into Union Bay as it moved. The new (present) west canal was constructed by carving a channel through dirt fill which was placed on top of a continuous timber matt dike. Refuse filling was discontinued in 1965, and that portion of housing previously built in the triangle was removed in 1969.

In 1971 rubble and earth fill from the Health Sciences expansion was spread across the site, and final grading and seeding was undertaken. The "dime lot" was constructed in the southwestern part of the fill, and the University began to move its corporation yards to land west of Fire Arts. No substantial site changes have occurred from 1972 to the present. Roads have been repaired, paths gravelled, and wet spots partially drained.

The 1974 sketch shows the site essentially as it is today: surrounded by parking lots and playing fields, penetrated by housing, parking and equipment storage yards. The gently rolling surface supports a grassy cover bordered by cattails and occasional trees. All that remains of the extensive marshlands which once covered the area are the peat islands and the small marsh at the eastern edge of the site.



SITE INVENTORY

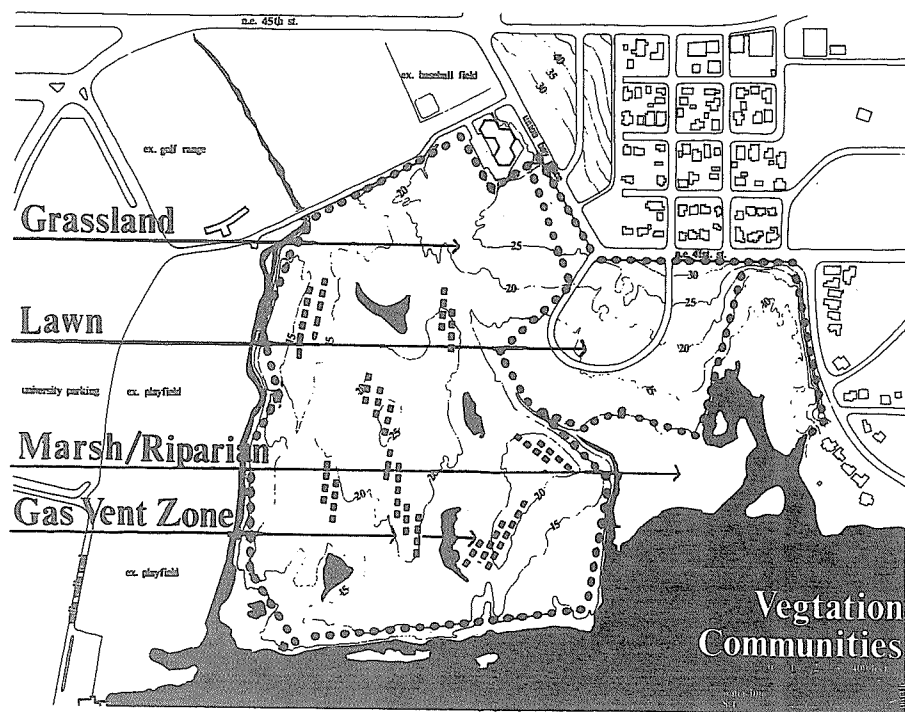
After evaluating existing sources of data, field studies were undertaken to fill the gaps. Different collection and mapping techniques were used, varying with the process, but all were based on two surveyed grids compatible with past studies. It will be necessary to continue some of these investigations in detail in the future.

GEOLOGY

The subsurface composition of the site is best illustrated in the sections which follow. Drill holes of varying depths and sizes yielded data on the water table, layers of fill, refuse, peat and sandy till that make up the "sandwich" which is the site. Surface "soil" of ablation tills, deposited randomly by truck, were mapped to facilitate permeability comparisons.

HYDROLOGY

Graded originally to provide positive drainage, subsequent subsidence throughout the site has created a well-defined drainage pattern that is partly internal. Four ephemeral ponds and several "wet spots" are in evidence and will increase in size. Water quality (measured in relative conductivity) in the ponds is equivalent to that of the lake; the west canal has deteriorated near the culvert constriction through stagnation. Ground water, sampled from the drill holes, was 100 times worse than the lake average, indicating a high leachate level but adequate filtration or barrier ability of the fill.



VEGETATION

Plant communities are quite unusual. The remnant marsh and lawn areas are recognizable, but the grassland has a very slow rate of succession toward woody plants. Quick turf establishment seems too simple an explanation of the woody plant absence. Most unique are the communities associated with the "gas vents". These have sharp ecotones directly attributable to variations in methane gas present in the soil. Except for the marsh, all of the communities are "artificial" and in flux, and it will be instructive to observe which plants dominate.

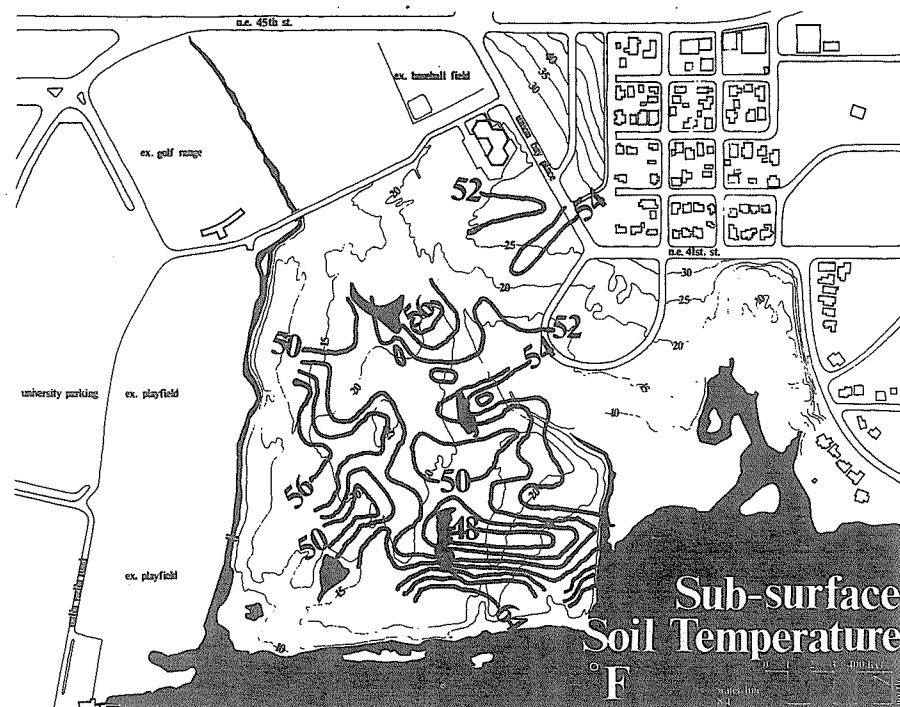
WILDLIFE

Small rodents, beaver and raccoons are the only mammals, but the shoreline harbors a full run of waterfowl. The special feature, however, is the large number of shorebirds,

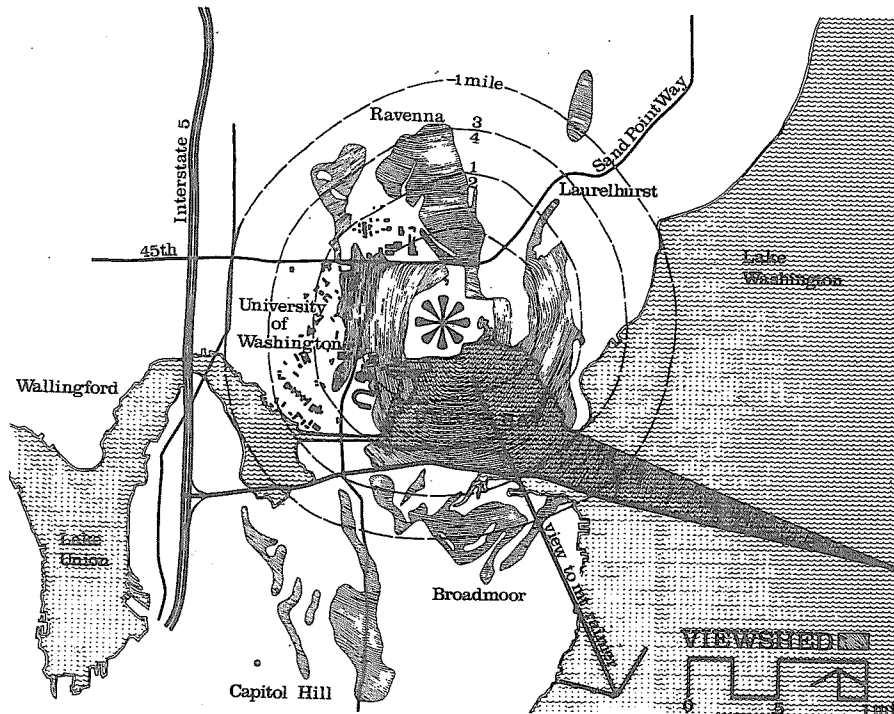
attracted to the site by the "drawdown" edge of the ponds as they dry up in the summer. Unique to Seattle, this open grassland/ephemeral pond combination affords birdwatchers and scientists opportunities that are normally hours away. A number of rare species have been observed.

CLIMATE

The site enjoys Seattle's general weather, but its position at the end of a long reach of Lake Washington makes it very windy, except where protected by the trees along the marsh shoreline. Two special investigations were made: subsurface soil temperatures are higher in areas of active decomposition, and these were mapped as part of the process of understanding the site's dynamics; baseline noise readings were undertaken, and while automobiles and wind were predominant, peaks were Canadian geese, children shouting, and airplanes.

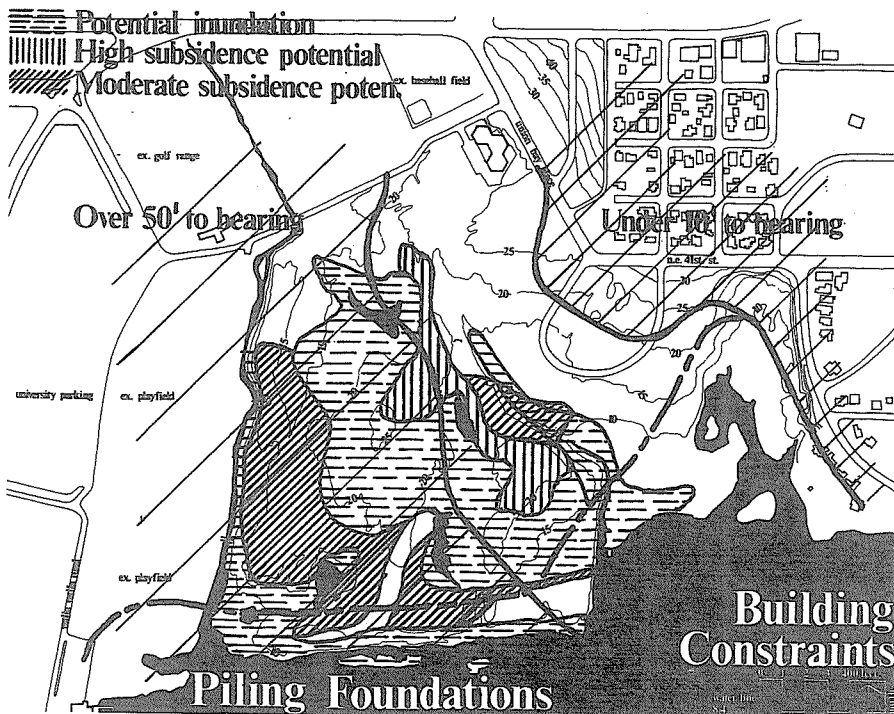


VIEWSHED



The former dump is visible from several of Seattle's residential neighborhoods, free-ways and the University campus (a fact that led to the elimination of open burning, in part). Viewsheds were developed as a guide to mitigating the visual impacts on those people who can see the site and allow the facility to capitalize on the magnificent vistas of Mount Rainier and the lake.

CONSTRAINTS & OPPORTUNITIES



These data were all evaluated as they would effect buildings, plantings and utilities. The example to the left is typical of the Constraints and Opportunities maps developed at this stage.

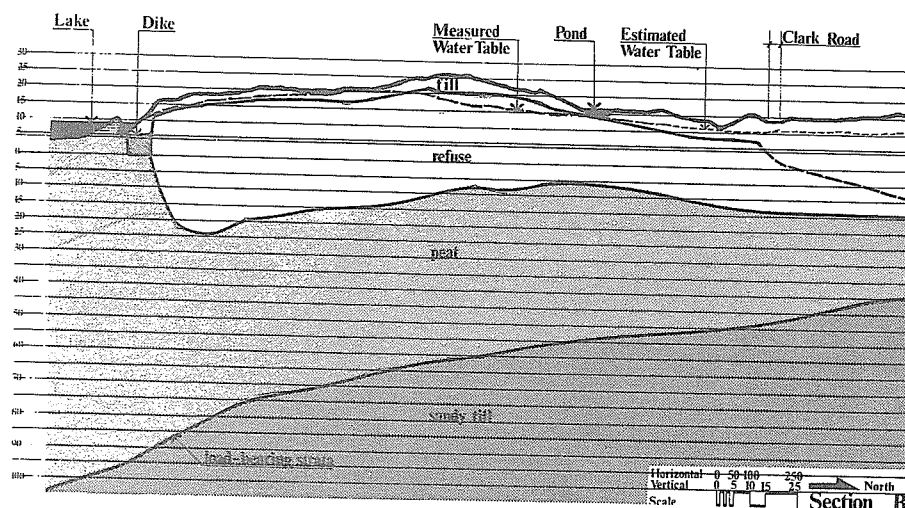
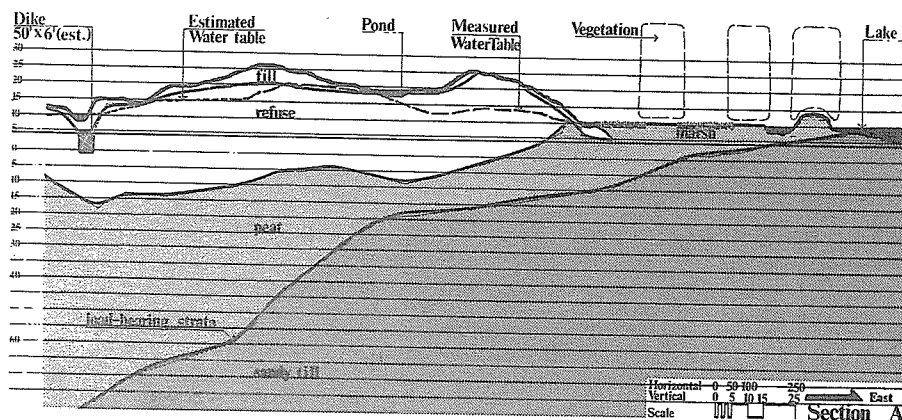
Subsidence - and lack of understanding of its rate, extent and duration - was the biggest limitation encountered. The next step was to ravel out the logic of that problem.

LANDFILL DYNAMICS

The illustrations to the left are the first of five that portray the complexities that exist "underfoot" at the site, and its resulting continued dynamism. (There is a 10x vertical exaggeration in these cross sections which are at right angles to each other, centered on the site).

The substrate is a typical compacted till, similar to those underlying the surrounding lowland areas. After Lake Washington stabilized, organic deposits created a thick layer of peat that covered this till to depths of 120 feet, the deepest in the state. We estimate that only about 60 to 75 feet of peat remain near the southwest corner of the site, due to compaction and displacement by the refuse fill. The engineering parameters of this peat are well known, but calculations depend on accurate knowledge of densities, depths, and loads...none of which is available. The refuse itself is highly variable, and, as no records were kept, locating a particular type of load (domestic waste, concrete rubble, wooden rubble, industrial waste, etc.) is impossible. Thus we cannot describe the mass or density or thickness of this layer with any degree of accuracy without further, detailed drilling.

The fill used to cap the refuse after 1966 is also a glacial till. This silty-sand-gravel was placed "where it was needed" according to one observer. As a result, overburden thickness varies unpredictably from none at all to more than twelve feet, with accompanying variations in local compaction. The dikes are made of crushed frame houses, weighted with fill. The location, size and condition of these features was not recorded. The water table is mounded, and closest to the surface in the west-central part of the site.

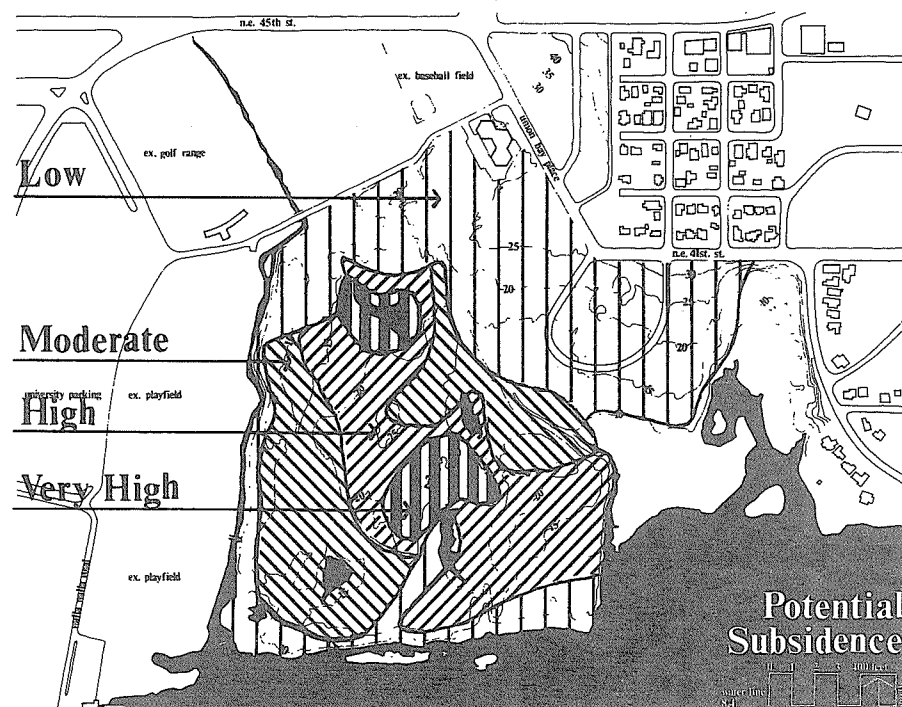
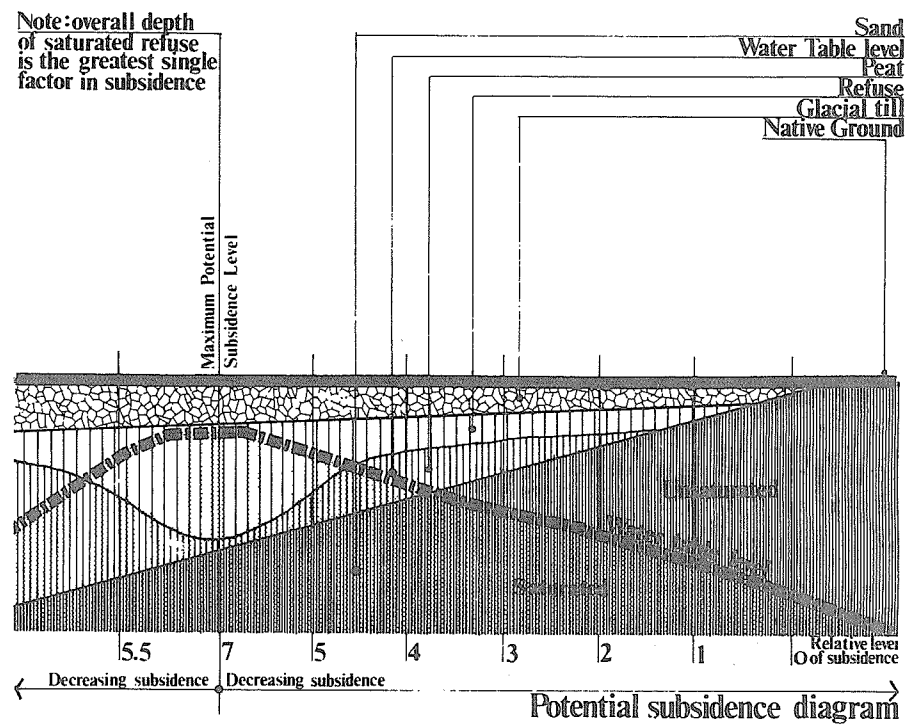


Our increasing understanding of the spatial relationships between the elements of the site allowed - finally - some reasonable estimates of what processes were creating and controlling the generation of gases, the high water table, and subsidence itself.

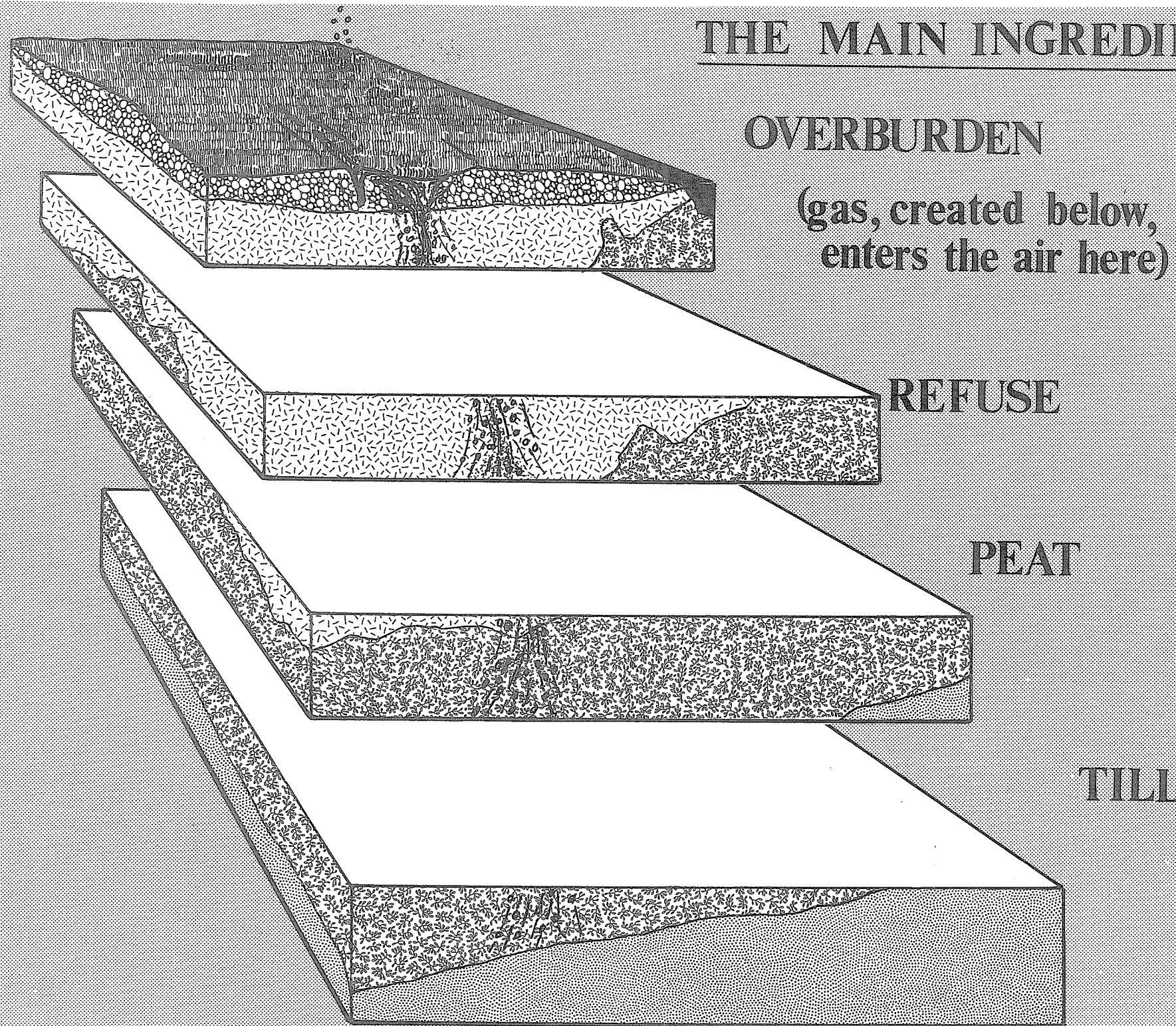
All organic compounds decompose, and here both the peat and organic refuse are breaking down. When these materials are saturated, the rate of decomposition increases, relative to unsaturated areas of similar composition. The illustration to the right is a schematic of what is happening below the surface. The mounded water table puts different amounts of water into contact with the refuse and peat, and this difference is what controls the potential for subsidence. As the map below shows, areas of high potential are quite similar to slices of a cone, indicative of the shape of the water table. All other factors influencing subsidence - density, mass, depth, age, seasonal variation, etc. - proved to have lower correlations.

The unique shape of the mound is not unexpected, being similar to others found in contained landfills. The dikes probably act as "walls" allowing the water to mound in that manner. Records show that the mound is slowly moving southeast, toward the one portion of the perimeter that is not diked, at rates correlative with the estimated permeability of the materials concerned.

The gasses generated when organic compounds oxidize vary with the material, but methane and hydrogen sulfide are the most common. Methane travels upward to the capping fill layer, which is relatively impermeable; then travels laterally "uphill" until it reaches a crack in the surface near the top where it escapes. This gas is present in commercially recoverable quantities, and creates barren zones where it is concentrated around the cracks. Plant roots find the gas-saturated soil inhospitable, and few survive



THE MAIN INGREDIENTS



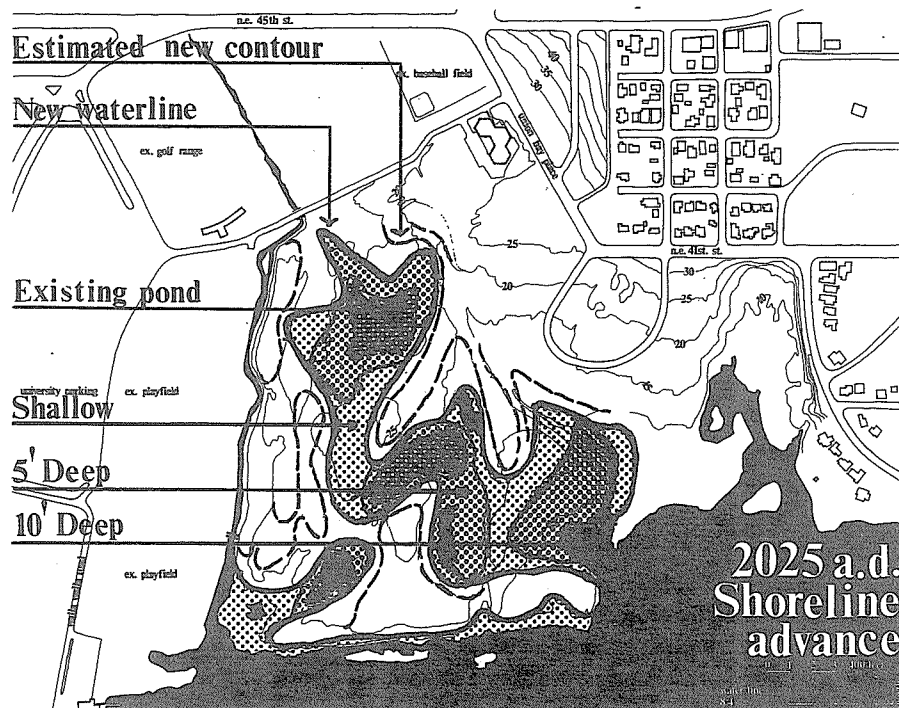
DYNAMIC OPPORTUNITIES

It would be foolish to believe that such a dynamic land mass would be without unique and difficult problems, yet, in some important ways, the very troublesome nature of the land is its greatest opportunity. This is not an argument for turning straw into gold. Mankind has become quite proficient in creating various sorts of wastelands, from scarred hillsides to asphalt jungles, and is trying - with some struggle - to learn how to mitigate these mistakes. The opportunity to monitor one such mistake at Union Bay should not be passed by.

Though the record is incomplete, we have the ability to rebuild the past story that led to the present landscape. By providing continuous, rigorous scientific records of the landfill as it continues to seek its "natural" level, and by attempting to modify the extreme conditions with plant materials, the Union Bay Teaching and Research Arboretum will add rapidly to the meager store of knowledge about these processes.

The stable land on the edges of the site will adequately answer the long term needs for structures and plantings (see Master Plan) to support the present and projected needs for teaching and research facilities in the plant sciences. As the land subsides and the lake encroaches, the opportunity for interdisciplinary work will increase, involving aquatic biologists, zoologists, soils scientists and engineers.

Accepting the reality of the site, learning to work with it in harmony, will lead to deeper insights into ways we may discharge our responsibility to our world.



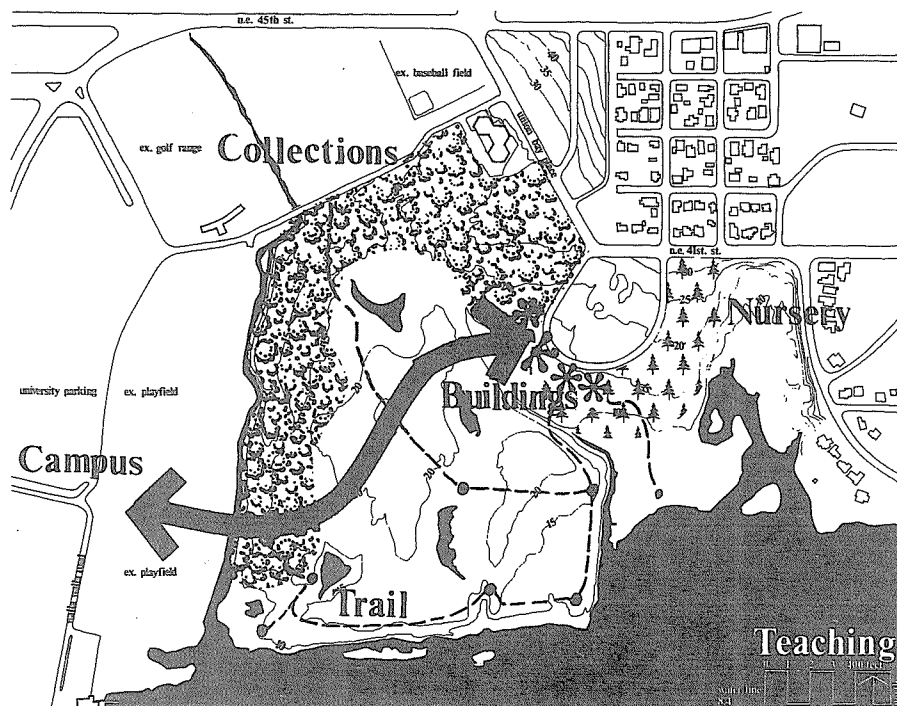
ALTERNATIVE CONCEPTS

To this point, the approach toward an evolving Master Plan was guided by the natural forces and values operating on the site, as well as the general programmatic requirements established by the Preliminary Concept Plan. Because of the complexity of the site and its proposed use, however, it was felt that a further framework was necessary to discipline the emerging plan.

Four major goals or responsibilities of all arboreta were taken in their purest form and examined for suitability, problems and opportunities on the site. The four -- Teaching, Research, Public Service/Display and Stewardship -- were extrapolated to produce logical and functional, though rather single-purpose solutions. These were examined for individual strengths without concern for the imbalances produced, which would be selected out in the next step.

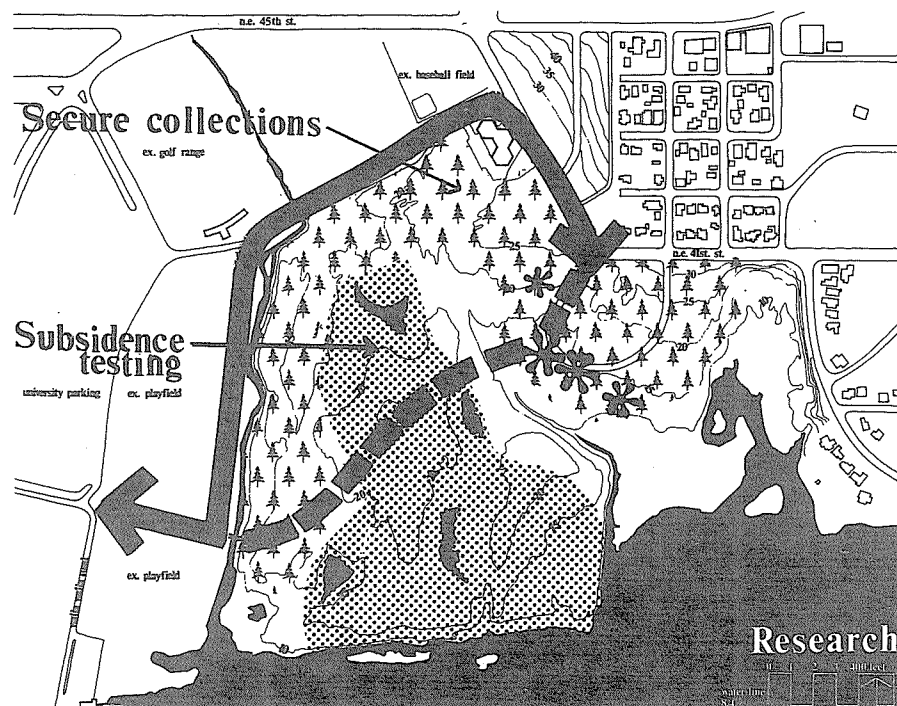
Two other concepts were "maximized" in this way, but for different reasons. Public Open Space is not normally a goal of an arboretum, but this site is one of the last large undeveloped pieces of Lake Washington Shoreline and, as such, has a considerable value for recreational uses. Reclamation was also examined as a more traditional future, as an alternative to "living with" the natural processes operating at the site.

TEACHING

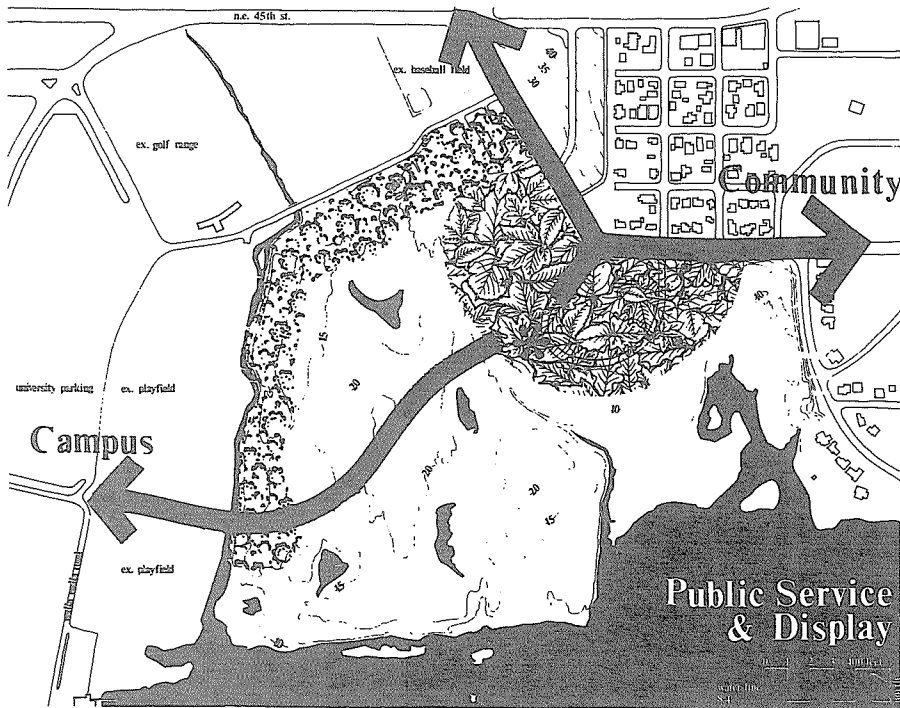


The focus of this study is on University-level classes in botany, forestry, horticulture and other life sciences. A large building complex is developed on the more stable portions of the site for use as a teaching center and would contain classrooms, meeting rooms, library, audio-visual support, and offices. The rest of the site would be dedicated to various collections arranged for teaching purposes, while the distant portions and specialized biosystems (marsh, gas vents, etc.) would be interpreted by remote teaching displays.

RESEARCH

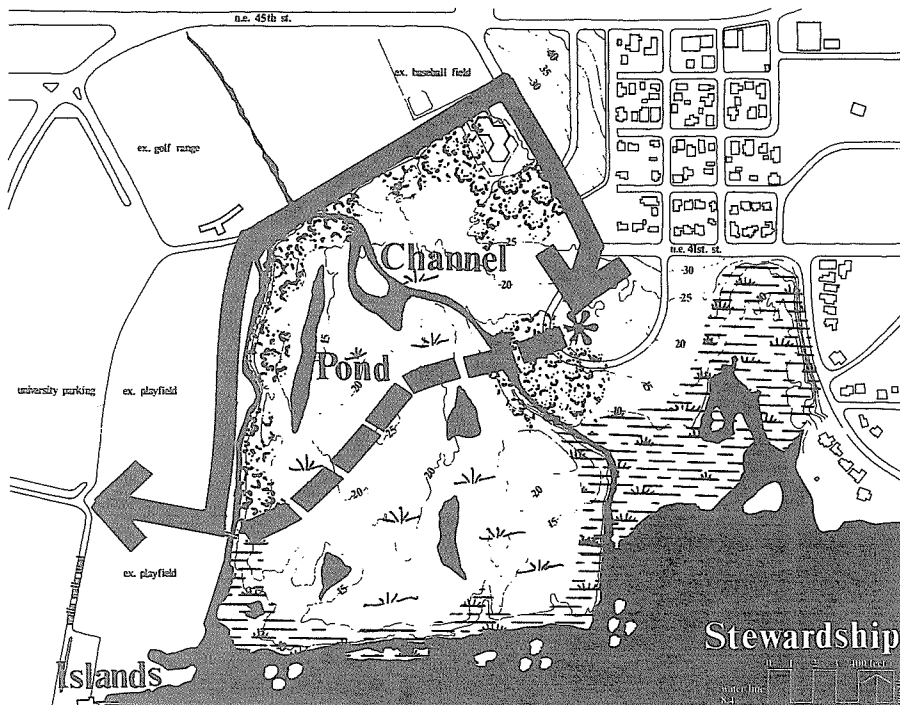


Maximization of all the site's research opportunities implies that much of it be closed to other uses, allowing controlled observation to proceed undisturbed. The stable ground would provide space for a research complex, housing, administrative offices, laboratories, conference rooms, library, herbarium, and support services. Traditional forms of botanic research would be conducted in the nursery, greenhouses, laboratory, and outplanting areas, leaving the bulk of the site for interdisciplinary landfill research.



PUBLIC SERVICE & DISPLAY

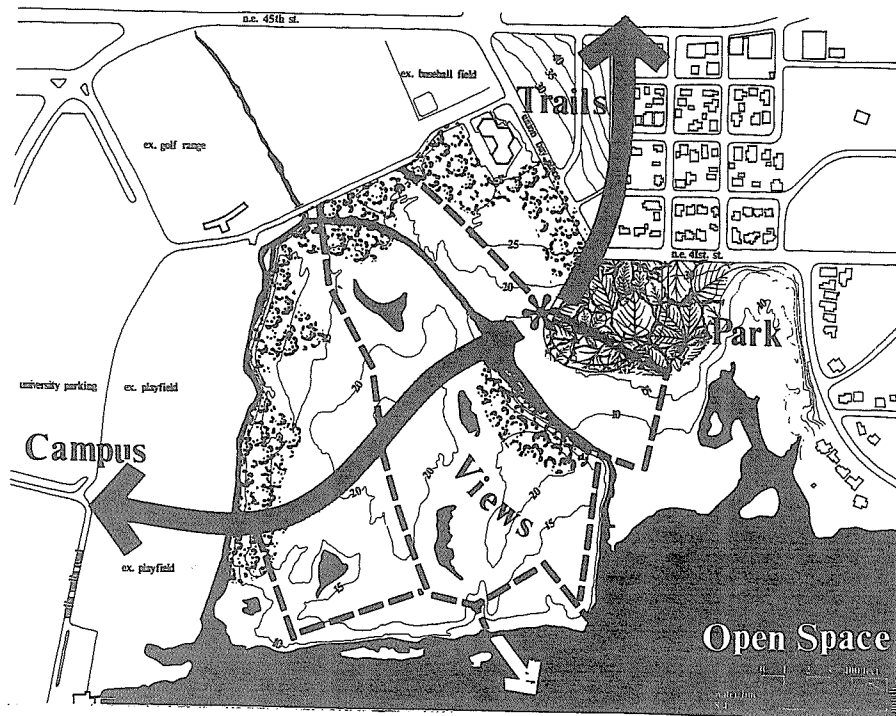
One of the most important aspects of any arboretum, the emphasis here is on public amenity planting, continuing education, and "practical" demonstration/display facilities. More space would be given over to plantings arranged for their interest to the lay gardener and specialized groups. The building would house multi-purpose meeting spaces suitable for lectures or small classes, and office space for horticultural support groups. Greater public use implies more parking, lighting and pathways, and more evening activities.



STEWARDSHIP

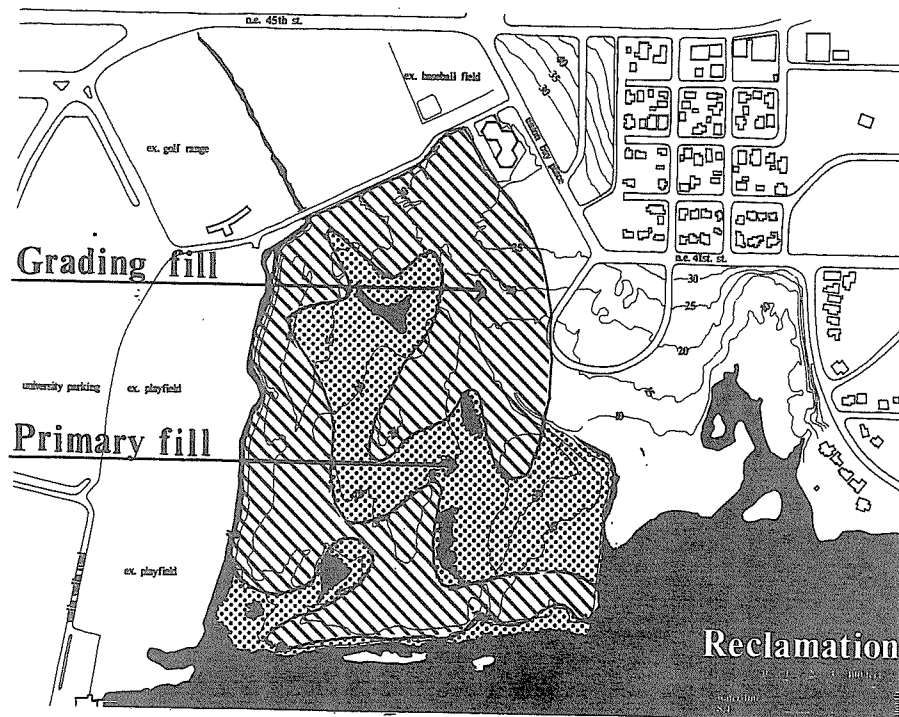
In addition to an arboretum's more traditional role as conservator of plant material and source of values, this site dictates some broader concerns. The unique ephemeral ponds, grasslands, and their associated wildlife, and the remnant marsh to the east require management and protection. To best preserve these resources, limits to access would be inevitable. Additional ponds and peat islands could be established, as well as shrub/tree cover and the revival of the eastern channel to increase habitat diversity. Interpretive facilities would be available. Buildings would be buffered from interference with the site.

OPEN SPACE



As mentioned before, the site is a major shoreline resource and is also the last remaining large open space on the campus. Maximizing on these resources would lead to increased park-like amenity plantings, public facilities, interpretive displays, access to water's edge and boat launch availability. Recreational marsh walks, outdoor pavilions, allotment gardens, parking, and more all-weather paths were considered. Connections to the campus and city trail systems were strengthened.

RECLAMATION



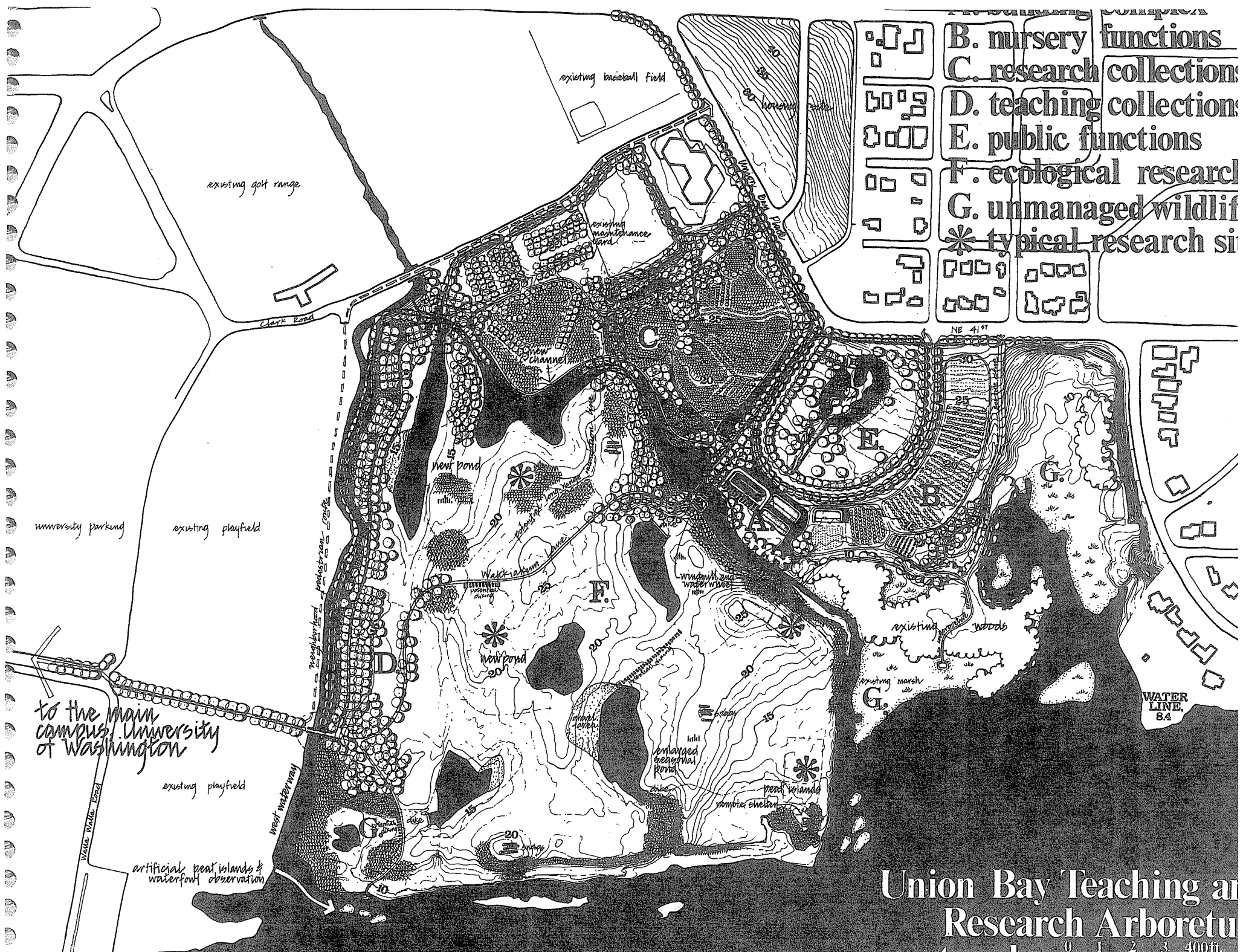
Subsidence and the advance of the lake will ultimately claim thirty or more acres of the site. If the University were to fill these, it would take an estimated 787,000 cubic yards of fill (allowing for settlement and contouring). At a 1975 cost estimate of \$5/yard for such material, delivered, the cost would be \$3,935,000, and all that would result is a gently rolling empty field. (This figure is in excess of the estimated cost of all facets of the basic Master Plan.

The MASTER PLAN

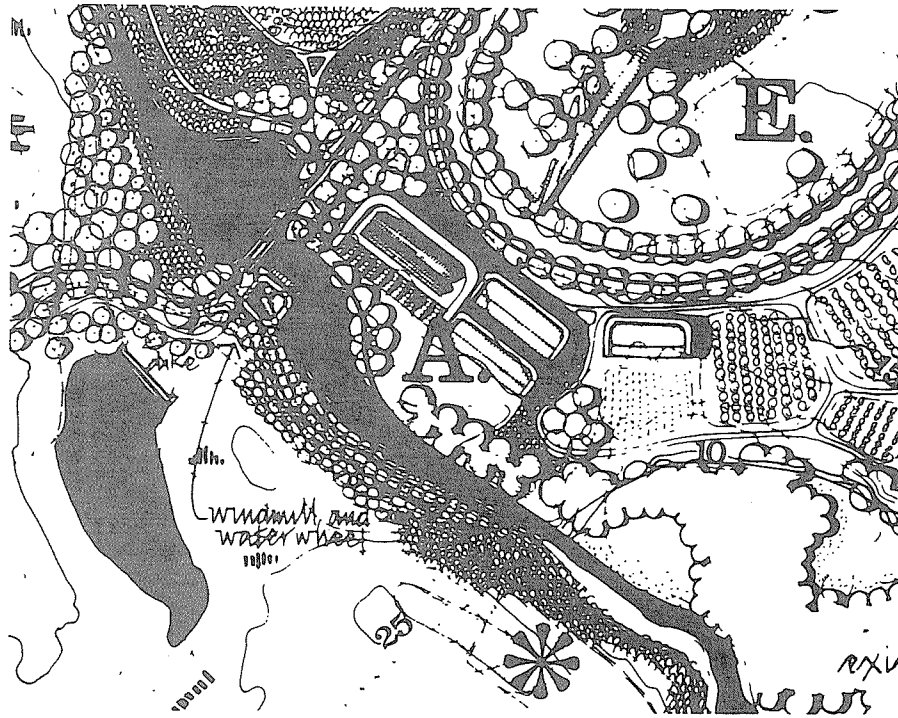
The Master Plan, shown opposite, resulted from the inclusion of strengths and resolution of conflicts within the concept studies. It is a complete solution to the requirements of the Preliminary Concept Plan. Major elements of the Plan are the Building Complex (1 ac.), Nursery Functions (5 ac.), Research Collections (25 ac.), Teaching Collections (10 ac.), Public Functions (5 ac.), Ecological Research (34 ac.) and Unmanaged Wildlife (20 ac.). They will be discussed in detail below.

Several elements of the plan are not limited to any one area. Enhancement of wildlife is a major goal, and with the support of other interested groups, much could be done to supplement the new ponds and islands the plan suggests. Reinstating the east canal would improve the water quality of the western portion, reviving a pleasant recreational amenity, while increasing shoreline habitat and protecting the research collections. Access to and through the site would vary, with the Nursery and Research Collections most protected. Shoreline access, and passage through the Ecological Research Area will be controlled to limit degradation, primarily by using limited, non-continuous trails. As part of the University, the site would be subject to the same security standards as the rest of the Campus. Substantial boulevard plantings and edge enhancement would blend the facility into its surroundings.

The opportunity exists to utilize the site's methane gas for heating and wind power to supplement irrigation needs. The Building Complex would be energy conserving, taking advantage of siting, vegetation, solar panels and new technologies and engineering.

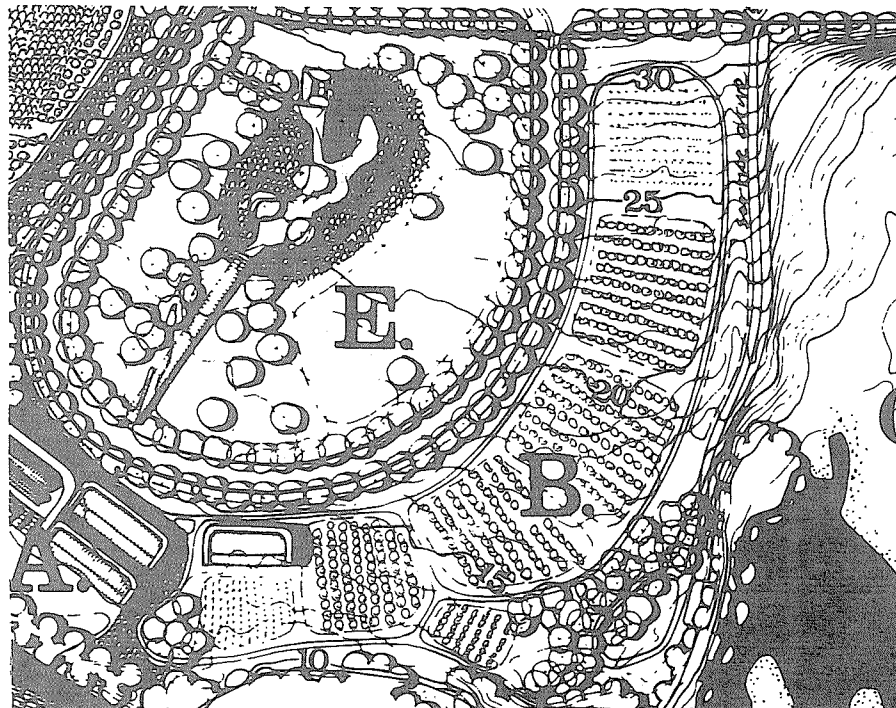


Union Bay Teaching and Research Arboretum



A. BUILDING COMPLEX

The Building Complex will house the administrative offices of the University of Washington Arboretum, and provide office space to horticultural support groups. Classrooms and meeting rooms would be flexible to service a wide range of users. The library and herbarium would be accessible to scholars and visitors. Greenhouses would be connected to the laboratory portion of the building and serve both propagation and research functions, while the labs would be suitable for a range of research activities. Specific designs for the building are premature, but it would be energy conserving with solar panels, low profile, oriented for maximum sun and minimum visual impact.

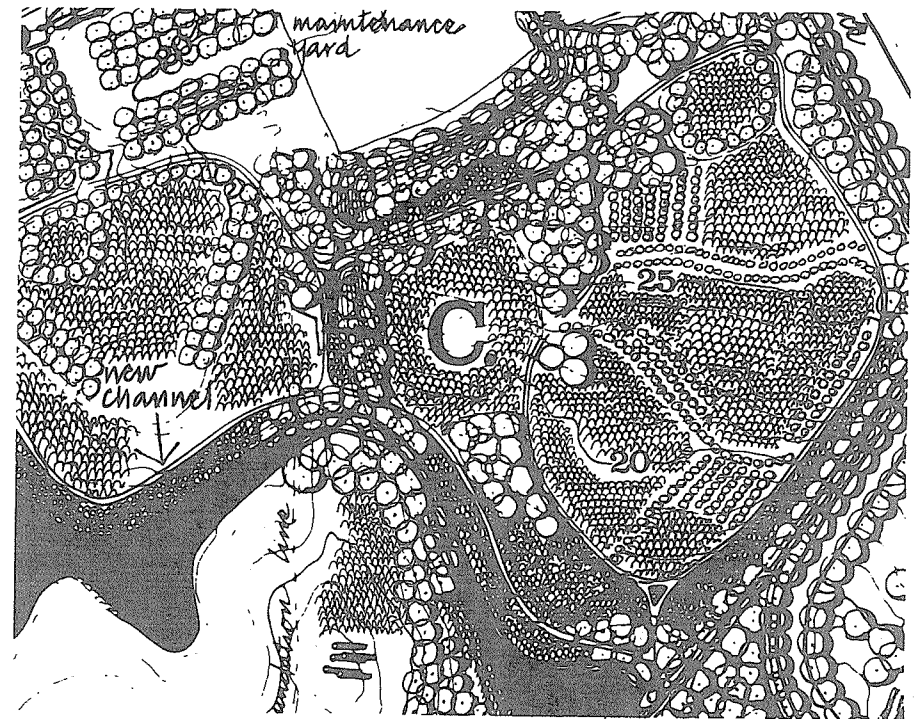


B. NURSERY FUNCTIONS

The Nursery area was selected for its sheltered qualities and good security. Ample space for both short and long-term outplanting is available here, and lathhouses and raised beds would solve specific problems. Initially, many of the plants needed for establishing the research and teaching collections on the Union Bay site would be grown here, as well as any plants to be used in the initial landfill investigations. Ultimately, all of the plants needed for the entire Arboretum Program will be given their start here.

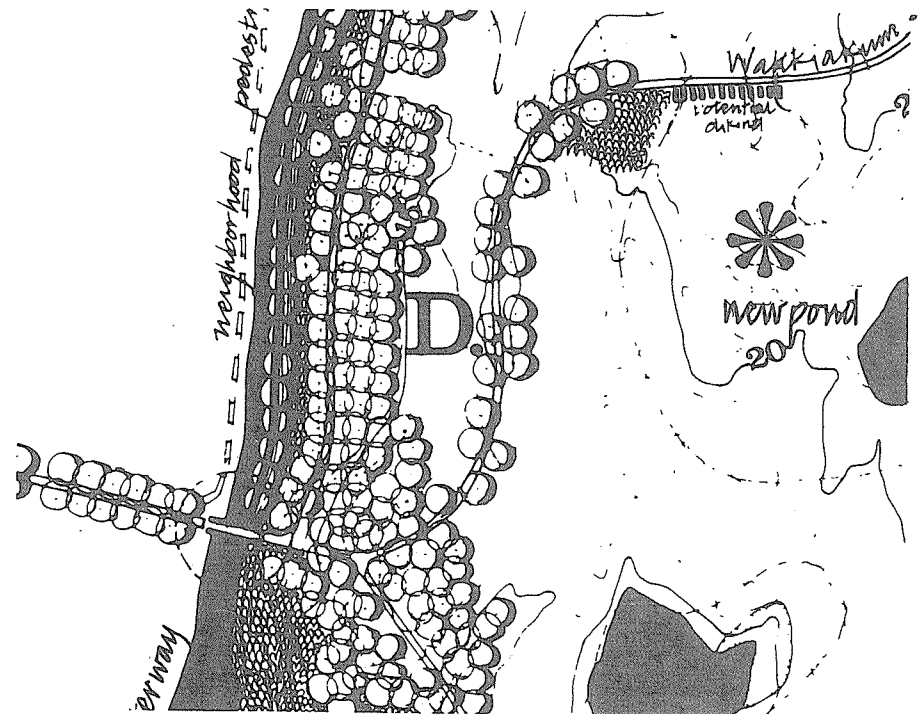
C. RESEARCH COLLECTIONS

The Research Collection would be rather agricultural in appearance. A large, flexible arrangement of on-going research plots would be found in this area, probably concentrating on plant survival, hardiness testing, landfill reclamation and regeneration and other types of controlled botanic research. Portions of the permanent teaching collection of woody plants would be used to buffer this part of the arboretum from the others. Access would be controlled.

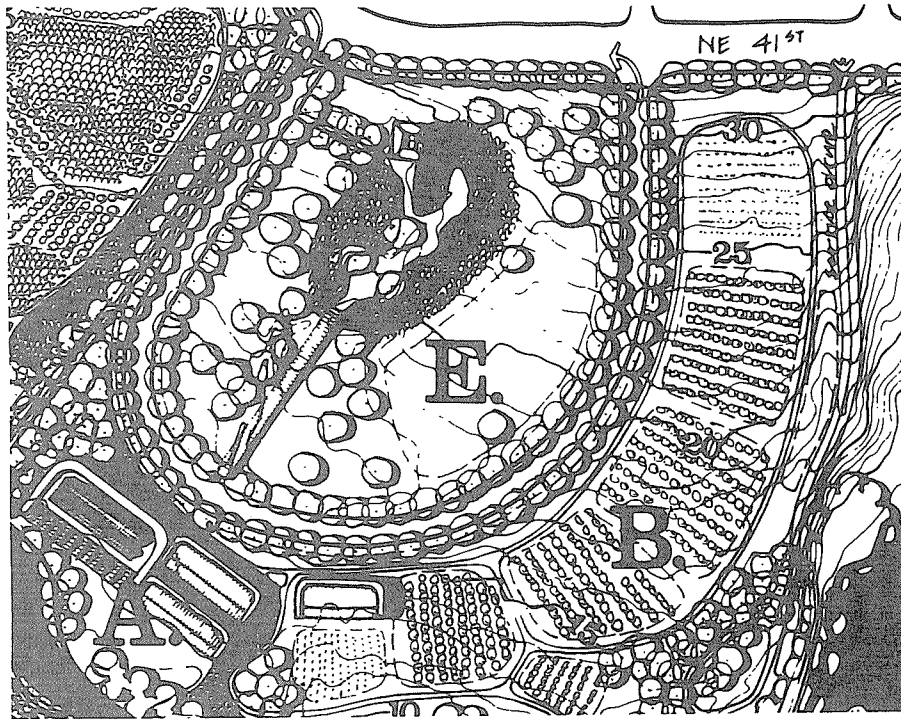


D. TEACHING COLLECTIONS

The Teaching Collections would be established along the west canal where the land is more stable, surrounding the research collections and as part of the amenity planting near the building complex. Woody plants would be arranged in this collection to facilitate the teaching of Dendrology and Botany, providing a needed facility close to the campus. The link to the main campus would be strengthened with the establishment of boulevard planting. These trees would also serve to screen the parking lot, improving the view of the campus from the new arboretum.

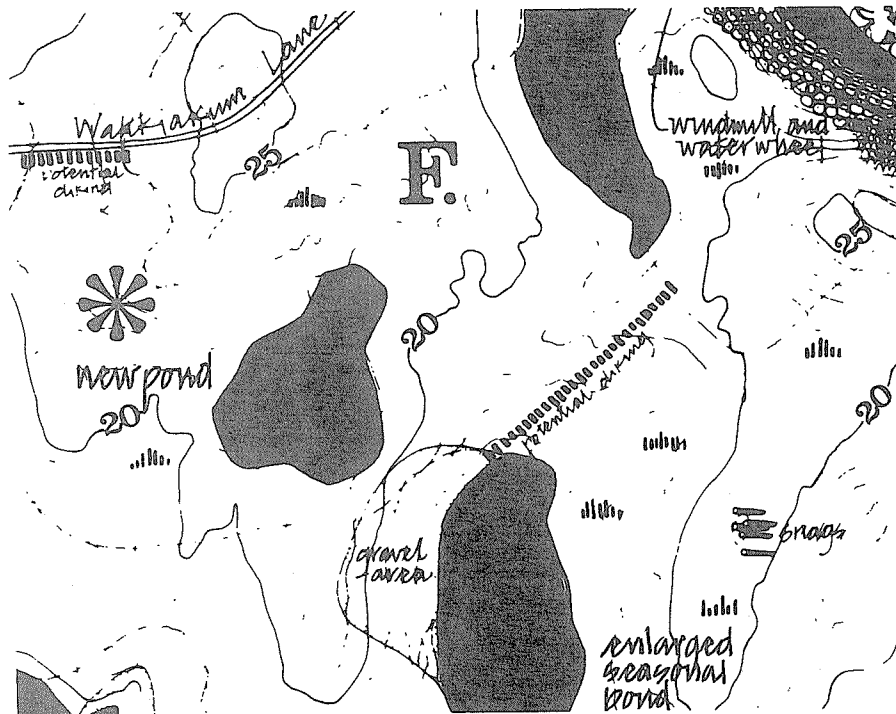


E. PUBLIC FUNCTIONS



The new entrance and public open space will serve many functions. First of all it is a strong statement of the activities available in the arboretum, turning an attractive face toward the surrounding community. Here would be displayed the results of on-going research efforts. Amenity planting, a shelter, picnic facilities and screened parking spaces - around the loop road - would be among the services available. The entrance to the building complex would serve as a directory, suggesting visits to the other campuses of the arboretum in Washington Park, Pack Forest and the Bloedel Reserve, and listing the public service programs available throughout the entire arboretum system.

F. ECOLOGICAL RESEARCH



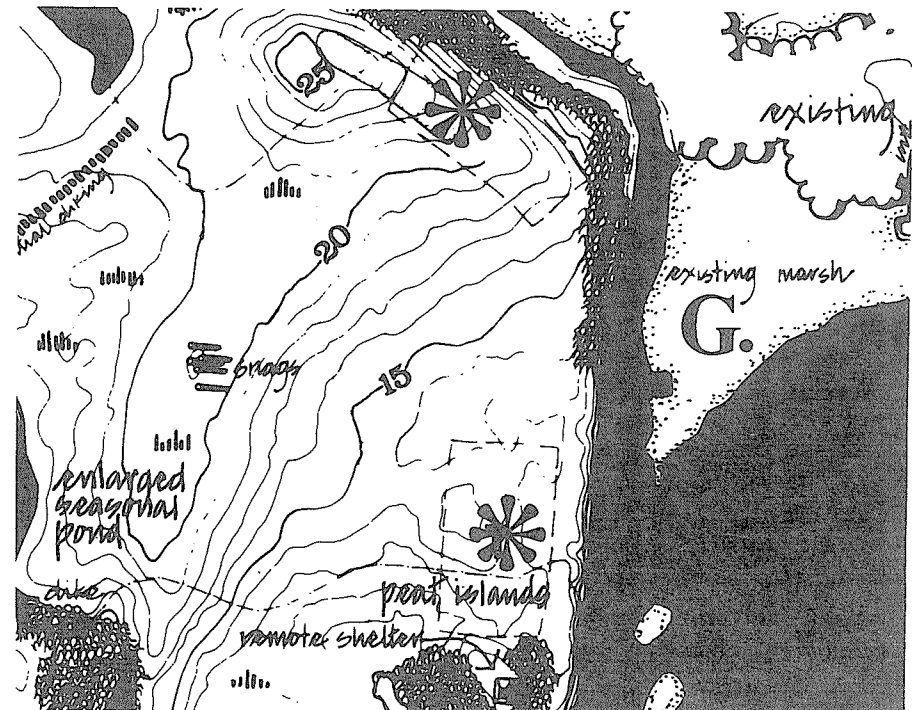
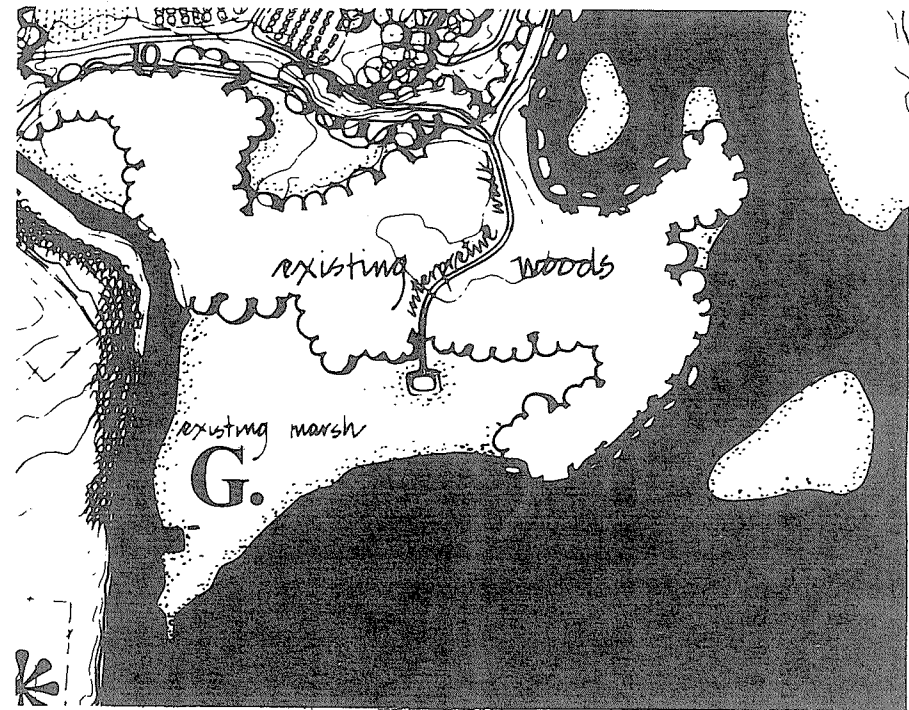
The Ecological Research Area, partially shown to the left, will be a managed grassland, maintained to preserve the wildlife and the research opportunities for observing an active landfill's change. Successful use of this area will depend on the interest of other departments and individuals in the University community, since many of the most exciting opportunities for research here are not, strictly speaking, botanical. Yet the web of life is so unusual on this man-made landscape, that isolating one discipline from another in studying it would be a serious error.

G. UNMANAGED WILDLIFE AREA

The Unmanaged Wildlife Area is actually the remnant of the original cattail marsh, created in 1916. Found on the eastern edge of the proposed nursery, it should remain the undisturbed framework for the new arboretum, serving as a constant reminder of the site's former self. The southwestern corner is emerging as a new wetland too, and will be allowed to regenerate itself in its own time.

* TYPICAL RESEARCH SITES

The Typical Research Sites shown here are indicative of the selected monitoring stations that will be located throughout the site. They will have varied purposes, collecting data on land-fill dynamics, water quality and location, vegetation response/adaptation, plant succession, environmental stress, gas generation and active subsidence. These sites will vary widely in size, location and access, but will never be so disruptive as to eliminate the wildlife.



The MASTER PLAN

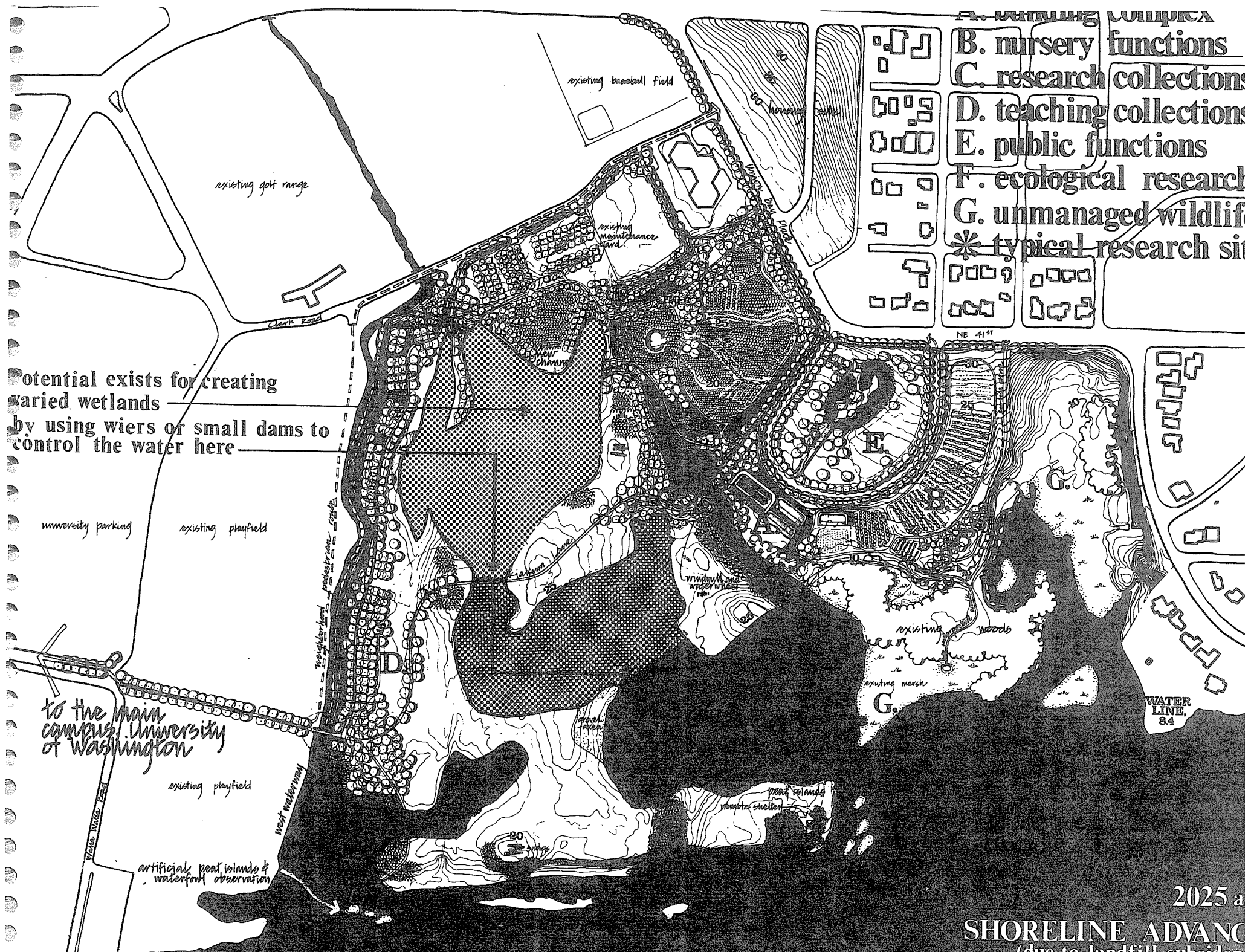
...Fifty Years Later

The map, opposite, shows the area projected to be covered with water fifty years hence. (The contours have not been corrected). As one can see, none of the basic arboretum functions will be disturbed by this occurrence, and, in fact, the chance to observe this action will be one of the prime research opportunities afforded by the landfill itself.

However, this process will gradually alter the wildlife habitat, eliminating the ephemeral ponds and creating new marshy shoreline. It is theoretically possible, and possibly desirable, to attempt to control this process in some way, and segregate the emerging wetlands from complete association with the lake. This would retain the isolated quality of the water bodies with enough intermittant pond habitat to remain. The use of tree planting, permeability control, or water table manipulation to control the inundation may be possible on a limited experimental basis.

Clearly, the active nature of the site offers more bonuses as a research facility than problems. The slow rate of subsidence will allow long-term monitoring of vegetative resistance to high water, gas, and subsidence, and the close association of research laboratories should facilitate detailed interdisciplinary studies in landfill dynamics.

The future will see a strong research and teaching facility with an everchanging challenge available in its "front yard".



- A. building complex
- B. nursery functions
- C. research collections
- D. teaching collections
- E. public functions
- F. ecological research
- G. unmanaged wildlife
- * typical research site

Potential exists for creating
varied wetlands
by using wiers or small dams to
control the water here

A SUMMING UP

The Union Bay site can, without question, accommodate a Teaching and Research Arboretum. No other city has such an asset, owned by a University, for conducting environmental research on the "Urban Wilderness". Field and laboratory studies are possible concerning woody plant propagation; plant survival under conditions of gas, toxic groundwater and active subsidence; soil modification; succession control to allow reclamation and regeneration of urban wastelands; landfill dynamics; water quality; habitat creation/enhancement ... a host of problems that we are forced to meet head-on everywhere.

In addition, the University of Washington Arboretum benefits directly in several ways: concentration of supervisory functions; nursery, propagation and outplantings; laboratory space to conduct research that is currently farmed-out or left undone; usable library and herbarium; secure field research plots; freedom to expand display and public service in Washington Park, finally realizing the potential of that renowned facility; closer student contact and better teaching facilities.

Small steps lead to distant goals. The Union Bay Teaching and Research Arboretum could be initiated with a relatively small outlay for nursery, utilities, headhouse, and some soil preparation, the rest following later. By working with the natural processes of the site, it becomes more and more valid scientifically and aesthetically as it adjusts toward a final repose. The opportunity to foster research and monitor change over the years is not only feasible, but a truly exciting prospect!

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The complete technical findings are available for review at that location. Inquiries about field techniques or design implications should be sent to: Jones & Jones, 105 South Main St., Seattle, WA, 98104.

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