BOLLING ANACOSTIA MASTER PLAN

Washington, D.C.

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KEYES, LETHBRIDGE & CONDON, ARCHITECTS AND PLANNERS
SASAKI, DAWSON, DEMAY ASSOCIATES, INC., LANDSCAPE ARCHITECTS

JUNE 1972

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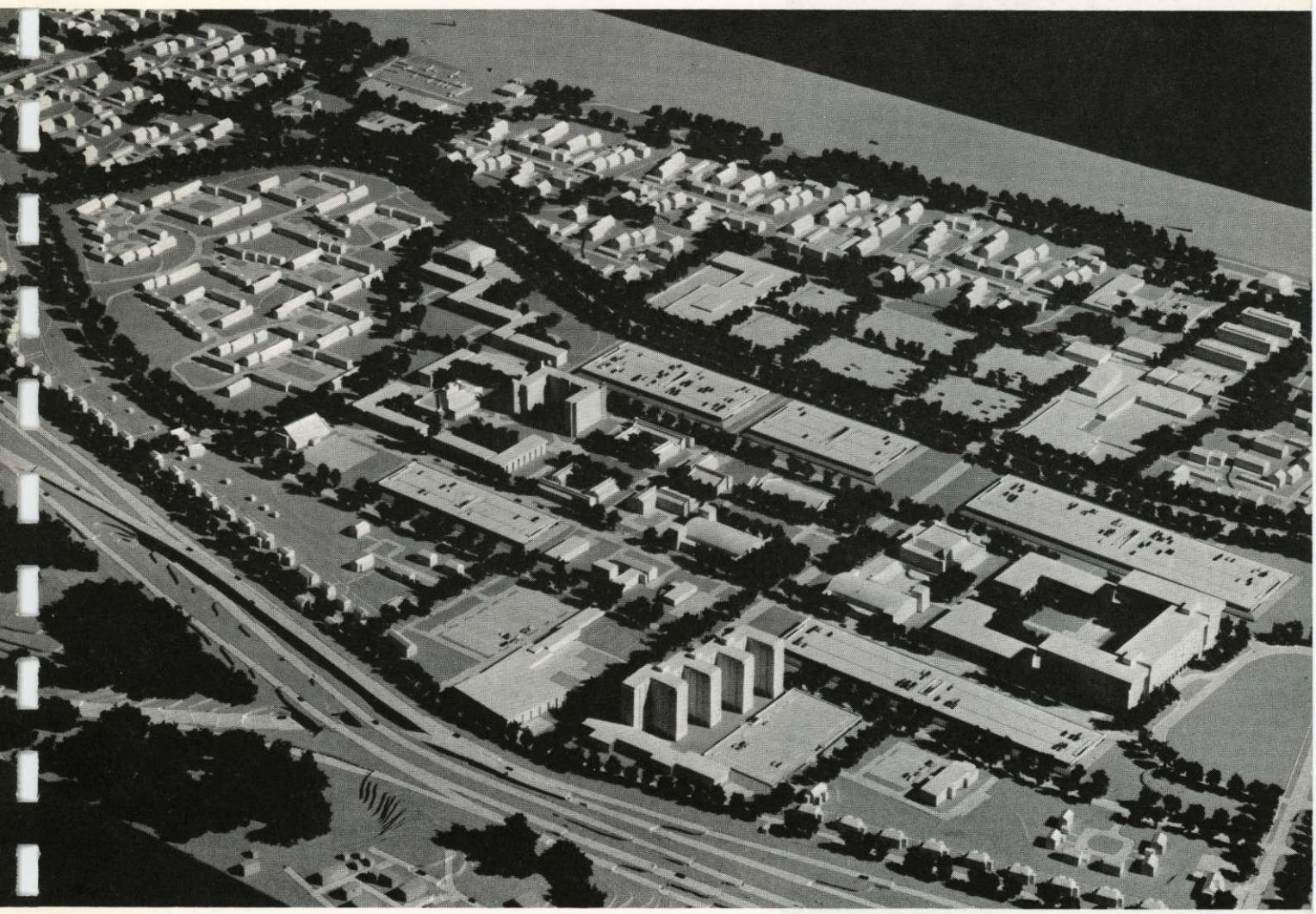

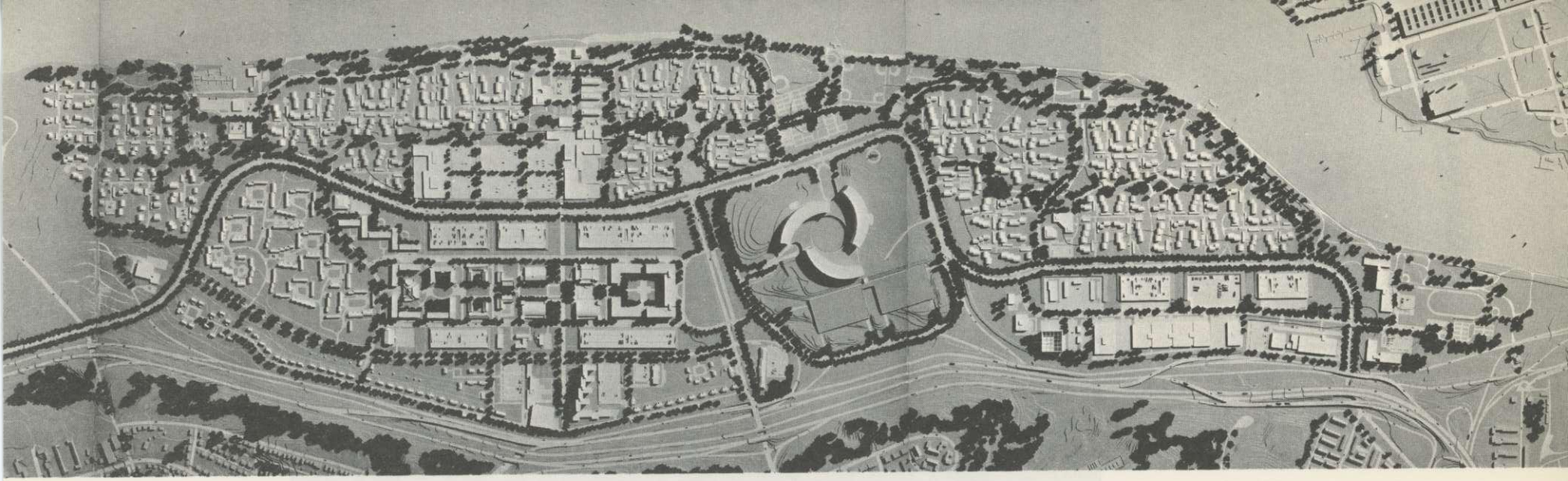

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Section One

INTRODUCTION & RECOMMENDATIONS

INTRODUCTION

The Bolling/Anacostia Tract of approximately 1,000 acres has been subjected to much fragmentary planning since it was first used as an airfield in 1917. There have been master plans prepared for Bolling Air Force Base, for the Naval Air Station and for the neighboring Naval Research Laboratory. At one time, the Department of Defense indicated that it did not need the entire tract, and the National Capital Planning Commission proposed use of a portion for urban renewal. Plans were prepared for this use as well. In mid 1971, however, a regional Master Plan for Navy Department facilities documented the need and desire for retention of the entire Bolling/Anacostia tract by the Department of Defense. A few months later, the overall Department of Defense Facilities Master Plan for the National Capital Region confirmed the need for retention of the entire tract, and incorporated the Navy Department proposals for its utilization. This regional plan (DOD/NCR Plan) was approved by the Secretary of Defense on 18 June 1971. In his letter of transmittal to the President, the Secretary pointed out the need for continued retention of the entire Bolling/Anacostia tract to satisfy the regional facilities deficiencies of his Department. The Plan designated this location as a Special Federal Employment Center to include administrative, medical, research, light industrial, housing and personnel support functions.

On 6 January 1972, the National Capital Planning Commission approved the DOD/NCR Plan in general, but deferred recommendation of the Bolling/Anacostia Tract until it could review a detailed Master Plan. Presented here is a Master Plan for joint military use of the entire Bolling/Anacostia Tract.

The Chesapeake Division of the Naval Facilities Engineering Command served as contracting agency. Planners for the project were Keyes, Lethbridge and Condon, Architects, in association with Sasaki, Dawson, DeMay Associates, Inc. Additional consultants have included Alan M. Voorhees & Associates, Inc., for traffic and transportation, David Volkert & Associates for civil engineering and utilities, Gladstone Associates, economic consultants, and George Schermer, community affairs consultants. Throughout the planning process, close contact has been maintained with Headquarters Command, USAF, at Bolling Air Force Base.

Partner-in-charge has been Francis D. Lethbridge, FAIA; project manager for the planning team was Colden Florance, AIA, of KLC. Project manager for the CHESDIV-NAVFAC was Robert Ramer and W. E. Fischer represented HQ Command, USAF.

SUMMARY OF RECOMMENDATIONS

The following points constitute the major recommendations contained within this report. These points are discussed at length in the body of the report but are extracted

here in the interest of convenience, clarity and emphasis:

1. The entire Bolling/Anacostia Tract should be planned as a single jointly-used, multi-purpose military facility.

2. Basic support and administrative needs should be given first priority.

3. Military family housing should be given second priority and provided to meet the area wide housing deficit only after satisfaction of all basic working requirements.

4. Relationships with the community in terms of employment opportunity, traffic impact and school considerations should be carefully studied. Close cooperation with District officials must be maintained on a continuous basis.

5. The water's edge should be developed as a park and recreational facility serving as a recreation resource for its entire length.

6. The present flood control levee should remain intact but no new building construction should be undertaken at an elevation lower than 16.5' (Bolling Air Force Datum). No major road construction should occur below elevation 14.5'.

7. An earth fill program should be instituted as soon as possible to meet the planned grade requirements. The effect of earth settlement should be clearly recognized. Design elevations should strive for the minimum fill necessary to provide acceptable surface run-off. The most economical balance must be struck between amount of fill and extent of underground drainage piping.

8. Access to the site should occur at three major points. These are Firth Sterling Street, Portland Street and the combination of Chesapeake Street and the Naval Research Laboratory interchange with I-295.

9. The south Capitol Street Corridor and the I-295 freeway system should be upgraded to handle ultimate vehicle demands. Interchange design should encourage the use of the Firth Sterling and NRL access points while reducing the use of the Portland Street entry.

10. Defense Office Building access should be confined to a separate ramp system.

11. Basic traffic circulation should be organized around a four-lane spine road running north-south from Firth Sterling Street to the interchange at the Naval Research Laboratory. This spine road should play a key role in defining major land use organization.

12. Excessive land area should not be devoted to parking. Instead, structured parking should be provided on a staged basis as growth develops. This parking should relate well to the spine road, basic land use areas and by virtue of proper landscape treatment, should act as a buffer between areas of different use.

13. A clear pedestrian and bicycle circulation system should be developed which minimizes street crossings and affords access to all major site areas including the two elementary schools.

14. Major city and regional truck sewers run through the tract and new ones are proposed. Easements for these lines should be located in conformance with the plan in order to encourage plan development.

15. Wherever possible, existing storm drain lines should be utilized. The condition of these lines should be determined through field investigation.

16. Landscape design concepts should reinforce the basic Master Plan and should be responsive to the basic ecology of the site with its lengthy river frontage. Within economic restraints, environmental considerations should dominate.

17. The proposed Master Plan is based on presently conceived base facility requirements which are satisfied in the various land use areas of the plan. Flexibility should be provided as needs change with new developments. Within the principal areas of the plan, such flexibility should be retained.

18. No provision has been made for the long term retention of the executive helicopter squadron. It is anticipated that this facility will operate from another location in the future.

19. Two elementary schools and one secondary school are proposed. The elementary schools should serve immediate residential neighborhoods and be the nuclei of neighborhood centers. The secondary school should serve as an interface between the base and the community at large, serving both.

20. Joint military construction programming for Bolling/Anacostia should make use of the existing structures by the water's edge at the old Naval Air Station as a relocation resource. Activities should be moved here from structures to be demolished to be demolished until construction of replacement facilities. These existing buildings should be the last to be removed.

21. The DOD should actively seek a Metro connection to Bolling/Anacostia.

AERIAL VIEW OF NORTH COMMUNITY AND INDUSTRIAL/TECHNICAL AREA

Section Two

PLANNING CONCEPTS

HISTORY & EXISTING CONDITIONS

The Bolling/Anacostia site is located in southeastern Washington at the confluence of the Potomac and Anacostia Rivers. It has approximately three miles of shoreline and is contiguous with the South Capitol Street/I-295 Corridor along its eastern boundary. It is bordered on the south by the Naval Research Laboratory and the Bellevue Naval Defense Housing Project. Further to the south is the Blue Plains Sewerage Treatment Plant, which accounts for the presence of a number of major trunk sewers on the site.

The surrounding area is a less prosperous part of the city with a disproportionate share of social and urban ills. There are an excessive number of small apartment dwellings, public housing units and abandoned housing. Considerable area is devoted to public institutions such as St. Elizabeth's Hospital, but employment opportunities in Anacostia are generally inadequate as are commercial and service facilities.

The Bolling/Anacostia site is a low-lying area much of which is filled ground. It is flat and difficult to drain. The soil is of generally poor structural quality requiring special foundation design for all but the lightest building loads. The site is cut off from the rest of the Anacostia community by the South Capitol Street Corridor and by a rugged grade change climbing to elevations of 100 feet above the Base. Penetration into the Anacostia community occurs on the north at Firth Sterling Street, in the middle at Portland Street and on the south at Chesapeake Street.

Across the Potomac River to the west is National Airport. An approach zone crosses Bolling/Anacostia from the southeastern end. Consequently, the site is subjected to substantial periodic aircraft noise.

The principal current use is the Bolling Air Force Base to the south. Air Force administrative functions, troop housing and messing, family housing, commissary - exchange - dispensary facilities, service clubs and recreational facilities comprise the base function. There is also a considerable amount of senior officer housing located on higher ground by South Capitol Street. There are a number of good buildings organized in general accordance with the Kling Master Plan prepared in 1965. Chief among these are family housing, a dormitory, a mess hall, a dispensary, a bowling alley, an airmen's club and a utility structure.

To the north, is the old Anacostia Naval Air Station where HMX-1, the President's helicopter squadron, is located. Various other naval activities including the Naval Photographic Center, limited officer housing and messing facilities, etc., are also located on the north portion of the site. Building groups are either at the water's edge by the mouth of the Anacostia or are close against South Capitol Street. The center of the site is occupied by old runways. Buildings here are in poor condition

with the exception of the Naval Photographic Center. Only the present HMX hangar, a large barracks building, a warehouse and a BOQ have useful life remaining.

Between these two areas, there is planned a large Department of Defense office structure, housing 10,000 employees in three curved structures occupying over 100 acres.

The former runways remain but no fixed winged aircraft operation takes place. A fill stockpiling program has been underway since 1967. These stockpiles are located toward the center of the site and are intended for use in construction of the DOB.

The Naval Research Laboratory to the south is a Naval Command devoted to scientific investigation much of which is classified. Accordingly, the Laboratory stands somewhat distinct from the rest of the site.

Historical highlights of the Bolling/Anacostia Tract are:

1608 Nacotchtanke Indians visited by Captain John Smith.

1633 Granted to Thomas Dent as part of the Gisborough Tract by the second Lord Baltimore.

1863 Leased to the U. S. Army as a cavalry depot for 30,000 horses by George Washington Young.

1866 Returned to Young -- became a river resort known as Gisborough Park, City View, Capitol View and Buena Vista.

1917 Chosen as a temporary site for the Air Service of the Army Signal Corps.

1918 Landing field officially designated. Named in honor of Colonel Raynal Cawthorn Bolling who was the first high ranking American killed in World War I. NAS Anacostia also established.

1930 500 additional acres acquired for Air Corps use to the south where the present Bolling Base is located.

1935 The original Bolling Base to the north turned over to the Navy.

1958 By Presidential request, the DOD was to report on future military requirements at Bolling/Anacostia.

1960 The Air Force proposed retention of 170 acres. The Navy proposed retention of 180 acres. The National Capital Planning Commission proposed use of 580 acres for urban renewal.

1961 Senate Arms Service Committee proposed joint military use for land retained.

1962 Air Force proposed joint use plan for 620 acres.

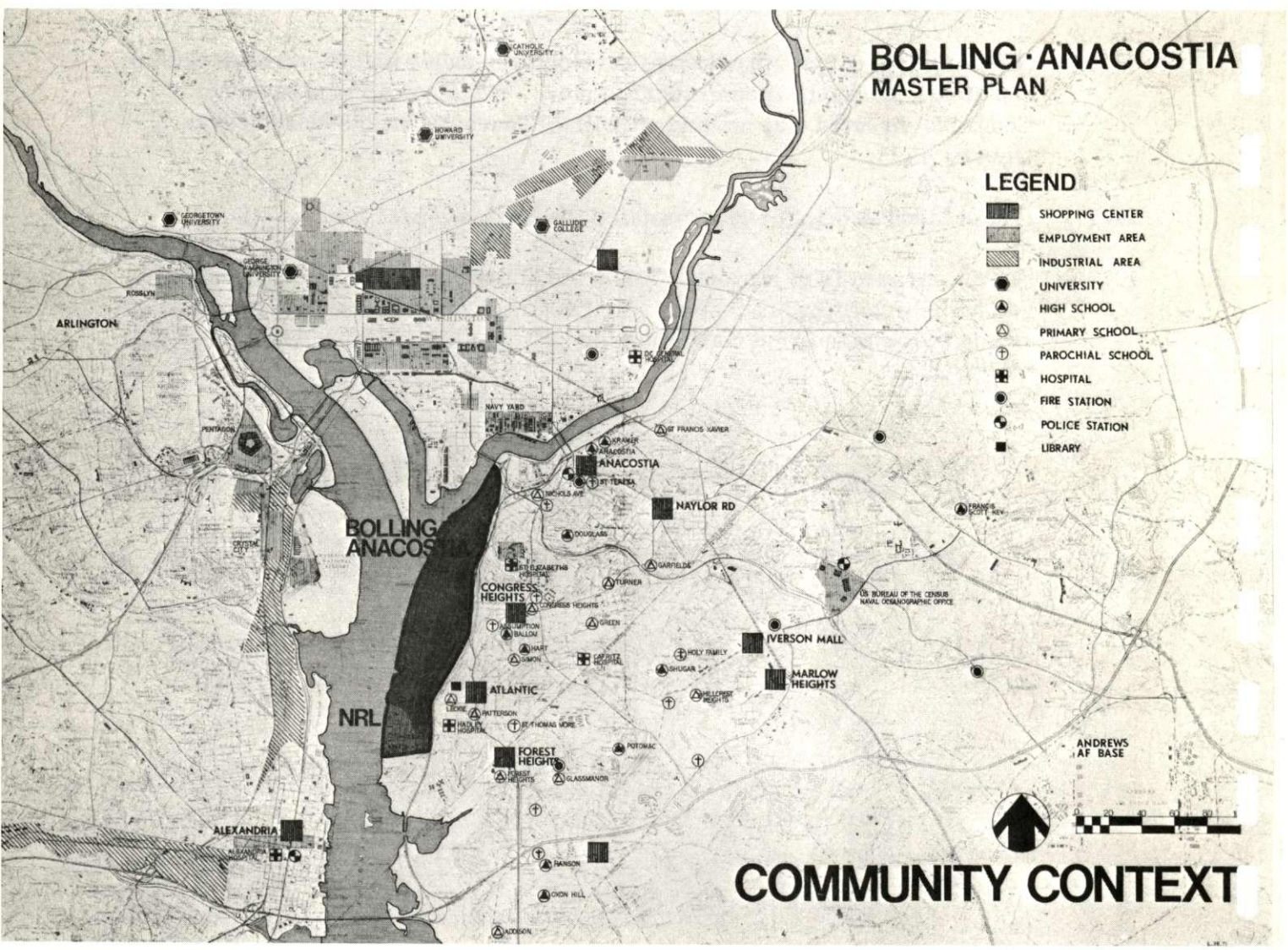
1963 Air Force revised plan -- proposed 325 acres at Bolling/Anacostia plus 10 acres for the Naval Photographic Center with a 6,000 man headquarters facility later superseded by the 10,000 man DOB requiring 70 acres. In addition, another 93 acres earmarked for helicopter use. Also the National Capital Planning Commission proposed tentative urban renewal boundaries.

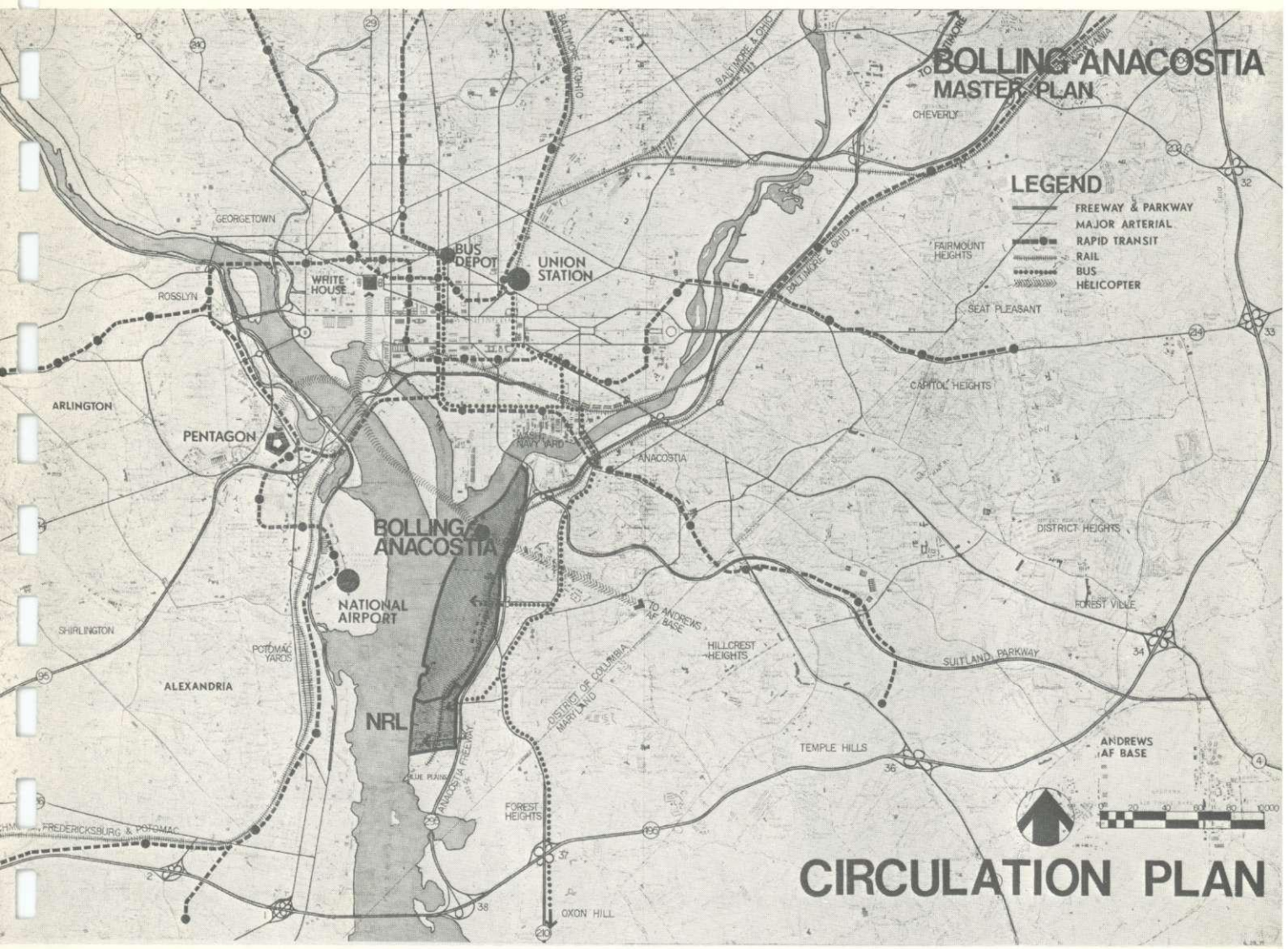
1964 Fine Arts Commission rejected a proposed dormitory design and questioned basic planning concepts at Bolling/Anacostia.

1965 NCPC approved a comprehensive development plan with 303 acres at Bolling and 10 for the Naval Photographic Center. The Rivers rider to an act of Congress directed that no land at Bolling/Anacostia be disposed of before January 1975.

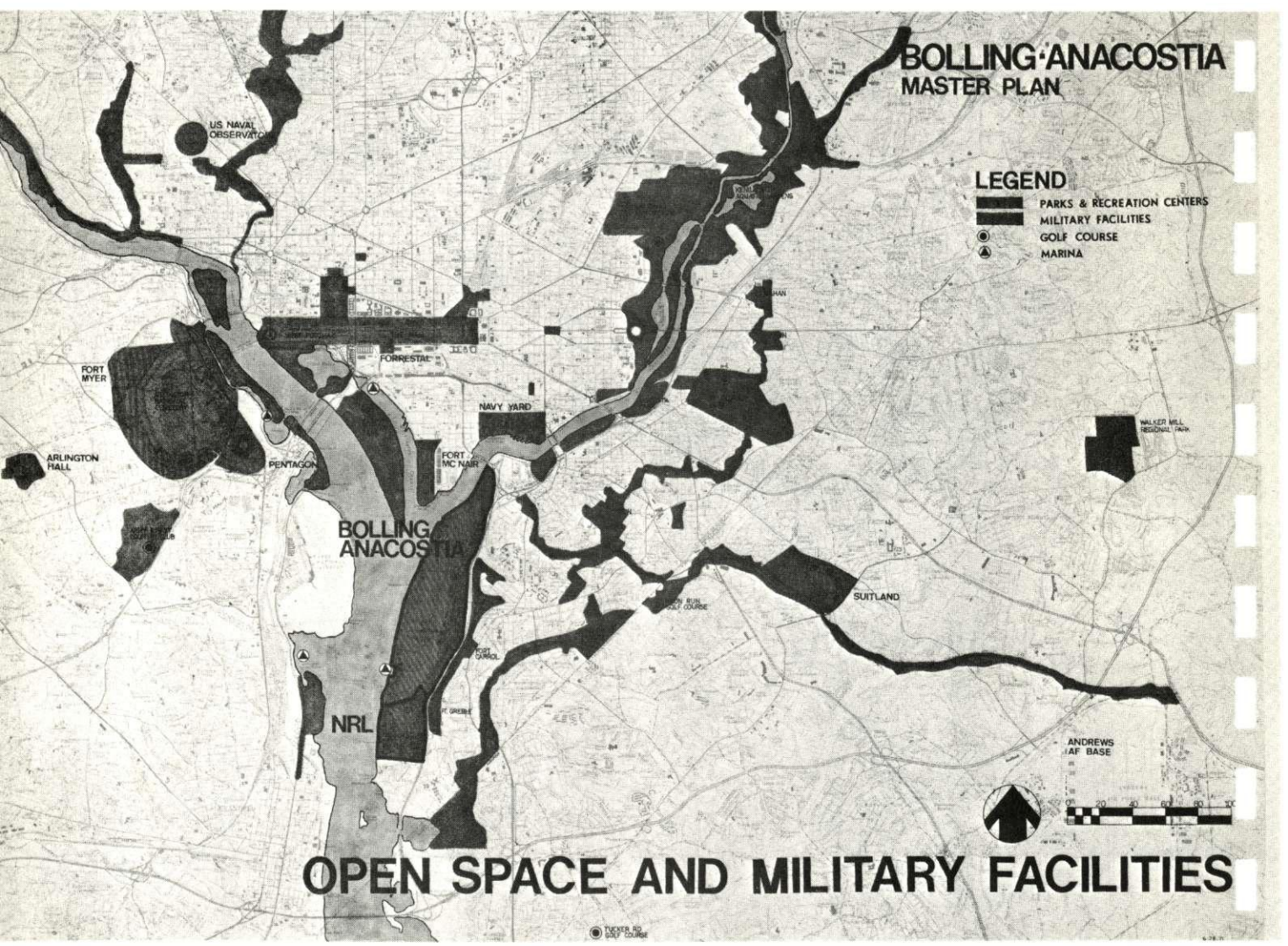
1971 Comprehensive Master Plan initiated for Bolling/Anacostia.

1972 NCPC approved DOD National Capital Regional Plan which recommended retention of Bolling/Anacostia. The Planning Commission deferred approval of this recommendation until a master plan for Bolling/Anacostia could be reviewed.


BOLLING · ANACOSTIA
MASTER PLAN
LEGEND
SHOPPING CENTER
EMPLOYMENT AREA
INDUSTRIAL AREA
UNIVERSITY
HIGH SCHOOL
PRIMARY SCHOOL
PAROCHIAL SCHOOL
HOSPITAL
FIRE STATION
POLICE STATION
LIBRARY
CATHOLIC UNIVERSITY
HOWARD UNIVERSITY
GEORGETOWN UNIVERSITY
GALLUDET COLLEGE
GEORGE WASHINGTON UNIVERSITY
ROSSLYN
ARLINGTON
PENTAGON
NAVY YARD
D.C. GENERAL HOSPITAL
ST FRANCIS XAVIER
KRAMER
ANACOSTIA
ANACOSTIA
ST TERESA
NICHOLS AVE
NAYLOR RD
FRANCIS SCOTT KEY
BOLLING
ANACOS
DOUGLASS
GARFIELD
ST ELIZABETHS HOSPITAL
TURNER
CONGRESS HEIGHTS
CONGRESS HEIGHTS
US BUREAU OF THE CENSUS
NAVAL OCEANOGRAPHIC OFFICE
GREEN
IVERSON MALL
ASSUMPTION BALLOU
HART
SIMON
CAPITOL HOSPITAL
HOLY FAMILY
SHUGAR
MARLOW HEIGHTS
ATLANTIC
HILLCREST HEIGHTS
LEGGE
PATTERSON
NRL
HADLEY HOSPITAL
ST THOMAS MORE
POTOMAC
FOREST HEIGHTS
FOREST HEIGHTS
GLASSMANOR
ANDREWS AF BASE
ALEXANDRIA
ALEXANDRIA HOSPITAL
RANSON
OXON HILL
ADDISON
0 20 40 60 80 1
COMMUNITY CONTEXT



CIRCULATION PLAN



OPEN SPACE AND MILITARY FACILITIES

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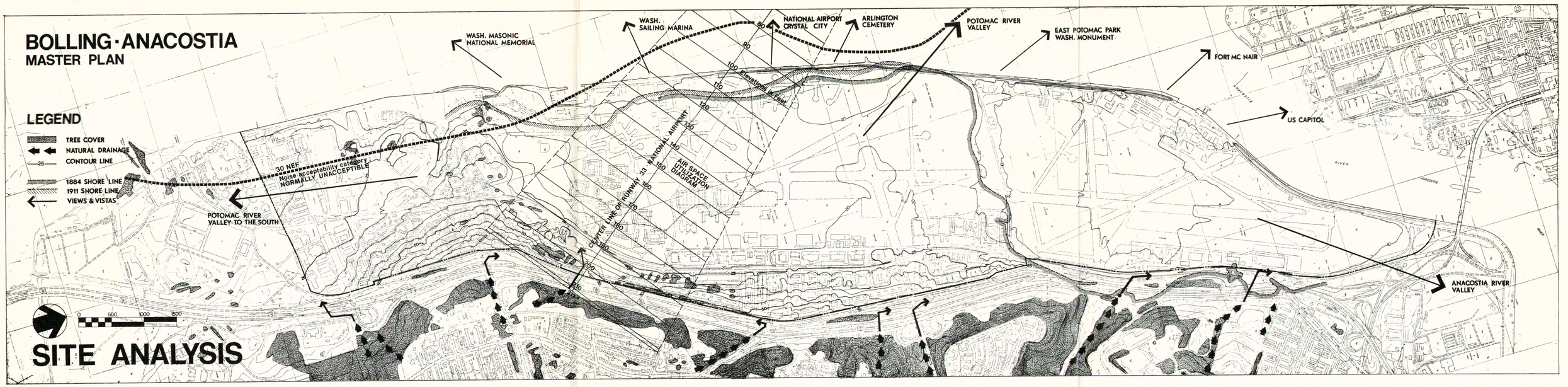
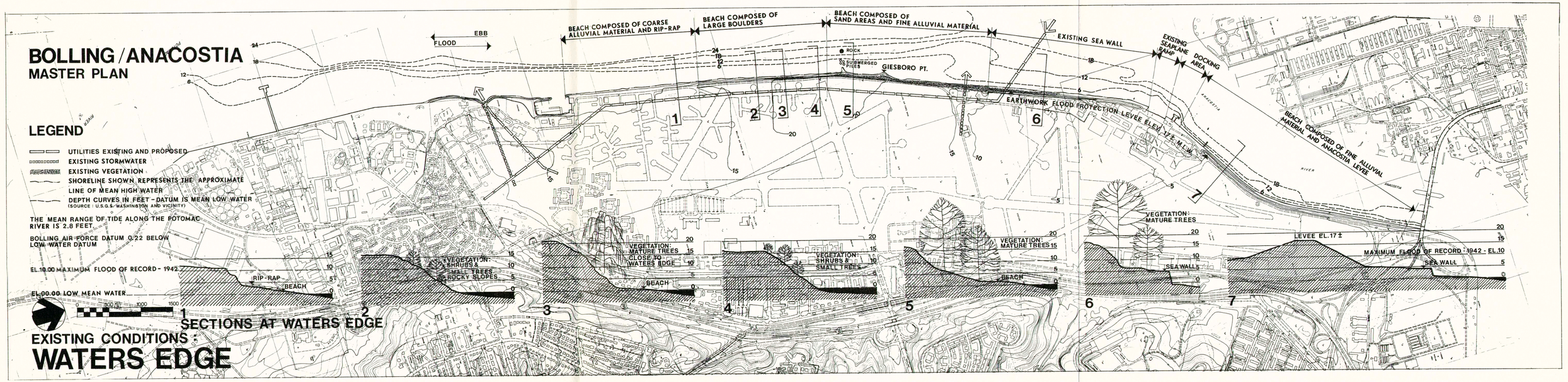
MASTER PLAN



SITE ANALYSIS

BOLLING / ANACOSTIA
MASTER PLAN



1 SECTIONS AT WATERS EDGE

EXISTING CONDITIONS :

WATERS EDGE

BOLLING · ANACOSTIA
MASTER PLAN

LEGEND

- EXISTING CONSTRUCTION
- NRL AND DOB PLANNED BUILDINGS

0 500 1000 1500

EXISTING AND PROPOSED
CONSTRUCTION

BOLLING / ANACOSTIA
MASTER PLAN

LEGEND

- EXISTING WATER
- PROPOSED WATER
- EXISTING GAS
- PROPOSED GAS
- EXISTING ELECTRIC
- PROPOSED ELECTRIC
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING SUBSTATION
- PROPOSED SUBSTATION

BLUE PLAINS SEWAGE TREATMENT PLANT

OVERFLOW

54"

9'4" x 8'4" OUTFALL

9'4" x 8'4" OUTFALL RELIEF

72"

96"

12"

30"

60"

POPLAR POINT PUMPING STATION

0 500 1000 1500

EXISTING AND PROPOSED
MAJOR UTILITIES

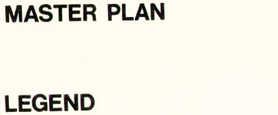
BOLLING · ANACOSTIA
MASTER PLAN

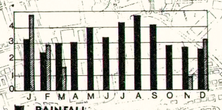
LEGEND

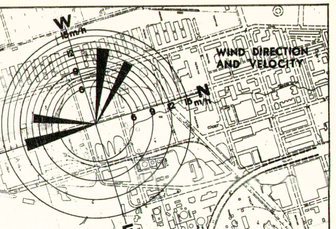
—30— CONTOUR OF TOP OF PILE BEARING

AREA WHERE TOP OF PILE BEARING:

- ABOVE 0 FEET
- FROM 0 TO –10 FEET
- FROM –10 TO –30 FEET
- FROM –30 TO –50 FEET
- FROM –50 TO –70 FEET
- UNDER –70 FEET







SECTION A-A

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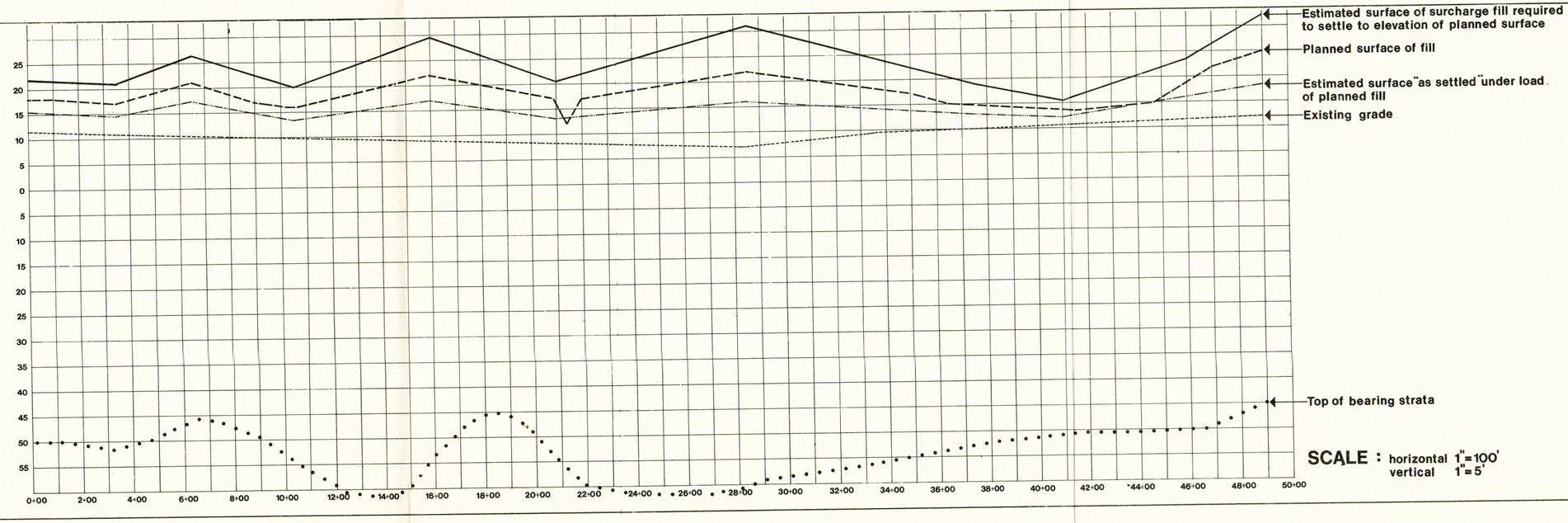
SOIL ANALYSIS

BOLLING · ANACOSTIA
MASTER PLAN



SCALE : horizontal 1"=100'
vertical 1"=5'

SETTLEMENT PROFILES SECTION AA

BASE LOADING

The DOD/NCR Plan allocated the total DOD population in the region to 23 long range locations. These allocations were based on maximum growth potential at these various locations. A working population of approximately 22,000 is considered the maximum growth potential at Bolling/Anacostia, including the Naval Research Laboratory. In addition, it has been assumed that the majority of the Air Force and Navy personnel working in the central metropolitan area will be supported by Bolling/Anacostia. The assumed breakout of this total working and supported population is 57% Civilian and 43% Military. Of the Military population, 47% are Officers, and 53% Enlisted men. Support of individual projects is to be developed by the supporting agency in the normal programming process.

Headquarters Command, USAF is the host command supporting over 800 world-wide operating locations, including those engaged in support of Unified and Joint Commands and inter-governmental agencies. The command also provides air and ground transportation for the Air Force and DOD, the Executive Department and foreign dignitaries.

LAND USE

The Master Plan proposed nine basic uses for the tract, not including the Naval Research Laboratory. They are:

Administrative Centers
Personnel Support Facilities
Industrial/Technical Complex
Community Center
Neighborhood Centers
Intermediate School Site
Family Housing
Park and Recreational Areas
Defense Office Building Site

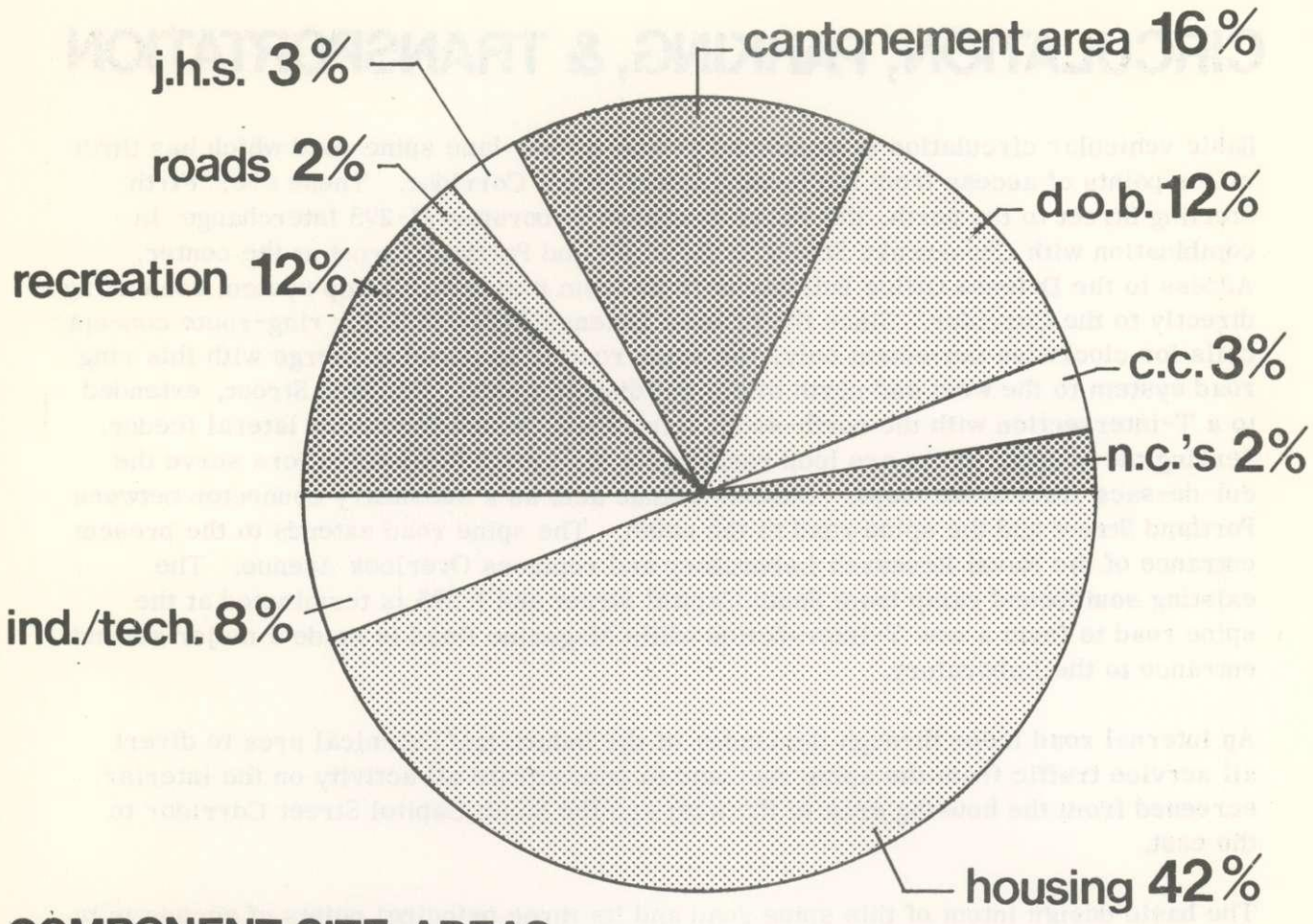
The disposition of these elements is shown on the LAND USE DIAGRAM. Approximate acreages and percentages for each are indicated on the COMPONENT SITE AREAS Diagram.

In general, land use areas are organized around the project spine road, as dictated by the location of existing facilities and the proposed DOB facility. Park and recreational facilities take advantage of the long river's edge. With the exception of existing senior officer housing and 300 units of existing housing already constructed, family housing is

located between the long park strip and the spine road. Within each of the two major family housing areas is located a neighborhood center, the nucleus for which is an elementary school.

Two major administrative centers occur. One is the DOB, the other is a complex located south of Portland Street which forms the north terminus of the Tri-Service Cantonement Area Mall. Basic personnel support facilities are at the south end of the Mall. These two parts are roughly separated by an east-west pedestrian landscaped axis. To the west along this axis is the community center which includes a commissary, base exchange and associated facilities. At the eastern end of this axis are the BOQ and the officers' open mess.

The Industrial/Technical Complex is organized north of the DOB between the spine road and South Capitol Street. Anchoring this area on the south is the proposed PEPCO substation; to the north is the Naval Photographic Center. As the spine road enters from Firth Sterling Street, it separates the Industrial/Technical area from the intermediate school site and it is at this point that the river's edge park originates.



COMPONENT SITE AREAS

TRI-SERVICE CANTONEMENT AREA	142.47 A.
INDUSTRIAL/TECHNICAL COMPLEX	74.21
COMMUNITY CENTER	33.35
NEIGHBORHOOD CENTERS	12.37
HOUSING	381.32
RECREATION	119.19
JUNIOR HIGH SCHOOL	24.00
TOTAL NET AREA	786.91 A.
ROADS (PORTLAND STREET AND MAIN SPINE ROAD)	14.49
DEFENSE OFFICE BUILDING	114.38
TOTAL GROSS AREA	915.78

CIRCULATION, PARKING, & TRANSPORTATION

Basic vehicular circulation is organized around a four-lane spine road which has three major points of access from the South Capitol Street Corridor. These are: Firth Sterling Street to the north, the Naval Research Laboratory/I-295 Interchange in combination with Chesapeake Street to the south and Portland Street at the center. Access to the Defense Office Building is to be from a separate ramp system connecting directly to the Corridor. Since the present Defense Office Building ring-route concept calls for clockwise movement only, the spine road is intended to merge with this ring road system to the west and north of the building complex. Portland Street, extended to a T-intersection with the north-south spine road, forms the major lateral feeder. Serving the housing areas are loop roads from the spine; local collectors serve the cul-de-sacs from these loops. Duncan Avenue acts as a secondary connector between Portland Street and the spine road to the south. The spine road extends to the present entrance of the Naval Research Laboratory and replaces Overlook Avenue. The existing southbound ramp from South Capitol Street and I-295 is terminated at the spine road to form a new T-intersection while Magazine Road is made a major second entrance to the Laboratory.

An internal road loops through the center of the Industrial/Technical area to divert all service traffic from the spine road and to concentrate all activity on the interior, screened from the housing area to the west and the South Capitol Street Corridor to the east.

The basic design intent of this spine road and its three principal points of access is to distribute peak ingress and egress traffic to the South Capitol Street Corridor more uniformly along the length of the Base. This is illustrated on the CIRCULATION DIAGRAM. Logical assignments of traffic from parking areas to the external road system result in peak hour percentages for these three access points of 31% at Firth Sterling Street, 30% at Portland Street and 39% at the Naval Research Laboratory/ Chesapeake Street combination. This distribution includes NRL traffic. These percentages do not include Defense Office Building traffic which is to be handled by its own ramp system. Improvements to the basic freeway system will be required to satisfy the ultimate traffic demand of the Base and these improvements will have to include upgrading of the three major interchange systems to accommodate the anticipated access distributions. To this end, close and complete coordination will be required between the Department of Defense and the District Highway Department. In addition, on-base management of parking, staggered hours, signals, controlled turns, etc., should be directed toward furthering this even distribution. Refer to Appendix II for supporting quantitative data.

The Plan contemplates a well-designed system for pedestrian and bicycle circulation free from traffic crossings. This system runs primarily north-south through the two

major housing areas linking the two neighborhood centers and the elementary schools, the community center and the intermediate school. The system interlocks with a pedestrian cross axis to the Mall Area as well as to the river's edge park which acts as a supplementary pedestrian system. Proposed are seven underpasses and one overpass.

As the land occupied by Bolling Air Force Base is extremely valuable and is strategically located within a major urban center, it is poor policy to devote excessive area to surface parking. This is true from both a practical and an aesthetic point of view. Accordingly, the Master Plan proposes stages parking structures served from the spine road as well as from Duncan Avenue. In the initial phases of development, these parking facilities will be open lots, depressed, and partially concealed by landscaped earth berms. As the need for parking increases, these lots will be decked with simple open structures -- probably of inexpensive pre-cast concrete construction. In this manner, parking capacity can be ultimately doubled thus conserving needed land area.

A variation of this concept will occur at the Industrial/Technical Area. Here the lower level of these parking structures will be devoted to shop, maintenance and storage space and roofs will be used for parking. It is proposed that the design and landscaping of these structures be similar to that of the decked over parking serving the mall complex. Such visual recall will afford continuity and coherence and these structures will serve as buffers between the community center parking and the mall as well as between housing and the Industrial/Technical Area. It would be well to consider this same approach for commissary and base exchange parking also, but present policies do not permit this solution. There is provision in the DOB plan for 3,000 structured parking spaces and the design of the Air Force Administration facility should include structured parking. Other minor surface parking areas occur throughout the Plan where needed.

Parking within the housing clusters is planned as a combination of gang carports and surface parking. In general, one covered parking space/unit will serve the residents while one open parking space/2 units will be for guests, service vehicles and the like. Carport structures will serve the additional function of space definition and screening.

Mass transit to the Base is to be encouraged. D. C. Transit presently operates bus lines to and from the Base and these lines should be expanded and improved as the Base grows. In addition, the Base should provide its own internal shuttle service as demand increases. When Metro is extended to Anacostia at the Good Hope Road Station, a shuttle service should be instituted to Bolling. Beyond this provision, serious study should be given to the actual rail extension of Metro to the site. The beneficial impact of such a connection on the heavily loaded South Capitol Street corridor can not be overemphasized.

At the present time, there exists a B & O track and right-of-way running the length of the base and terminating at the Blue Plains Sewerage Treatment Plant. Its sole

function is to provide chlorine for the Plant. As this trackage and use is awkward and undesirable for the base in the long run, the Plan indicates its ultimate removal. It is recognized, however, that the track must remain until an alternate solution to the chlorine supply problem can be found. Retention of this line could be desirable, however, if it could be used as a Metro spur.

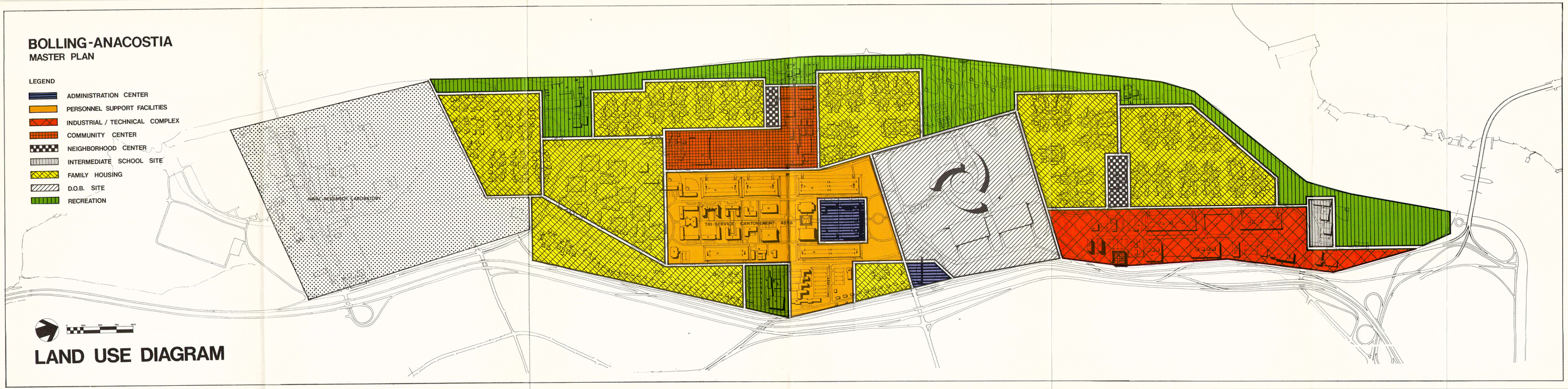
Access to the Base by boat will be provided at the existing marina as well as at a proposed landing to be built in conjunction with the DOB. Plans for the DOB also include a helicopter landing pad.

Proposals in past years for a river crossing located approximately at the boundary of the NRL and Bolling Air Force Base have no official status at this time. Accordingly, no provision for such a crossing has been shown. The land use indicated at this point, however, is housing which could be relatively well relocated in the event such a river crossing were to become a reality.

BOLLING-ANACOSTIA
MASTER PLAN

LEGEND

- ADMINISTRATION CENTER
- PERSONNEL SUPPORT FACILITIES
- INDUSTRIAL / TECHNICAL COMPLEX
- COMMUNITY CENTER
- NEIGHBORHOOD CENTER
- INTERMEDIATE SCHOOL SITE
- FAMILY HOUSING
- D.O.B. SITE
- RECREATION



LAND USE DIAGRAM

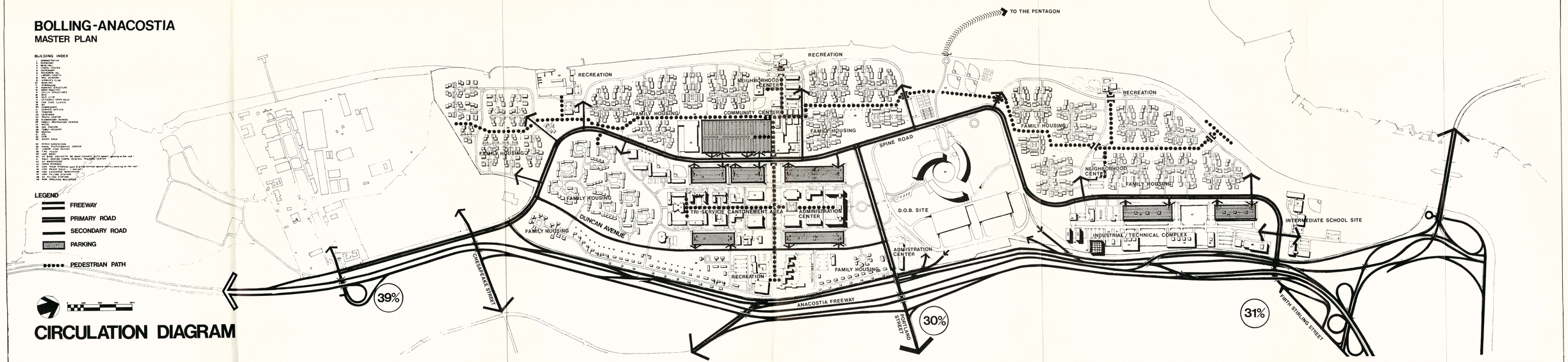
BOLLING-ANACOSTIA
MASTER PLAN

BUILDING INDEX

1 ADMINISTRATIVE
2 BARRACKS
3 MESS HALL
4 CHAPEL CENTER
5 DISPENSARY
6 LAUNDRY
7 ENLISTED CLUB
8 NCO ACADEMY
9 OFFICERS CLUB
10 BOWLING
11 GARAGE
12 PARKING STRUCTURE
13 OFFICERS MESS
14 UTILITY TRENCHING
15 NCO CLUB
16 ENLISTED OPEN MESS
17 CAR CARE CENTER
18 BX
19 COMMISSARY
20 SERVICE OUTLETS
21 GYMNASIUM
22 CAFETERIA
23 THEATER
24 ELEMENTARY SCHOOL
25 FAMILY RECREATION CENTER
26 POOL
27 FAMILY HOUSING
28 BERTHING
29 PIER
30 LOCK
31 OPEN SPACE
32 HYDRO SUBSTATION
33 NAVAL PHOTOGRAPHIC CENTER
34 JUNIOR HIGH SCHOOL
35 CLUB, NCO
36 FIRE HOUSE
37 NAVAL RESERVE CENTER (NOTE MAINTENANCE BUILDING MAY overlap on the river)
38 NAVAL RESERVE CORPS TRAINING CENTER
39 OFFICE BUILDING
40 OPEN STORAGE
41 USSR "RIVER STORAGE (used to purge storage vessels before entering or on the river)
42 USSR ADMINISTRATION BUILDING
43 USSR EXCHANGE WAREHOUSE
44 USSR MOTOR POOL GARAGE
45 AT FILLING STATION
46 USSR SPECIALIZED BUILDING

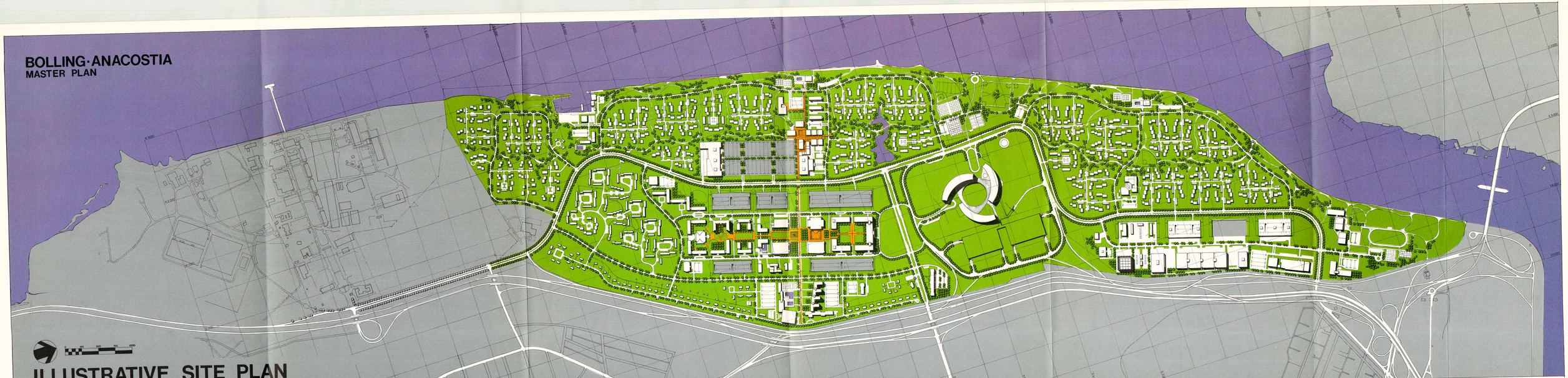
LEGEND

- FREEWAY
- PRIMARY ROAD
- SECONDARY ROAD
- PARKING
- PEDESTRIAN PATH



CIRCULATION DIAGRAM

BOLLING·ANACOSTIA
MASTER PLAN



ILLUSTRATIVE SITE PLAN

GRADING CONCEPTS

The following were major objectives in developing site grading concepts :

1. Adequate site drainage
2. Minimum fill
3. Flood Protection (based on 100 year flood)
4. Reinforcement of the pedestrian system

The GRADING CONCEPT Drawing indicates the land forms affording site drainage after fill is in place. These land forms become partially prepared sites for construction to follow. Final grading will be accomplished as construction of housing and building proceeds. Fill must be engineered so that it can receive housing loads without special foundation design. (For problems of settlements, see section entitled, SOILS AND FOUNDATIONS.)

The basic site grading provides for drainage at a minimum slope of two percent in the North Housing Area where the greatest amount of settlement will take place, and one and one-half percent in the South Housing Area, north of the Operational Marina. Finished floor elevations have been established at a minimum of 16. 5 with a minimum of 14. 5 for road elevations. (See section entitled, FLOOD PROTECTION.)

Main drainage swales and land forms are designed to reinforce the pedestrian system. Runoff is collected by catch basins located at low points in the drainage swales and underpasses. Drainage of spinal and secondary roads is achieved by a system of high and low points spaced 300 feet apart with one and one-half percent slopes. The spine road has concrete curbs and runoff is collected by grate inlets at low points. Secondary roads are drained by drainage ditches with catch basins provided at low points. On these roads gradients can be reduced to one-half percent.

In the final detailed grading design for site fill, it will be necessary to weigh amount of fill against extent of underground pipe drainage in order to determine the most economical balance.

FLOOD PROTECTION

Bolling Air Force Base and the U. S. Naval Air Station are protected from flooding by an earth levee and a concrete flood wall. The levee and the wall are constructed to an elevation of 18. 59 (Bolling Air Force Datum). Included as part of the system are four pumping stations and flood gates on sewer outfalls and storm drains.

The existing levee was part of a Washington, D. C. flood control project recommended in House Document No. 107, 73rd Congress, 1st Session, and adopted by the Flood Control Act of 22 June 1936. The principal portions of the work were completed in 1939, but due to settlement in the sections at the concrete floodwall, the levee was brought to final completion in low lift stages over a period of four years.

Since the completion of the original project in 1944, the following alterations have been made:

1. Steel sluice gates have been installed on the outlet pipes of the pumping stations.
2. A 10 - foot opening with a stop log enclosure has been constructed in the flood wall to provide access to a seaplane pier.
3. A concrete driveway and an unloading area have been constructed against the levee.
4. An addition to Building No. 86 and a small parking area at Building No. 94 extend slightly into the toe of the levee.
5. Low concrete retaining walls have been added to protect the stability of the levee in all areas of encroachment.
6. Changes in the sanitary sewer system have been made to allow pumping stations No. 2 and 3 to handle storm drainage only.
7. The U. S. Navy has constructed a steel sheet pile flood barrier riverward of the U. S. Naval Station Annex to provide access over the levee at three points.

The use of fill to raise the ground level to a higher elevation than the projected flood elevation is recommended as the primary means of flood protection in the Master Plan. However, the present flood control levee and dam system should remain but no new building construction should be undertaken at an elevation lower than 16. 5 and with the exception of minor roads, no road grade should occur below 14. 5. These figures are based on previous work by the U. S. Army Corps of Engineers; the Mueser, Rutledge, Wentworth and Johnston Report of 1966, and consultation with the Navy.

SOILS & FOUNDATIONS

Soil and foundation conditions at the site are variable and range from hard preconsolidated clay to soft recent alluvium. Much fill has been placed historically to extend the shoreline and recently additional fill has been placed in advance of construction.

Detailed descriptions of the geology and soil are available in the several reports cited in the references and the bibliography.

It is planned that considerable fill be placed over certain portions of the Bolling/ Anacostia Area. It is the purpose in the following paragraphs to analyze and evaluate in a preliminary manner the effects of this fill upon the underlying soil.

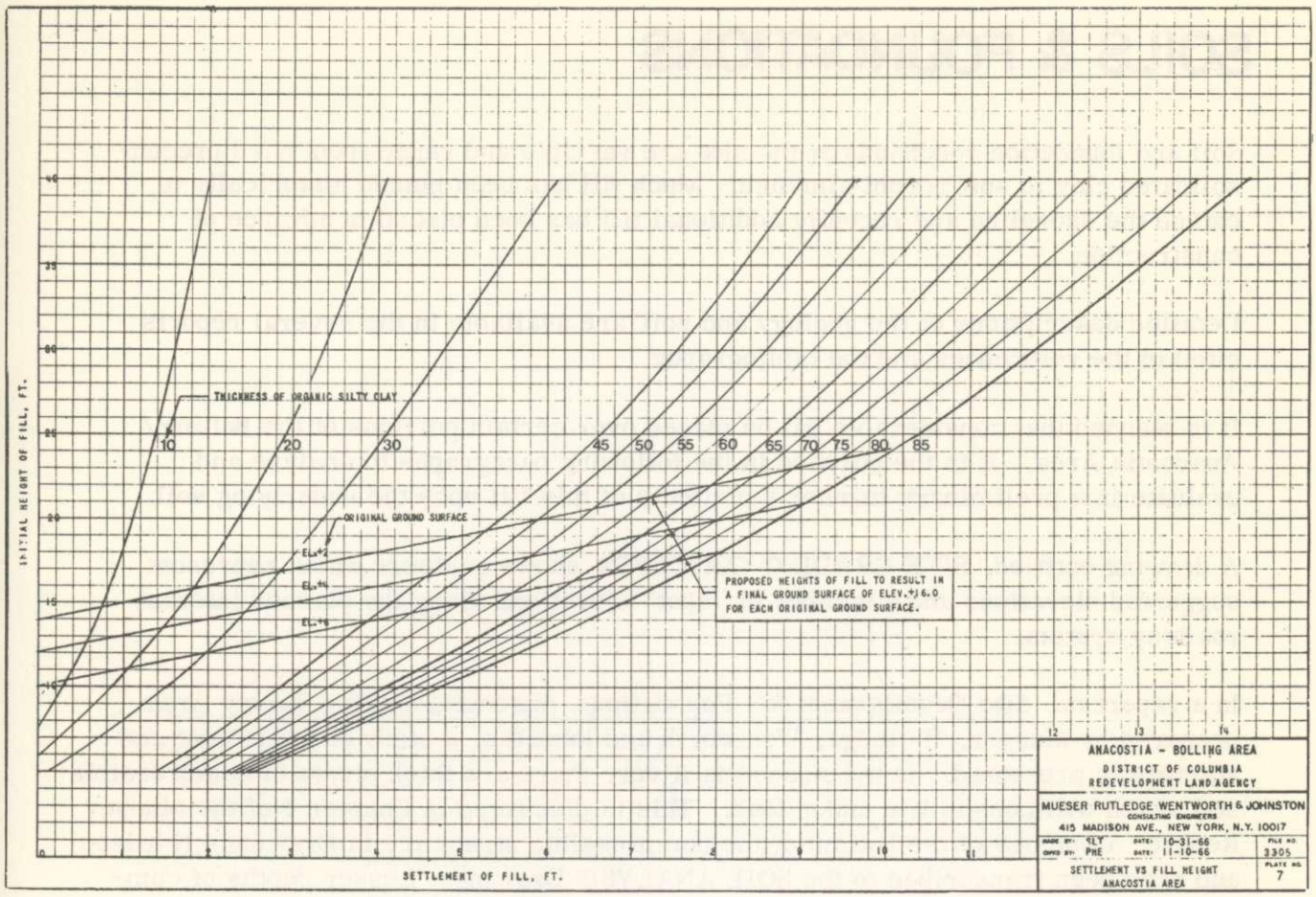
A drawing entitled, SITE GRADING CONCEPTS shows contours which represent suggested elevations and a number of "spot" elevations along the planned internal roadway system.

In a report on Site Development for Foundations Anacostia-Bolling Survey Area , prepared by Mueser, Rutledge, Wentworth and Johnston, a study of settlement and stability is presented. In the Anacostia River, there are thick strata of compressible soil which will consolidate under load. This is discussed in Chapter 4 of the Mueser Report. Contours of the bottom of the compressible strata are in Drawing 4 (Mueser) and have been transcribed to the SOIL ANALYSIS Drawing. Lesser depths of compressible material overlie portions of the remaining project and these will consolidate to a lesser extent subsequent to fill placement.

The alignment which was selected to demonstrate the results of settlement from superimposed fill is shown in plan of the SOIL ANALYSIS Drawing as A-A'.

The profile of alignment is plotted on SETTLEMENT PROFILES Drawing, together with the existing surface elevation trace. The intercepts of the several contour lines representing the elevations of bottom of compressible strata have been transcribed to the profile to provide a visual impression.

Long-term settlements computed from consolidation test data had been calculated by Mueser for his study and he had developed a chart relating height to fill to settlement. The Mueser chart (Plate 7) is reproduced as Drawing SETTLEMENT VS. FILL HEIGHT, ANACOSTIA AREA. By use of this chart estimates of settlements along the profile have been made. The final (after settlement) grades are shown and identified on SETTLEMENT PROFILES Drawing.



It is obvious that in order to attain the final plan grades (or somewhere near them) after settlement, it will be necessary to place fill to elevations above those grades shown on SITE GRADING CONCEPTS Drawing. This will act as a "surcharge" and will cause a greater settlement than a lower height of fill. An example of determining how much surcharge fill would be required at a particular location is given below:

Assume

Original surface elevation	=	+ 6'
Final grade desired	=	+26'
Height of fill	=	20'
Depth of compressible strata	=	30'

Solution

1. From Figure (Mueser Plate 7) determine
   Settlement = 3.35'
2. Try 5' Surcharge
   (Fill height for trial = 25')
3. From Figure (Mueser Plate 7) determine
   a. Settlement = 4.1'
   b. 25 - 4.1 = 20.9'
   which equals elev. 26.9', 0.9' too high
4. Try 4' Surcharge
   a. Settlement = 3.95'
   b. 24 - 3.95 = 20.05'
   which is elev. ± 26' desired design elev.
5. Therefore at this point construct fill to elevation 30' to attain an elevation of 26 feet after settlement.

Plotted on SETTLEMENT PROFILES are the estimated heights of surcharge required to attain design grades at the several locations along Section A-A'.

The profile taken in the Anacostia portion approximates the greatest settlement potential and provides a linear picture of what may be expected. As this is an areal project, the added surcharge fill would be placed as a blanket over the entire area. Depths of fill were taken from SITE GRADING CONCEPTS Drawing and used with depths of compressible material taken from SOIL ANALYSIS Drawing to estimate the depth of surcharge.

Consolidation of the compressible strata will take time. Table 4 of the Mueser Report shows the situation which would obtain to provide a final elevation of +16 for three depths of organic silty clay. These times would decrease for higher fill and increase for lower fill. Each of these different conditions would have to be calaculated from consolidation test data taken from the nearest boring or an assumed value from average values. Acceleration of consolidation may be accomplished by means of sand drains which are discussed in the Mueser Report. This type of assistance is more applicable to the deeper areas of soft material. At best, the calculated magnitudes of settlements and the times required for them to occur are estimates and may vary considerably from the times observed during construction.

Stability of fill placed on soft foundations is an important consideration and was studied by Mueser who established a 10-foot initial height which was stepped up to 20 feet after providing a 70' long berm. All areas included on SITE GRADING CONCEPTS Drawing appear to meet of exceed this requirement except between the coordinate points E1000-S1500 and E2000-S500 in Bolling Field grid. This shoreline and roadway grade will require stability analysis.

In areas where existing utilities are situated beneath the new embankment, consideration must be given to the effects of the embankment applied load and also settlement.

a. To evaluate the effect of added load over the pipe, the type of pipe and its foundation conditions must be known. Determination of this information should be the subject of a special study. However, it is our opinion that an added 10 to 15 feet of fill placed over the present pipe installations which are not pile supported would not damage the pipe.

b. Settlement can be estimated for utilities as it was previously in the Anacostia area above. An example of settlement over an existing storm drain follows. For this example no surcharge has been added, but initial fill would have to be placed to an elevation greater than 27 feet to attain the desired design elevation:

Existing elevation	=	17'
Planned elevation	=	27'
Fill	=	10'
Bottom elevation of soft layer (assume 10' of soft material)	=	-10'
Settlement	=	0.4'
If soft layer is 20' deep then settlement	=	0.9'

In our judgement, existing storm sewer pipes, whether concrete or corrugated steel, could sustain total settlements of about 1.5 feet with about 1/2 of the total as differential over a distance of about 100 feet without undue distress at joints. For areas where outfall is pile supported or crosses the Potomac Interceptor Sewer or where settlement is due to less load, there may be a "sag" in the pipe proper and it will function in the nature of a syphon. Some elongation of the pipe will occur with the sag and joints will open somewhat. Some leakage and infiltration may be expected.

Existing watermains and sanitary sewers are more critical functionally than storm sewers. Structurally, they probably can sustain about 15 feet of fill satisfactorily if not rigidly supported. Breakage or leakage would be very undesirable for either pipe. To reduce chances of breakage and leakage, total estimated settlement of the pipe should not exceed 1/2 foot. Each area and alignment would require separate analysis to estimate magnitude of settlement.

Using the existing utility systems as much as possible would be economical provided all concerned understand and agree to the calculated risks involved.

New utility pipe, to be placed in the fill planned to be constructed, should be placed after all significant settlement has taken place.

Construction control will be of prime importance. The responsible agency must know where it will start by determining existing conditions. A system by which settlement may be observed and controlled during the placement of fill should be planned and initial layout established. It must be decided whether, where and how acceleration of consolidation will be accomplished. These and other elements must be coordinated.

Conclusions and recommendations are:

a. The random pattern of hills and valley fills will cause greater settlement under the higher fills and less settlement under the lower fills with foundation conditions the same.

b. To attain the planned design grades, an areal surcharge will have to be placed to varying elevations (requiring estimated calculations) above the design grades.

c. Amounts and rates of consolidation which will occur and must be observed and recorded during construction may vary widely from those calculated from test data. Height and rate of fill placement will be subject to control during construction.

d. Stability of the fill adjacent to the river is satisfactory with only one area requiring further analysis.

e. Existing pipes should sustain 15 feet of fill structurally provided pipe is not on unyielding support, i. e. piles.

f. Existing storm water pipe should perform satisfactorily after sustaining 1. 5 feet settlement.

g. Existing waterlines and sanitary sewers probably would function satisfactorily with up to 1/2 foot of settlement.

h. Housing placed on fill should be designed in units which can sustain some differential settlement in the long term. Small groups of structures will settle as a unit while a long (over 100') row house configuration might be damaged by differential settlement of a central or end portion.

UTILITY DISTRIBUTION CONCEPTS

During the preliminary study and planning of existing and proposed water, sanitary sewer and storm sewer systems for the Bolling/Anacostia Master Plan, several areas, each of which involved specific grading conditions, have been identified and studied.

Following is a list of these areas which are shown on the SITE UTILITIES CONCEPT Drawing:

Area I	North Housing Area
Area II	Industrial/Technical Complex
Area III	North Recreational Area
Area IV	Defense Office Building Area
Area V	Housing Area North of Operational Marina
Area VI	Housing Area South of Operational Marina
Area VII	Tri-Service Cantonement Area
Area VIII	Officers' Housing Area
Area IX	NCO Quarters' Area

Existing utilities now serving buildings which will remain on the site as part of the Master Plan will be utilized whenever feasible, otherwise new lines will be constructed to provide additional capacity to existing areas and serve new areas of construction, as shown on the SITE UTILITIES CONCEPT Drawing.

The U. S. Navy Civil Engineering Design Manual Number NAVFAC DM-5 dated January 1969 was utilized as the basis for design criteria of proposed utility systems.

WATERMAINS

The site is now served by an existing 30" watermain running along South Capitol Street. The District of Columbia Department of Environmental Services is presently proposing the construction of a 36" watermain which will enter the site north of Area II and will run south along the proposed spinal road serving the North Housing Area, the Industrial/ Technical Complex, and the North Recreational Area. Thence it continues along the spine road toward the Potomac River, through a proposed sewer easement serving the DOB Area and then turns south parallel to the existing Potomac Sanitary Sewer Interceptor. At a point near the junction of Portland Street alignment extended and the Potomac River, the proposed watermain is reduced to 30" diameter and continues south to a point north of the Operational Marina. Thence it turns west and connects to the existing 30" watermain at South Capitol Street at a point south of the Officers' Housing Area.

A 30" branch of this watermain will traverse the site west to east along Portland Street alignment extended connecting to the existing 30" watermain at South Capitol Street. This will complete a primary loop providing additional service capacity to the Tri-Service Cantonement Area and the Officers' Housing Area.

Except for the Tri-Service Cantonement Area, the Officers' Housing Area and the NCO Quarter's Area which will continue to be served from the existing 30" watermain on South Capitol Street, a new series of secondary loops along proposed street rights-of-way will be constructed to serve the rest of the site which will complete the distribution system.

The D. C. Department of Environmental Services is engaged in the preparation of final construction drawings for the proposed 30" and 36" watermains which will provide additional service to the Navy Research Laboratory area and will serve those units to be built under the FY 72 construction program.

The design of horizontal and vertical alignments for this proposed watermain along the Waterfront paralleling the Potomac Sanitary Sewer Interceptor has required a more extensive study of other existing and proposed utilities.

Some of the existing storm sewer lines serving the Tri-Service Cantonement Area and the Officers' Housing Area may either remain in service, provided their present structural conditions are satisfactory, or will be abandoned and a new series of lines will be constructed. New lines crossing over the existing Potomac Sanitary Sewer Interceptor may interfere with the horizontal and vertical alignments of the proposed watermain. It is recommended, therefore, that the proposed watermain be located as far as possible west of the outside wall of the existing Potomac Sanitary Sewer Interceptor, and within the existing easement to provide sufficient space to build new storm sewer lines and drop-manholes, should such be required, thereby diminishing future design problems. An alternative would be to provide sags in the proposed vertical alignment of the watermain at those locations where new storm sewer lines are proposed to cross over the Potomac Sanitary Sewer Interceptor.

SANITARY SEWERS

Three major sanitary sewer trunk lines presently traverse the southern areas of the site. The Potomac Interceptor running along the waterfront consists of a 10'-0" x 11'-5" outfall relief sewer carrying sanitary sewage and a 12'-3" x 11'-5" combined sanitary and storm sewer system. The second is a 9'-4" x 8'-4" trunk sewer outfall running through the center of the Bolling Air Force Base area. The third is a 9'-4" x 8'-4" trunk sewer relief outfall which runs through the Tri-Service Cantonement Area and connects to the previous one at a junction chamber located west of the Operational

Marina, from which an overflow line runs through the proposed Housing Area south of the Operational Marina and into the Potomac River.

Sewage from existing buildings in the Bolling Air Force Base area is now being carried either by gravity systems or pumped into these three major gravity sewers. As far as possible existing lines serving buildings which will remain as part of the proposed Master Plan will continue in service. If new building construction requires an existing line to be increased in size to provide proper capacity, it will be replaced. Pumping stations in the existing NCO Quarter's Area and Operational Marina will also remain in service and will continue to serve existing buildings.

In the northern portion of the site, only one building, the Naval Photographic Center, is proposed to remain in plcae as part of the total Master Plan for the area. The existing sanitary sewer line and pumping station are expected to remain in service provided their present structural conditions are adequate.

The D. C. Department of Environmental Services has recently completed the preparation of construction drawings for a twin trunk carrying sanitary and combined sewage which enters the site at a point located between the DOB area and the Industrial/ Technical Complex, and runs along the proposed spine road in an easterly direction and connects to the existing Potomac Interceptor.

Two systems will connect to the proposed sanitary box culvert. One will serve the Industrial/Technical Complex, the North Recreation Area and portions of the North Housing Area. The other will serve the remaining portions of the North Housing Area. The South Housing Areas in the Bolling/Anacostia area will be served by new lines connecting to existing manholes over the Potomac Interceptor or to new manholes when their cost offsets the cost of the additional length of pipe required to meet existing manholes. Other new lines will connect to the existing sanitary sewer outfall running through the center of the area, and similarly existing manholes or taps will be utilized whenever feasible. Connections to existing combined sewer will require screens.

The Tri-Service Cantonement Area and the Officers' Housing Area will be served by existing lines connecting to the sanitary sewer outfall and the relief outfall lines, although new construction will require some existing lines to be abandoned. For such cases, new lines with larger capacity will be constructed. All new sanitary sewer lines throughout the site will flow by gravity. Site grading has been planned to eliminate requirements for new pumping stations.

STORM SEWERS

Under existing conditions the northern areas of the site in the Anacostia Naval Station are drained through a series of pipes running by gravity to several existing pumping stations near the Anacostia River. This area will be regraded with fills up to 15' in height constructed for flood protection which will require a completely new drainage system taking advantage of the new surface contouring.

Several outlets through the existing concrete seawall will be utilized wherever feasible to drain the North Housing and the North Recreation Area. All of the Industrial / Technical Complex Area, with the exception of the existing Naval Photographic Center, will be drained into a proposed 10'-0" x 10'-0" trunk sewer which enters the site just north of the intersection of the proposed spine road and South Capitol Street, between this area and the North Recreation Area and outfalls at the Anacostia River.

The D. C. Department of Environmental Services had initially considered the design of a 96" storm sewer which does not have sufficient capacity to pick up the run-off from this area. The cost of this additional capacity is not contained in any District budget, therefore, early discussions should be held to determine capacity and costs of this particular storm sewer.

The Naval Photographic Center cannot be drained by gravity into the above system. Existing lines presently draining the area adjacent to the building will be abandoned, and construction of a pumping station will be required to handle the run-off of this area.

The southern portions of the site in the Bolling Air Force Base area are now drained through a series of lines running toward the Potomac River in a westerly direction serving the Officers' Housing Area, the Tri-Service Cantonement Area, the NCO Quarter's Area and existing runways.

All existing runways west of the Tri-Service Cantonement Area will be abandoned and a residential development identified as the South Housing Area, north of the Operational Marina will be constructed. This area will be regraded and fills up to 11' in height will be placed over existing storm sewer lines.

The Officers' Housing and the Tri-Service Cantonement Areas will not be regraded since many structures will remain as part of the proposed Master Plan for those areas. The existing lines now serving those areas may continue in service if their present structural conditions can withstand the additional fill as they cross the South Housing Area.

The South Housing Area, north of the Operational Marina, will drain toward the Potomac River through a series of new storm sewer lines.

All existing and proposed lines serving this area with outfalls at the Potomac River will cross over the existing Potomac Sanitary Sewer Interceptor. As it was reported under WATERMAINS, a 30" watermain is to be constructed east of the sewer interceptor and these storm sewer lines will have a definite effect on the final alignment of this proposed watermain.

Consideration has been given to run all proposed storm sewer lines in this area under the existing Potomac Interceptor. This idea has been abandoned since it will require multiple number of submerged outlets creating silting conditions at outfalls and further difficulties in their design and construction since the Potomac Interceptor is supported on piles.

Due to the flat grading conditions throughout the site, all proposed new gravity lines will run at very flat slopes requiring large pipe sizes, except those serving the easternmost areas of the South Housing residential development north of the Operational Marina.

The existing buildings of the NCO Quarter's Area are now served by a gravity system which outfalls at the Operational Marina. This system will remain in service, since it has sufficient capacity to serve the additional units to be built in this area.

All existing buildings in the South Housing Area, south of the Operational Marina are to be abandoned. Grading of this area will be minimal and some of the existing storm sewer lines may be utilized depending on the final physical location of proposed construction. Otherwise they will be abandoned and a new system will be constructed with outfall at the Potomac River.

EFFECTS OF SITE GRADING

A preliminary evaluation of the effects of site grading and the placement of fill is presented for the several areas previously identified. Existing utility systems, which are presently in place and underlain by compressible material, will settle when a fill load is imposed. New utilities placed in the surface layer of a fill over compressible soil will also settle with the fill.

Exact analysis of settlement is not possible. An approach to determining the amounts of settlement can be made by use of soil test data. Such an approach was used as a basis for the analysis and examples presented in the section, SOILS AND FOUNDATIONS. This section provides guidance with respect to settlement and stability which will be important considerations during design. It stresses the worst conditions and points out the variations over the project site.

It is stressed that each specific situation will require evaluation during design phase to develop design decisions. The areas described below for the GRADING plan are located by numerals on the SITE UTILITIES CONCEPTS plan.

Areas VI and VIII	Not affected by grading.
Areas VII and IX	Eastern portions not affected. Some few feet of fill in western parts along proposed spinal road may yeild a few inches of total settlement.
Area V	Western strip adjacent to river under roadway may settle up to one foot; northern 2/3 up to six inches; and southern 1/3 six inches to one foot.
Area IV	Roadway along west side and playground areas to west may settle six inches to one foot or more at northwest corner.
Area II	Settlement may range from a few inches along the east portion increasing up to three feet along the west and north parts.
Area III	Settlement of a few inches in the east ranging to three or more feet in the central and south.
Area I	Settlement examples have been noted in SOILS AND FOUNDATIONS. Maximum of four to five feet with a surcharge is indicated. Minimum under the lower fill areas is estimated at about one to two feet.

In anticipation of plan implementation, further study leading to a detailed utility plan should be undertaken for the entire Bolling/Anacostia site.

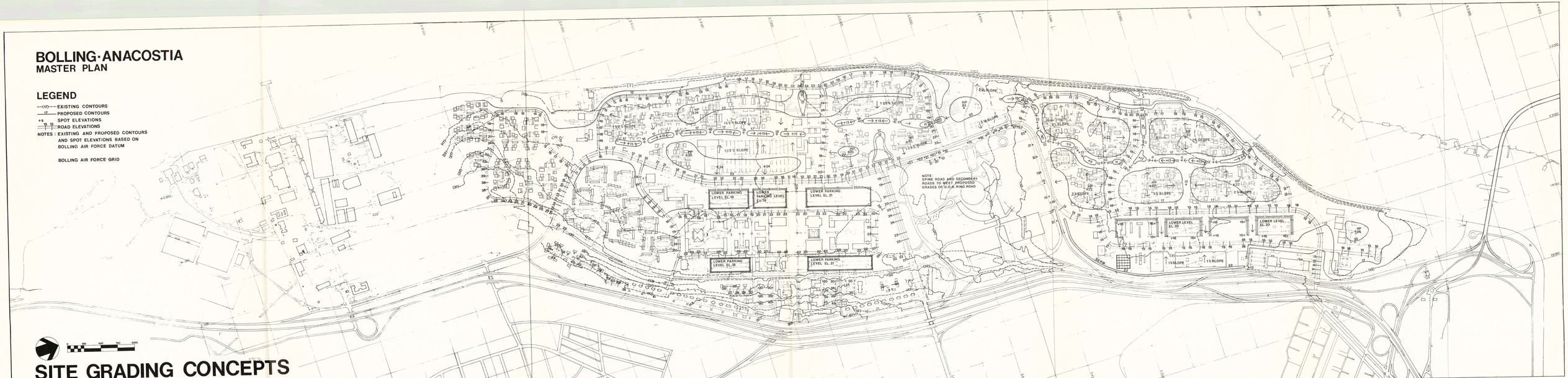
BOLLING·ANACOSTIA
MASTER PLAN

LEGEND

--(17)--- EXISTING CONTOURS
——17—— PROPOSED CONTOURS
+9 SPOT ELEVATIONS
19 19 ROAD ELEVATIONS

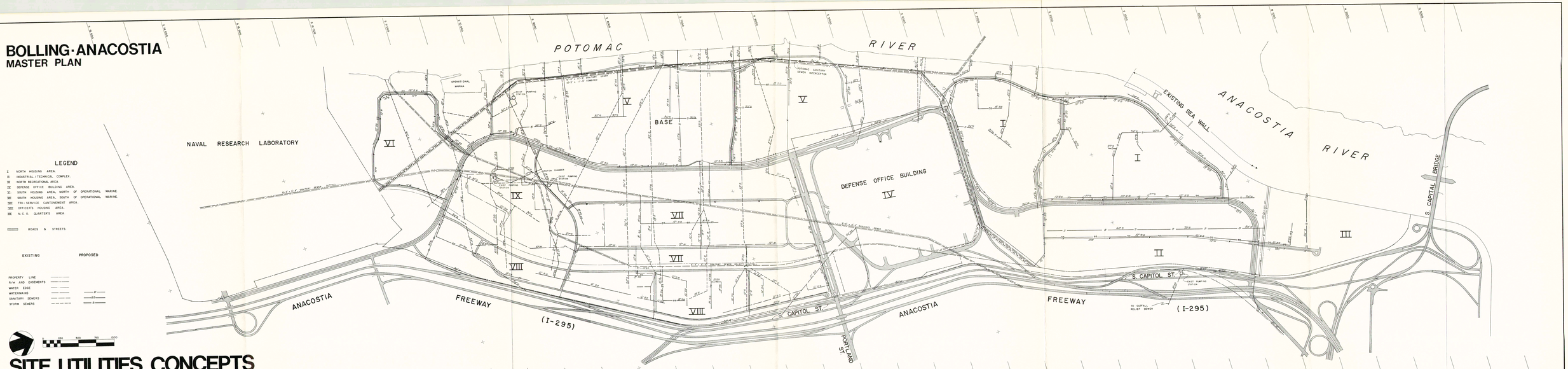
NOTES : EXISTING AND PROPOSED CONTOURS AND SPOT ELEVATIONS BASED ON BOLLING AIR FORCE DATUM

BOLLING AIR FORCE GRID



SITE GRADING CONCEPTS

BOLLING·ANACOSTIA
MASTER PLAN



LEGEND

I NORTH HOUSING AREA.
II INDUSTRIAL / TECHNICAL COMPLEX.
III NORTH RECREATIONAL AREA.
IV DEFENSE OFFICE BUILDING AREA.
V SOUTH HOUSING AREA, NORTH OF OPERATIONAL MARINE.
VI SOUTH HOUSING AREA, SOUTH OF OPERATIONAL MARINE.
VII TRI-SERVICE CANTONEMENT AREA.
VIII OFFICER'S HOUSING AREA.
IX N.C.O. QUARTER'S AREA.

ROADS & STREETS.

	EXISTING	PROPOSED
PROPERTY LINE	———	
R/W AND EASEMENTS	———	
WATER EDGE	———	
WATERMAINS	———	——W——
SANITARY SEWERS	— — —	——S——
STORM SEWERS	— — — —	——D——

0 250 500 750 1000

SITE UTILITIES CONCEPTS

LANDSCAPE CONCEPTS

Key to an effective Master Plan for Bolling/Anacostia is landscaping. The site is flat but will be given some shape by the fill program discussed under SITE GRADING CONCEPTS. The river's edge with its many excellent vistas is a major opportunity. The character of the soil existing and new is a considerable constraint. Capitalizing upon these conditions, landscape concepts are proposed by the Plan which will reinforce its main structure and secondary elements. Hierarchies of planting systems are recommended to emphasize the spine road and Duncan Avenue; to set the character of the Tri-Service Cantonement Area; to soften the Industrial/Technical area; to reinforce the pedestrian greenway system and to develop a large scale lineal park at the river's edge. Section III of the report is a detailed analysis of landscape concepts proposed by the Plan. See COMPREHENSIVE LANDSCAPE PLAN and LANDSCAPE CONCEPT - HOUSING.

FACILITY REQUIREMENTS

The Plan indicates both existing and proposed structures and specifies their use. The facility program for Bolling/Anacostia has been developed from a consolidated Base Facility Requirement List prepared by the Chesapeake Division of the NAVFAC working with Air Force data prepared by Headquarters Command, USAF. In preparation of this list, certain facilities were included not as a direct requirement of a particular user agency but in conformance to standards contained in NAVFAC P-80, Facility Planning Factors for Naval Shore Activities. Some of these uses appear impractical or inappropriate and have not been included in the Plan. Examples are two skating rinks, two additional 1,000 seat theatres, a field house, an exchange laundry plant and an exchange dry cleaning plant.

A heliport appears on the consolidated list of facilities but has not been shown on the Plan. Such a use is not only wasteful of valuable land, but is also incompatible with family housing. By the same token, no provision has been made for HMX-1, the Executive Helicopter Squadron. This facility is expected to operate from another location in the future and is therefore considered a temporary use for planning purposes. There is provision, however, for a small helicopter pad on the site of the DOB.

The BUILDING INDEX identifies specific building functions. It should be stressed, however, that as requirements change and evolve, particular building uses will also change and evolve. To this end, the Plan allows flexibility within the major site areas to accept such change as it occurs.

Appendix I indicates in detail the program provisions of the Plan presented here. Specific building uses are shown on the BUILDING INDEX in Section IV.

STAGING

The problem of staging must be analyzed in implementation of the Master Plan. In general, there will be four major considerations in developing construction phasing for Bolling/Anacostia. They are:

1. Demolition of structures not planned for retention
2. Site filling and preparation
3. Utility extension
4. Access road extension

These constraints must be coordinated as Fiscal Year programming is developed. The following chart indicates these constraints for the major site areas:

	Demolition Required	Site Fill Required	Utility Ext. Required	Access Road Required
FGO Housing Area	●		●	●
NCO Club & NCO Units		●	●	●
Marina	●		●	●
South Housing Area	●	●	●	●
Community Center		●	●	●
North Housing Area	●	●	●	●
Senior Officer Housing	●		●	●
BOQ and Officer Open Mess	●		●	
Tri-Service Cantonement Area	●		●	
DOB	●	●	●	●
Industrial/Technical Complex	●	●	●	●
Park and School Area	●	●	●	●

In general, the two most complex areas for staging are the North Family Housing Area and the Tri-Service Cantonement Area. Of secondary complexity are the Defense Office Building, the South Housing Area and the Industrial/Technical Area. *

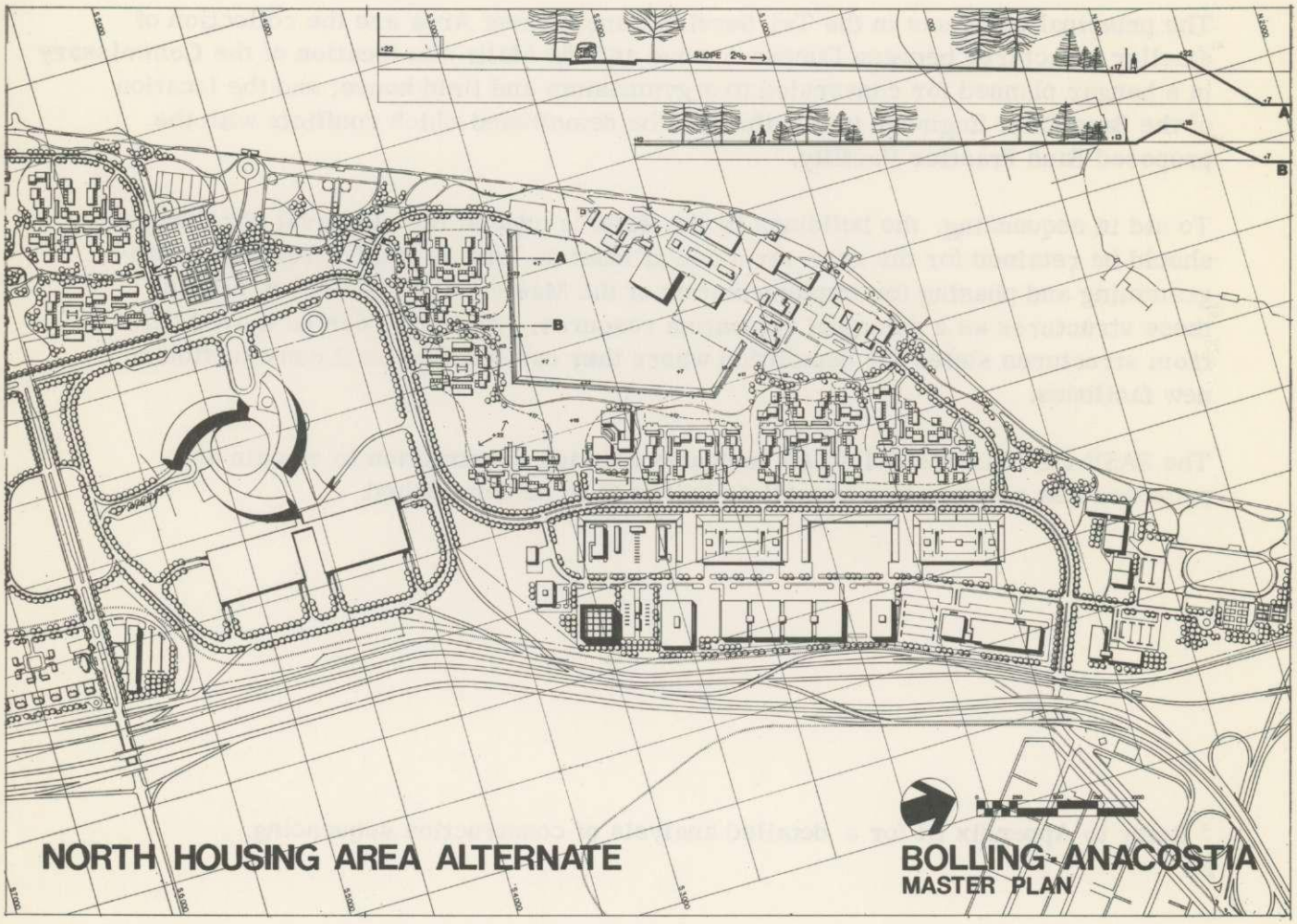
In the North Housing Area, difficulty stems from the short-term continuation of HMX-1 at its present location, even though reduced in area. Houses constructed around this facility will be subjected to adverse sound conditions for a period of several years until the relocation of the helicopter function can be completed. To this end, it is proposed to construct a temporary noise-deflecting berm to buffer the housing area. This berm will also serve as a stock-pile for fill to be used when the last housing is built. Notwithstanding such measures, the helicopter squadron should be relocated at the earliest possible moment. The North Housing Area also presents the most serious fill problem on the site since settlement in this area is expected to be the most severe.

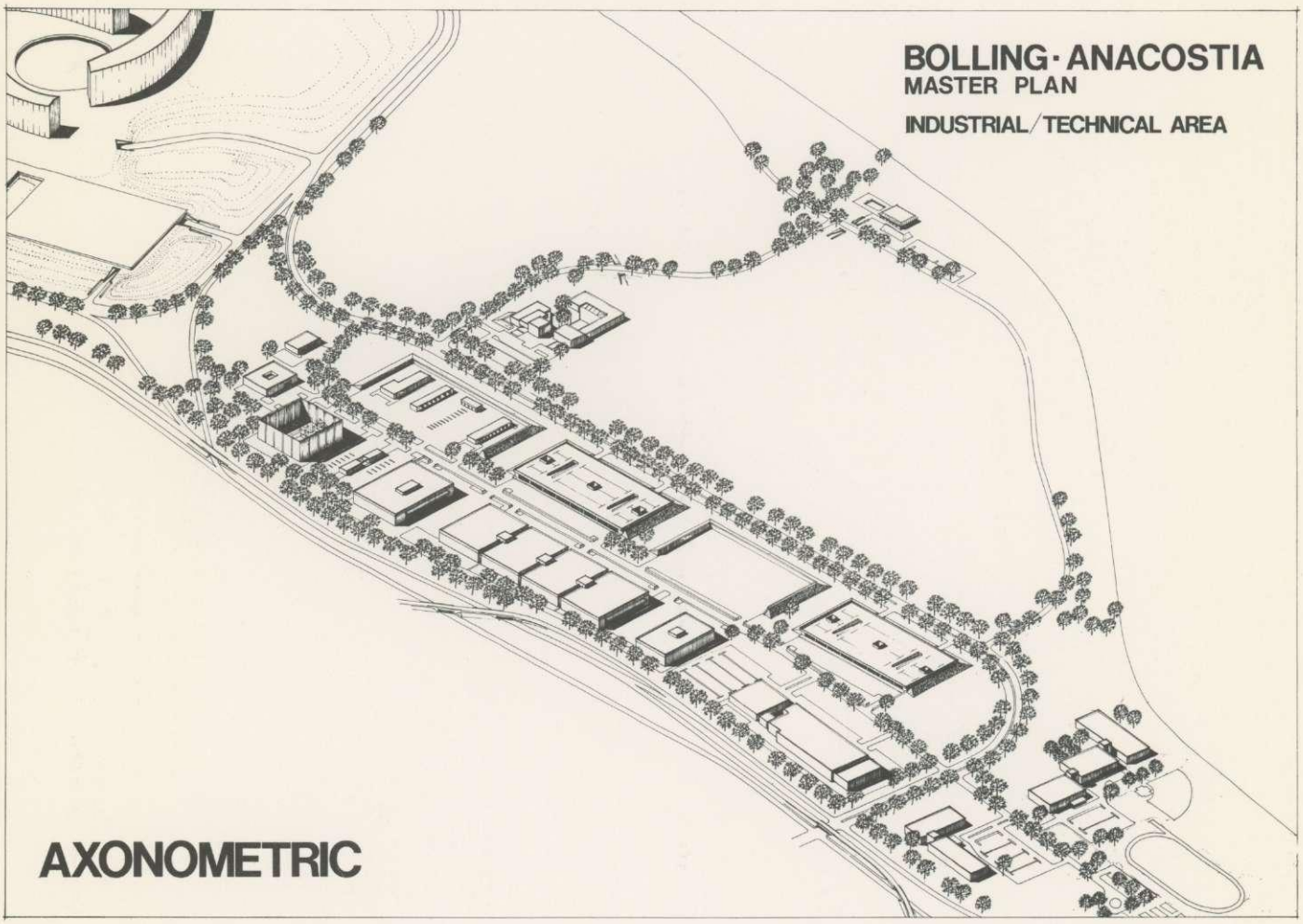
The principal problems in the Tri-Service Cantonement Area are the collection of smaller structures between Duncan Avenue and the Mall; the location of the Commissary in a hangar planned for conversion to a gymnasium and field house; and the location of the Base Civil Engineer in a building to be demolished which conflicts with the proposed Band Practice Facility.

To aid in sequencing, the buildings by the water's edge at the old Naval Air Station should be retained for the near-term and at least as long as HMX-1 remains. Programming and phasing for implementation of the Master Plan should then utilize these structures as a principal relocation resource. Activities can be moved here from structures slated for demolition where they can function until construction of new facilities.

The BASE DEVELOPMENT PLAN indicates existing construction to remain and proposed new construction as well as buildings to be demolished.

* Refer to Appendix III for a detailed analysis of construction sequencing.

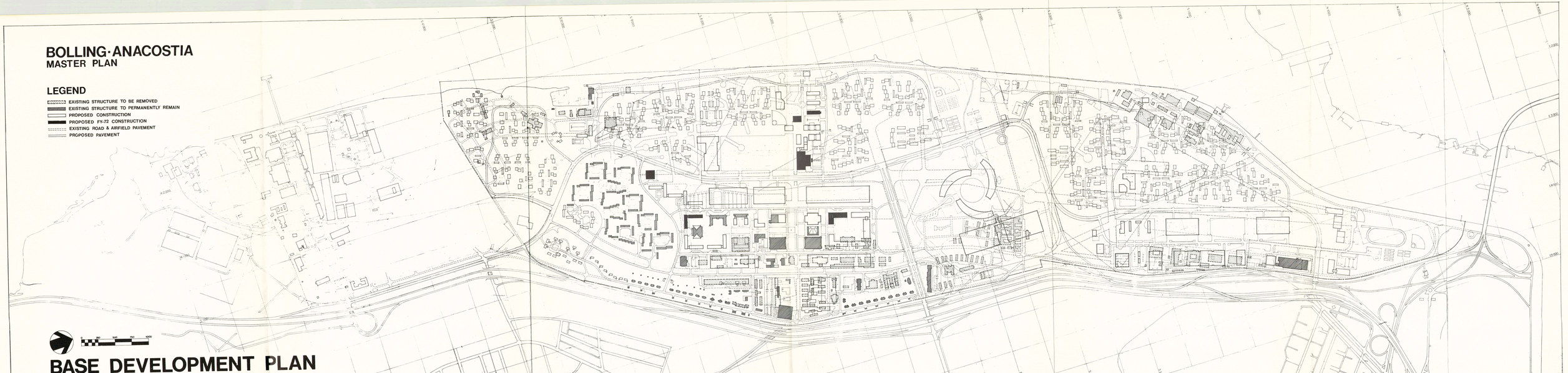

SLOPE 2%
A
B
NORTH HOUSING AREA ALTERNATE
BOLLING - ANACOSTIA
MASTER PLAN


BOLLING · ANACOSTIA
MASTER PLAN
INDUSTRIAL/TECHNICAL AREA
AXONOMETRIC

BOLLING·ANACOSTIA
MASTER PLAN

LEGEND

- EXISTING STRUCTURE TO BE REMOVED
- EXISTING STRUCTURE TO PERMANENTLY REMAIN
- PROPOSED CONSTRUCTION
- PROPOSED FY-72 CONSTRUCTION
- EXISTING ROAD & AIRFIELD PAVEMENT
- PROPOSED PAVEMENT



0 100 500 1000

BASE DEVELOPMENT PLAN

HOUSING

The Master Plan indicates approximately 2,000 dwelling units of which 332 are existing. Twenty-four existing and twenty-two intended are detached single family houses; eight existing and thirty-two proposed are duplex.

The balance of approximately 1,862 units will be three and four bedroom townhouses. This category of housing constitutes the military's greatest deficiency and, therefore, is the preponderant housing type programmed for the Bolling/Anacostia tract.

Appendix I, pages 126,127, 128 & 129 indicates net and gross densities for the various housing areas.

The townhouses are shown arranged in a basic U-shaped cluster with open space between the two legs of the loop. Gang carports are included and these provide both space definition and privacy control. There is one parking space per unit within the carports and an additional 1/2 space per unit in surface parking bays. Fenced forecourts for private service areas are indicated and garbage collection would be built into an end portion of the carport structure. Variation in placement of housing blocks helps somewhat in dampening the effect of aircraft noise as well as providing a visually more interesting environment.

This loop configuration affords great flexibility and adaptability as the Master Plan shows. It also lends itself to variations in density. The basic cluster can be made of 88, 90 or 92 units without any compromise in system. The loop also facilitates circulation in contrast to the more conventional cul-de-sac configuration.

SCHOOLS

Three schools are indicated on the Master Plan. There is an elementary school serving the South Housing Community located just to the west of the Community Center. An elementary school forms the nucleus of a neighborhood center in the North Housing Community and a Junior High School is located at the northern tip of the site close to the Firth Sterling entrance.

The two elementary schools are sized to serve the housing communities in which they are located and are considered neighborhood schools. By contrast, the Junior High School is intended to serve school children living on site as well as school children in the adjoining Anacostia school district.

The Master Plan proposes that these schools be constructed and operated by the District

of Columbia on land leased, sold or donated to the District. Problems concerning land transfer, school construction, pupil distribution policies and the like should be the subject of early negotiation between the Department of Defense and the D. C. School System.

The following chart indicates the school age population anticipated at Bolling/Anacostia and is based on statistical experience with military families. Total number of dwelling units assumed is 1,948:

GRADE	Pre-K	1 - 6	7 - 12	Total
PERCENT	.11/DU	.54/DU	.32/DU	.88/DU
NUMBER	214	1,052	448	1,714

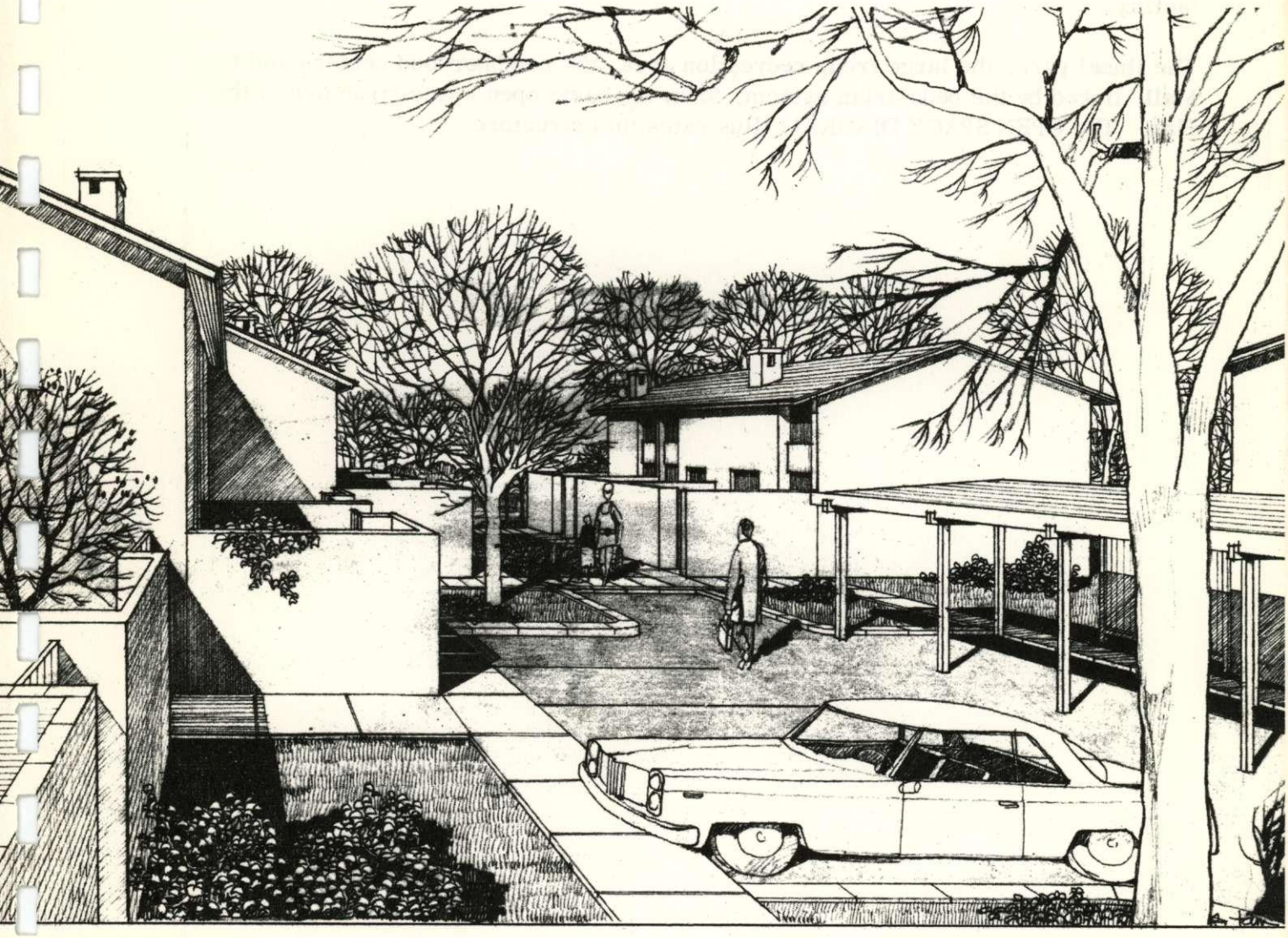
In response to these figures, the two elementary schools should be 600-pupil schools each. The Junior High School, serving a larger area, should be for 1500 pupils. The Plan proposed 6.26 acres for the South Community School, 6.11 acres for the North Community School and 24 acres for the Junior High School. The schools will be multi-storey and the building outlines shown are consistent with applicable Department of Education Guidelines for School Construction.

OPEN SPACE, PARKS & RECREATION

The single most dominant feature of the Bolling/Anacostia site is its long, long shoreline. At some points, it is made up of boulders; at others, fine sand. A seawall occurs in places and at the north end is the distinct profile of the Anacostia levee. The views of the city, the river and the Virginia shore are impressive. There is some existing vegetation, mainly mature willows growing by the water's edge at Giesboro Point. The shoreline constitutes the major recreational resource on the site and the Master Plan proposes it be used as long, lineal park. This use is currently supported by the NCPC and is a concept of long-standing in the city of Washington.

Running the length of the lineal park is a walk which is its key structuring element. Experiences along the path will be rich in variety and will alternate in general from larger areas of passive use to smaller nodes of much more active use. Principal vistas are exploited by control of planting and advantage will be taken of changing natural conditions. The WATER'S EDGE illustration, together with the LINEAL PARK SECTION best describe the Master Plan intent. For a detailed description of landscaping concepts for the park, refer to section III, LANDSCAPE DEVELOPMENT.

Recreation falls into two general categories: recreation for family housing and recreation for the troops. The major troop recreation area occurs between the Potomac and the DOB. Here there are softball fields, volleyball courts, tennis courts,



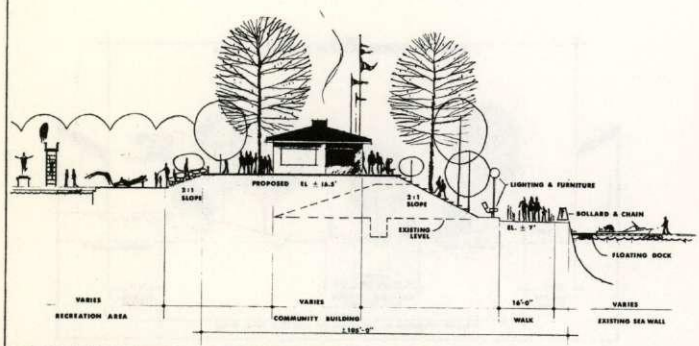
TYPICAL HOUSING CLUSTER

a lighted baseball diamond and a football field. Other troop recreation is planned adjacent to the dormitories and at the south end of the Tri-Service Cantonement Area. Included are a gymnasium, bowling, airmen's club with swimming pool, library, crafts and hobby shops.

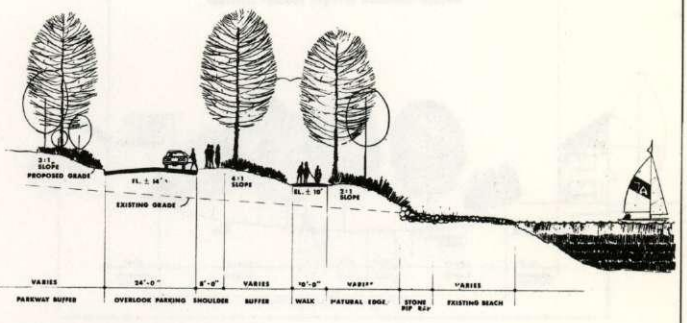
Recreation for family housing is centered around two swimming pool facilities each located opposite the main housing communities. These developments are within the lineal park and linked to the pedestrian system by means of underpasses. Tennis and other activities would be included and it is intended that these complexes have a sense of neighborhood identity.

Other common recreational opportunities include two movie theatres and a marina facility.

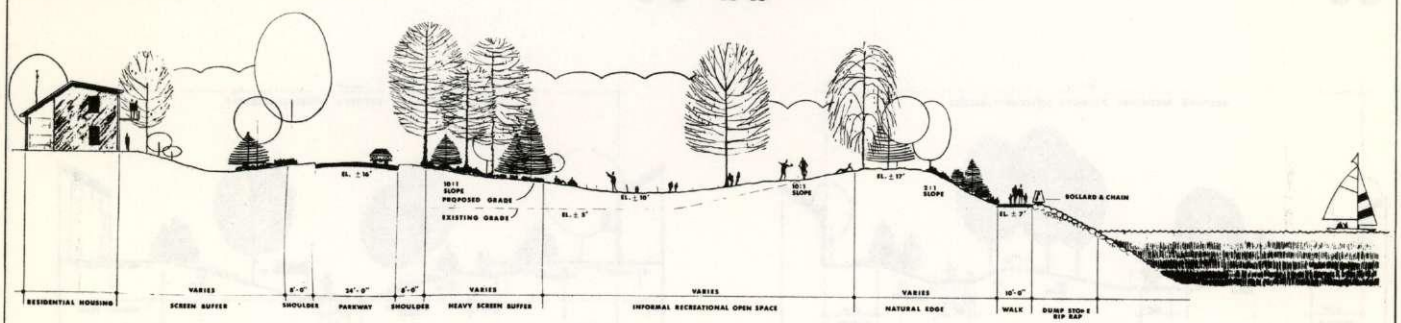
The lineal park, the large troop recreation area, the neighborhood centers and the Mall, linked by the pedestrian system, form the basic open space structure of the Plan. The OPEN SPACE DIAGRAM illustrates this structure.



COMMUNITY RECREATION FACILITY
a-a



PARK OVERLOOK
b-b

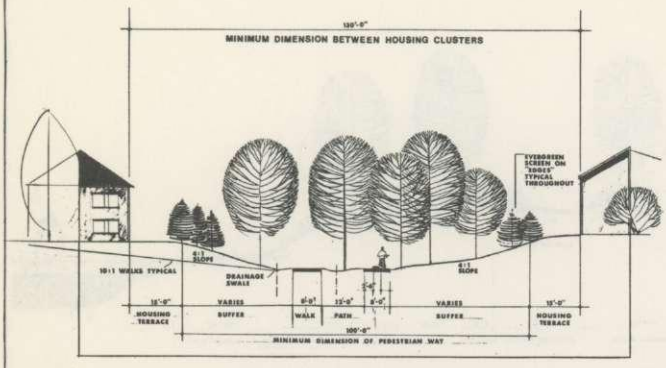


TYPICAL OVERALL PARK SECTION-bb
C-C

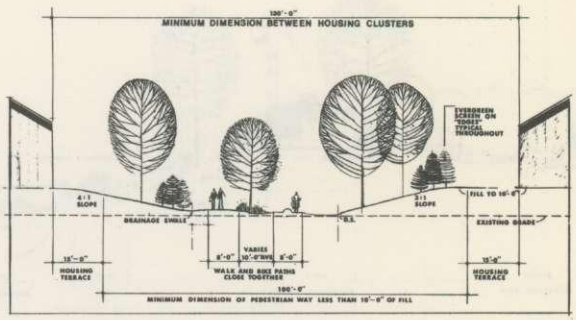
LINEAL PARK SECTIONS

0 5 10 30 40

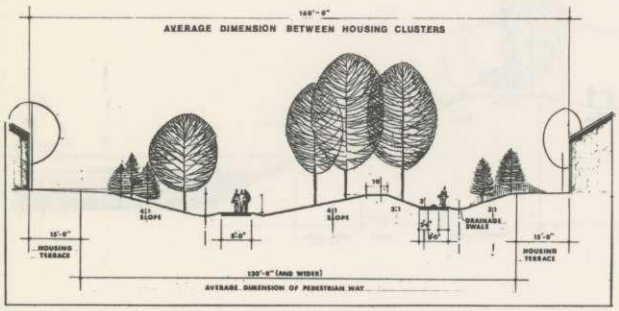
BOLLING-ANACOSTIA
MASTER PLAN



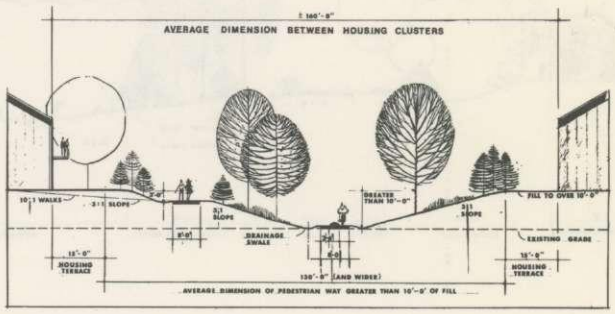
TYPICAL BIKE PEDESTRIAN WAY
d·d



FILL - 0 TO 10 FT.
e·e



TYPICAL MOUNDED GRADE SEPARATION
f·f



FILL - 10 FT. AND OVER
g·g

PEDESTRIAN WAY SECTIONS

0 5 10 20 40

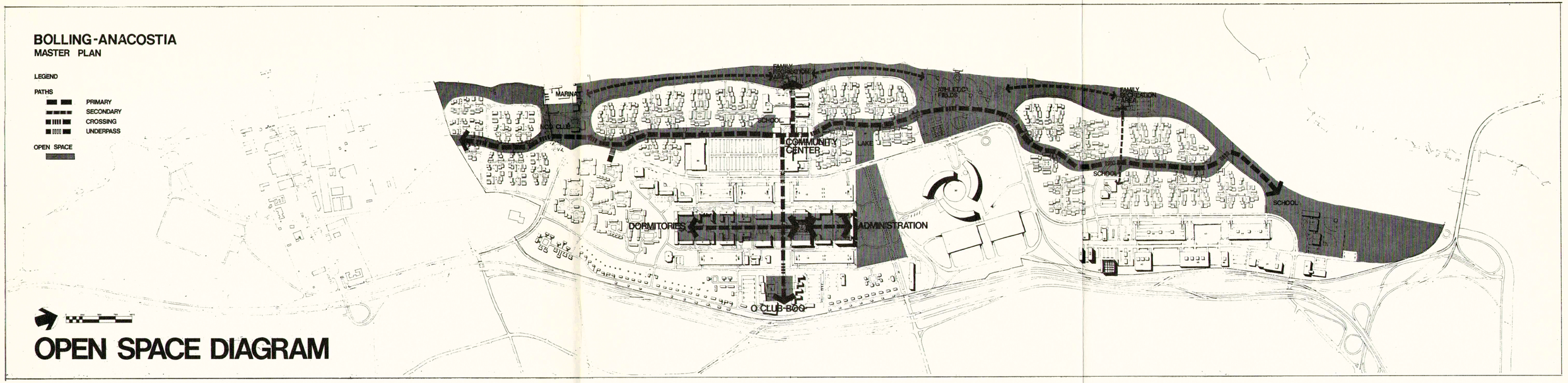
BOLLING·ANACOSTIA
MASTER PLAN

BOLLING-ANACOSTIA
MASTER PLAN

LEGEND

PATHS
- PRIMARY
- SECONDARY
- CROSSING
- UNDERPASS

OPEN SPACE

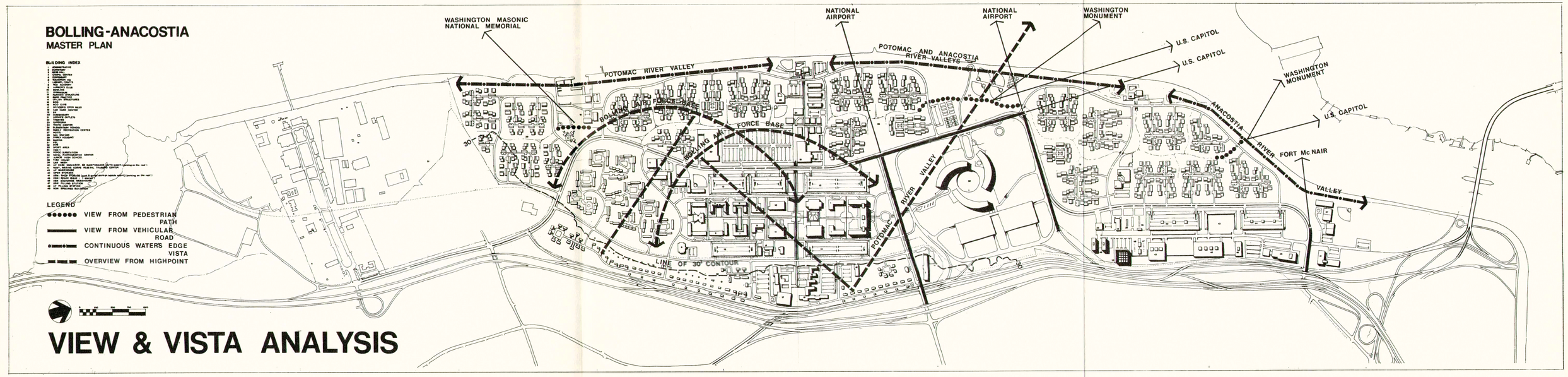


OPEN SPACE DIAGRAM

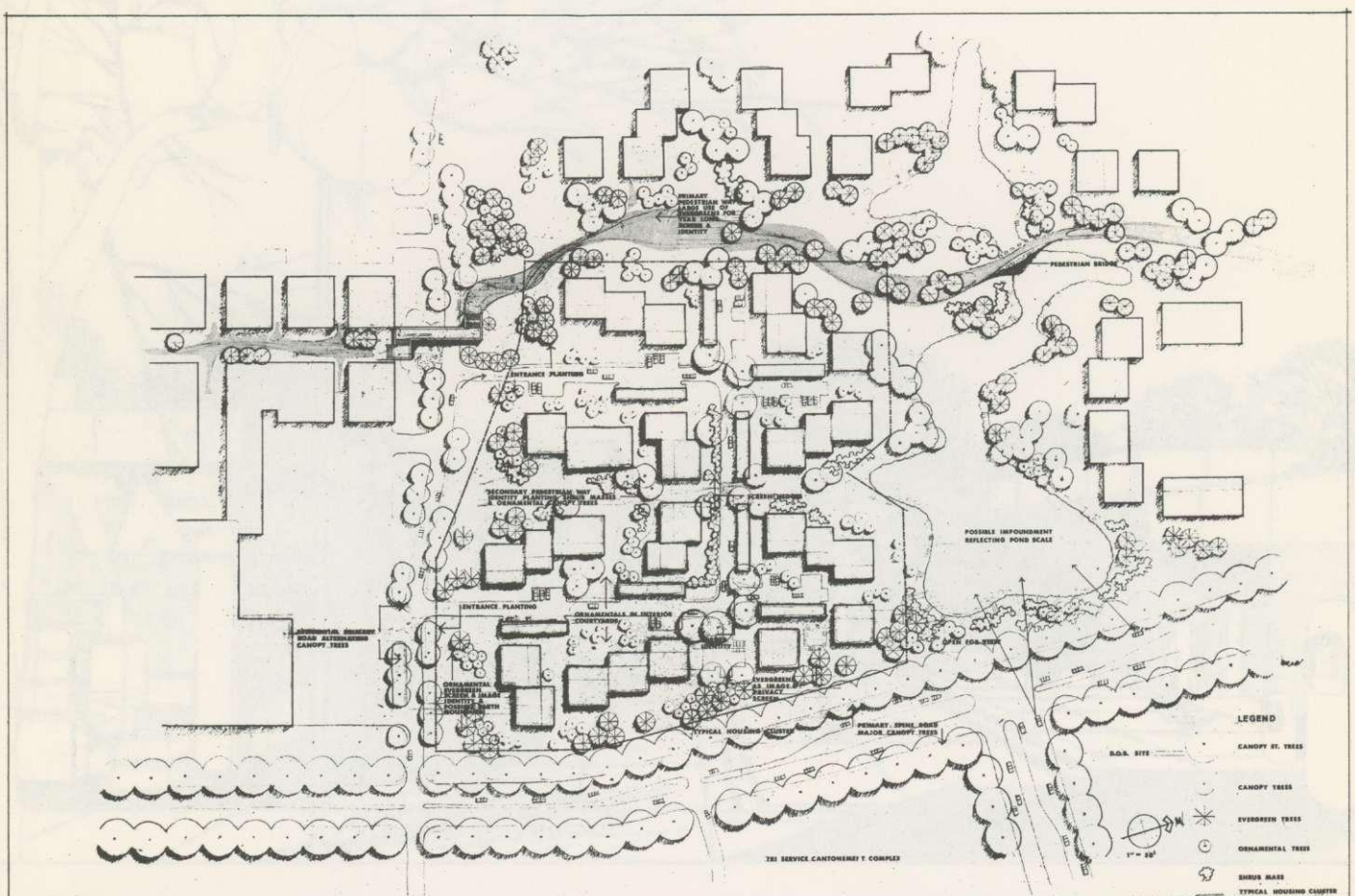
BOLLING-ANACOSTIA
MASTER PLAN

BUILDING INDEX

LEGEND
- VIEW FROM PEDESTRIAN PATH
- VIEW FROM VEHICULAR ROAD
- CONTINUOUS WATERS EDGE VISTA
- OVERVIEW FROM HIGHPOINT

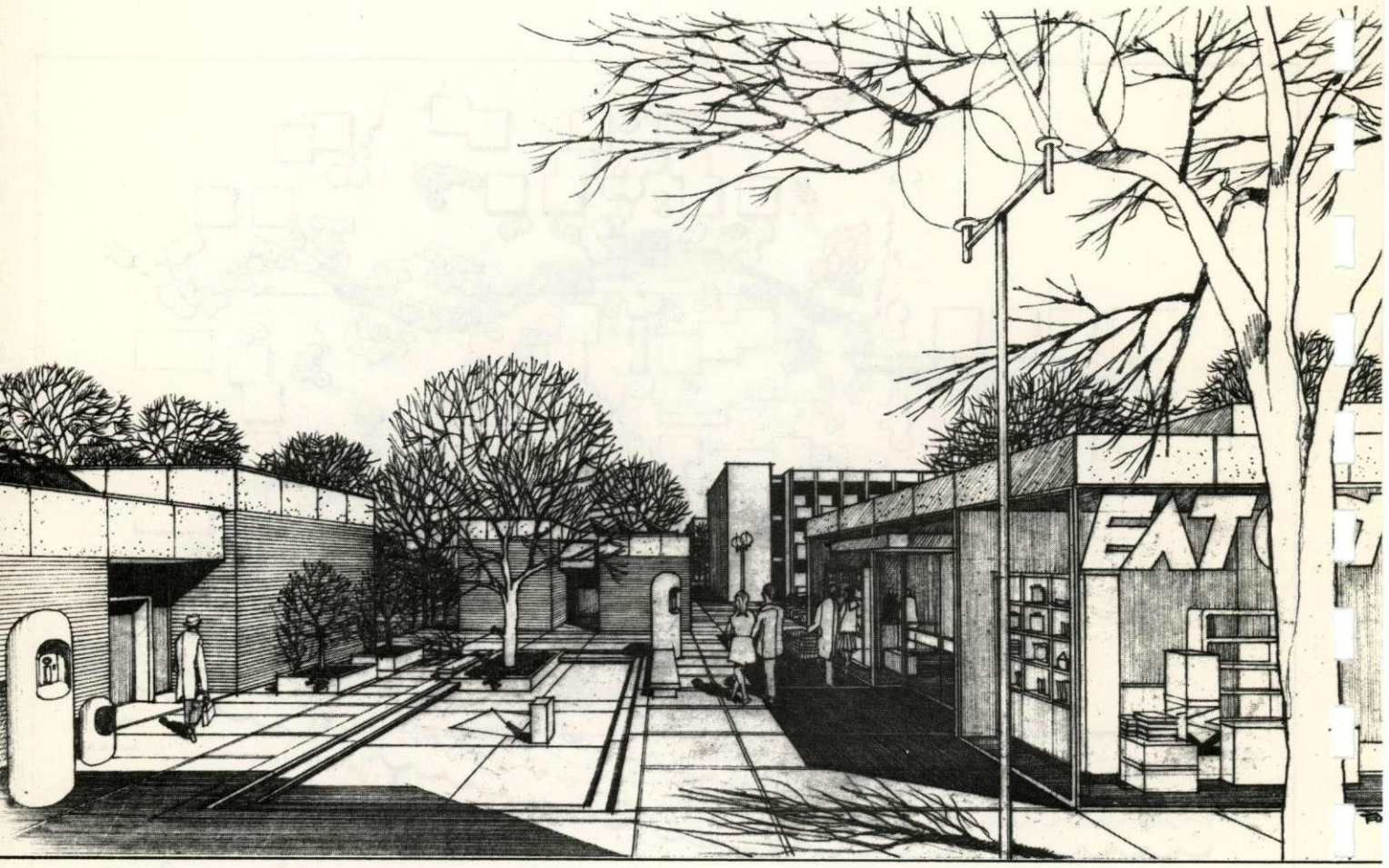


VIEW & VISTA ANALYSIS



LANDSCAPE CONCEPT - HOUSING

BOLLING·ANACOSTIA
MASTER PLAN



TYPICAL VIEW OF SHOPPING AREA

ARCHITECTURAL CHARACTER

Generally speaking, a brick architecture trimmed with concrete, cast-in-place or pre-cast is proper for Bolling/Anacostia. This architecture should constitute the overall fabric of the base and should serve as a visual foil to the limestone-colored pre-cast concrete expanse of the DOB. In keeping with some of the newer structures in the Tri-Service Cantonement Area, dark grey metal roofing and spandrel panels with batten seams can be used for punctuation and accent, but this use should be sparing lest it lose impact through over-repetition. Where used for roofing, it should be reserved for lower structures.

Throughout the entire base, which is low-lying, careful treatment should be given to roof design to control roof structures, color and general appearance.

To the extent possible in the mall area, common cornice lines should be struck and vertical elements and dimensions should be carefully related. Monumental scale should be avoided and individual buildings should fit well with one another and the mall upon which they open.

In the Industrial/Technical Area, flat roofs will prevail and a strong concrete coping should be used in a consistent way to insure unity. Here again, common cornice lines should be struck although they will perforce differ on opposite sides of the inner road due to differing building types and dimension.

Community Center facilities should continue the general brick character of the other major site areas but the use of larger openings, graphics and street furniture and the like should denote the commercial, meeting-place quality of the center.

Ideally, family housing should also be executed in brick with dark grey, brown, or black roofs. A somewhat greater variety in brick colors would be desirable for family housing than in the mall or industrial/technical area but brick used throughout should be in a compatible range of colors for the base as a whole.

The pressure of economics is such that family housing may well have to be frame and siding. In this case, the use of plywood sidings, finished on the job, would be preferable to the various pre-finished sidings available. Job finishing allows much more control over color schemes than pre-finished materials which are limited in selection and therefore inflexible. Earth colors, sympathetic to brick colors elsewhere on base, should predominate.

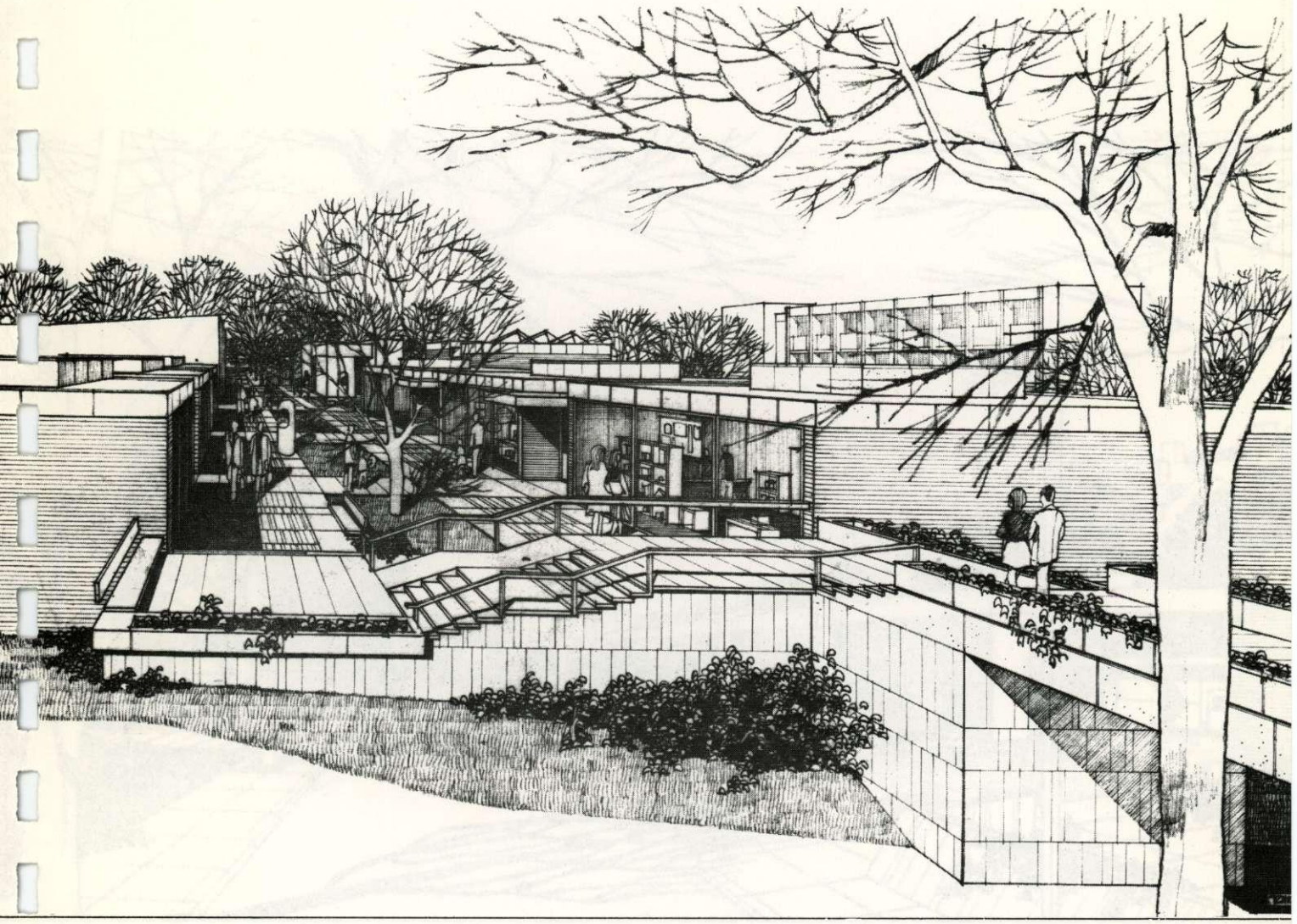
If economic considerations suggest the use of some brick mixed with frame and siding, then certain clusters should be all brick with the balance all siding. The

two materials should not be mixed on individual houses nor in rows.

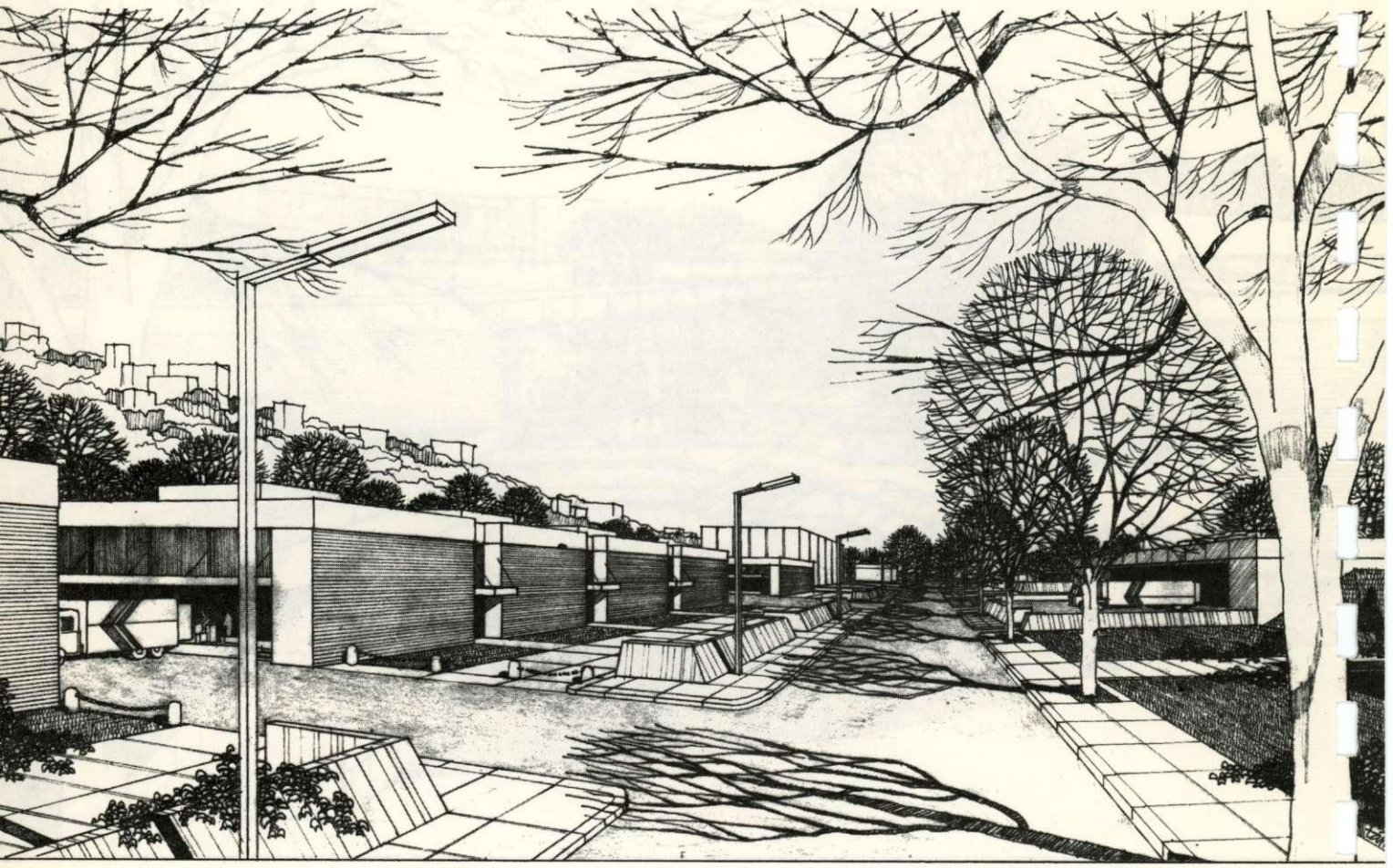
As indicated on the Plan and to prevent monotony, rows of houses should have systematic set-backs and long rows without breaks should be avoided.

Design of family recreation structures should be residential in feeling and in the same character as the housing.

The overall architectural character of the base should be simple with consistent materials, brick and concrete, and should have a sense of quality and reasonable permanence. The feeling should be one of neat and attractive serviceability with occasional special accents at key places and buildings. Throughout, this character and sense of quality should be reinforced by the proposed landscape program which should be given high priority.



VIEW OF OVERPASS AND SHOPPING AREA



INDUSTRIAL / TECHNICAL AREA

ENVIRONMENTAL IMPACT

A memorandum from the Deputy Secretary of Defense dated 8 August 1970, specifies that in accordance with the National Environmental Policy Act of 1969, DOD activities must submit an Environmental Statement for proposed action if, in the opinion of the DOD activity, the action qualifies for a statement under either one of the two following criteria set forth in the Secretary's memorandum:

(1) A significant adverse environmental effect will result from the proposed action, or

(2) the proposed action is likely to be controversial with respect to environmental effects.

While the Master Plan for Bolling/Anacostia does not meet the test of the above criteria and no official Environmental Statement is therefore required, the following impact analysis has been prepared in keeping with the spirit of the National Environmental Policy Act.

The Plan is consistent with plans prepared for the area in the provision of a major employment center, the inclusion of housing of moderate cost and in the proposal for a park strip along the water's edge.

While the bulk of employment will be relocated from other areas in Washington and the National Capital Region, a number of new lower income jobs will be created most particularly at the DOB.

The Plan proposes approximately 2,000 new housing units, of which 1,341 are for junior officers and non-commissioned officers. This housing will help to offset the current military deficit of 5,000 family housing units in the National Capital Region. As this is a particularly acute problem for junior personnel and their families, construction of these units will proportionately reduce competition for low and moderate income housing units in the civilian market.

Two new elementary schools are provided to meet the needs of the new on-base housing communities and a secondary school is proposed to serve both on-site and off-site educational needs. The Plan includes fully adequate community support facilities for the proposed new housing. Retail shopping facilities, service facilities such as dry cleaning, barber shop, etc., are contained within the Community Center as are a Post Office, bank, credit union and the like. Also proposed are a youth center and a day care center. Accordingly, existing community facilities will not be overloaded by anticipated base development.

Access to the base will be facilitated by development of three major connections to the South Capitol Street Corridor and peak hour volumes will therefore be manageable. The increase in the working population at the base, however, will require upgrading of South Capitol Street, I-295 and the interchanges at NRL, Chesapeake Street, Portland Street, the DOB and Firth Sterling Street. Improvements to be undertaken by the District Highway Department, aided by funds from the DOD, will eliminate increased traffic volume as an adverse environmental factor.

The impact of surface parking will be greatly reduced by proposed structured parking at the DOB, within the high rise AF Administration facility and in the decked and roof-top parking indicated along the spine road and Duncan Avenue. This parking, where not completely concealed within structures, will be bermed and carefully landscaped. Not only will parking be controlled aesthetically but valuable land will be recovered for higher use.

Enhancing environmental quality will be the extensive pedestrian and bicycle system interconnecting housing, schools, the riverside park, the community center and the Tri-Service Cantonement Area without conflict with automobile traffic.

Demolishing decaying temporary structures, adequately developing the 1,000 acre site and removing the unsightly and unused airfield pavement will bring stability to the area with a corresponding effect on the neighboring community. Current Air Force programs linked to the community will continue and can be strengthened as a result.

The lineal park at the river's edge will constitute an ecological advance. Existing growth will be retained and new planting and water's edge treatment will recapture the shoreline as a prime resource. Wildlife, now largely non-existent on the site, may be encouraged by this development. Supporting the park improvement is the general overall landscape plan together with the proposed open space structure which calls for increased planting as development progresses.

Land quality, poor in bearing capacity and below the 100 year flood level in many areas, will be improved by a controlled site filling and grading program. Advantage will be taken of this program to provide satisfactory drainage, above and below grade, and soil conditioning is suggested for fill in areas where major planting occurs.

No harmful substance, including chemicals, will be discharged upon the land surface and solid waste will continue to be disposed of off base under contract to a private concern.

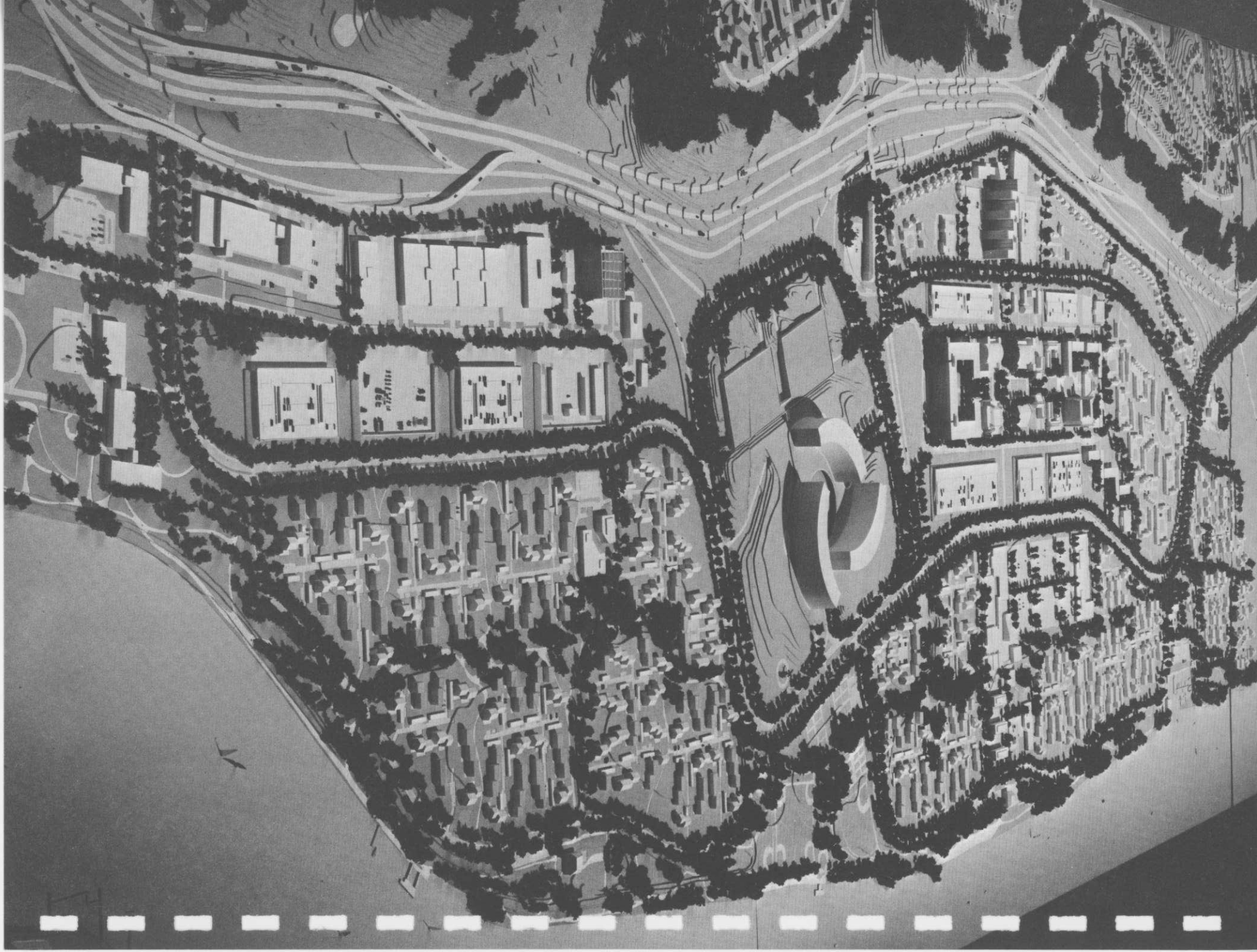
Air pollution from jet use of the Washington National Airport and from bus and automobile traffic in the I-295 Corridor occurs today and is beyond control of the Master Plan. Relief results, however, from the virtually constant summer and winter winds associated

with this river site. Fuel used in the central heating plant is low in sulphur content and does not contribute to air pollution.

The base will continue to discharge sanitary waste into the various lines leading to the Blue Plains Treatment Plant. Increasing loads occasioned by planned development will be more than offset by the current enlargement of the Blue Plains Plant. Storm drainage will be controlled by filling, proper grading, underground drainage systems and adequate landscaping. Soil erosion and siltation will be prevented by use of the latest control practices during construction.

The chief noise problem at Bolling/Anacostia will be aircraft use of the Washington National Airport. Current helicopter operation by the President's Squadron and the Metropolitan Police will be phased out in the short-term eliminating this source of noise. Minor helicopter and hydrofoil access to the DOB will not contribute significantly to noise pollution.

The proposed Master Plan for Bolling/Anacostia should have no adverse environmental impact, either on site or off. Rather it should result in considerable environmental improvement in the area.



Section Three

LANDSCAPE DEVELOPMENT

EXISTING LANDSCAPE CHARACTER

The site is surrounded by the Anacostia River and River Valley to the north and west, the Anacostia Freeway to the east, and the Potomac River Valley to the south. The best views are across the river to the west where one can see an impressive panorama of the Washington Masonic National Memorial, the Washington Sailing Marina, National Airport, Crystal City, the Arlington Cemetery, the Potomac River Valley, East Potomac Park, the Washington Monument, Fort McNair and the U. S. Capitol.

Because of the site's proximity to National Airport, the noise level and frequency of air craft departures and arrivals presents a major design problem -- not unfamiliar to most military bases. Adequate amounts of vegetation where there is none at present would aid considerably to muffle and soften some of this environmental irritation. Because of this all pervasive influence on the character of the landscape every effort should be made to reduce its impact.

Ecologically, the site is a typical example of coastal plain estuarine development. Presently it consists of a combination of open flood plain with areas of land fill added over a period of years to create level air landing strips. The ground surface lies generally between elevation 11 and 16, except for a portion to the south of the property which is at elevation 7. Typical of air fields, there is a vast flat openness to the site except for the southeast edge which rises toward the expressway.

The river edge possesses a varied condition starting from the north with a man-made levee and sea wall. Moving south where there is no sea wall or levee, many sections of the slopes adjacent to the edge show evidence of shore line erosion encroachment due to the swift river currents and a lack of soil holding vegetation. Methods should be employed along these portions of the river's edge to stabilize this natural erosive action. Back from the river's edge, vegetation cover varies. In general -- there is very little of it, though in some cases mature trees stand close to the water's edge and natural grasses provide soil cover.

LANDSCAPE CONCEPTS

MAJOR VEHICULAR CIRCULATION

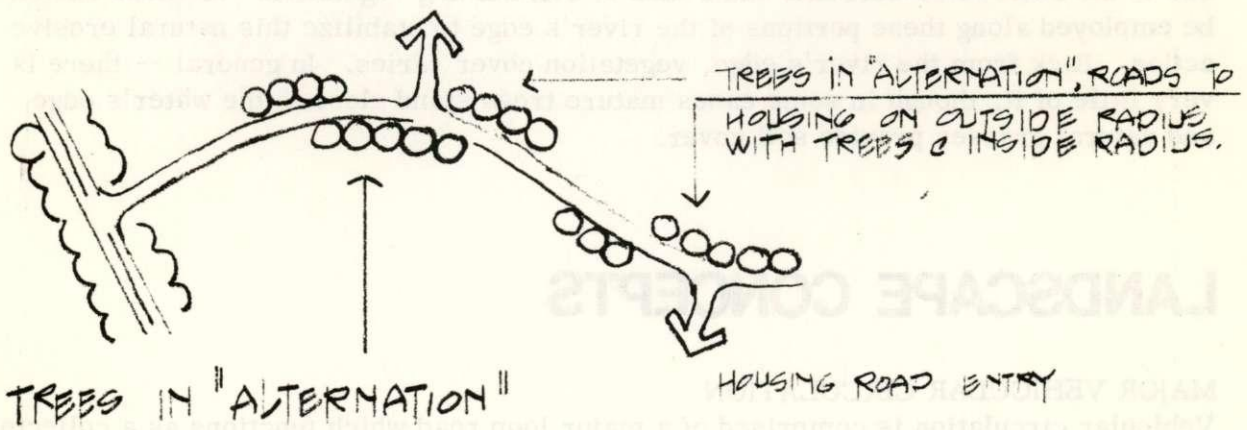
Vehicular circulation is comprised of a major loop road which functions as a collector and distributor of traffic, major connector roads between the expressway and the loop road at Portland Street, Overlook Avenue, Suitland Parkway Entrance, and primary and secondary access roads to the housing areas and industrial zones.

The pedestrian circulation system consists of a series of exterior at-grade walkways and underpasses which connect the base with the Base Exchange and Commissary, housing areas and waterfront park.

The roads form the basic landscape structure. Design recommendation for general landscaping treatment of the major roads throughout the project is a key element to the project improvement. Fifty foot spacing of willow oaks are proposed on both sides of the Spine Road as it winds through the site from north to south to denote the major connection element between the Defense Office Building and the Tri-Service Cantonement Area.

Tilia Cordata (Little Leaf Linden) in formal rows, is planned for Duncan Street. The trees are utilized in pair groupings to establish a different character for Duncan Street. They are spaced 40' apart, with 80' gaps between pairs parallel to each other, on both sides of the street. Duncan Street serves as a major collector of traffic and this organization of pair groupings helps to reinforce its unique character.

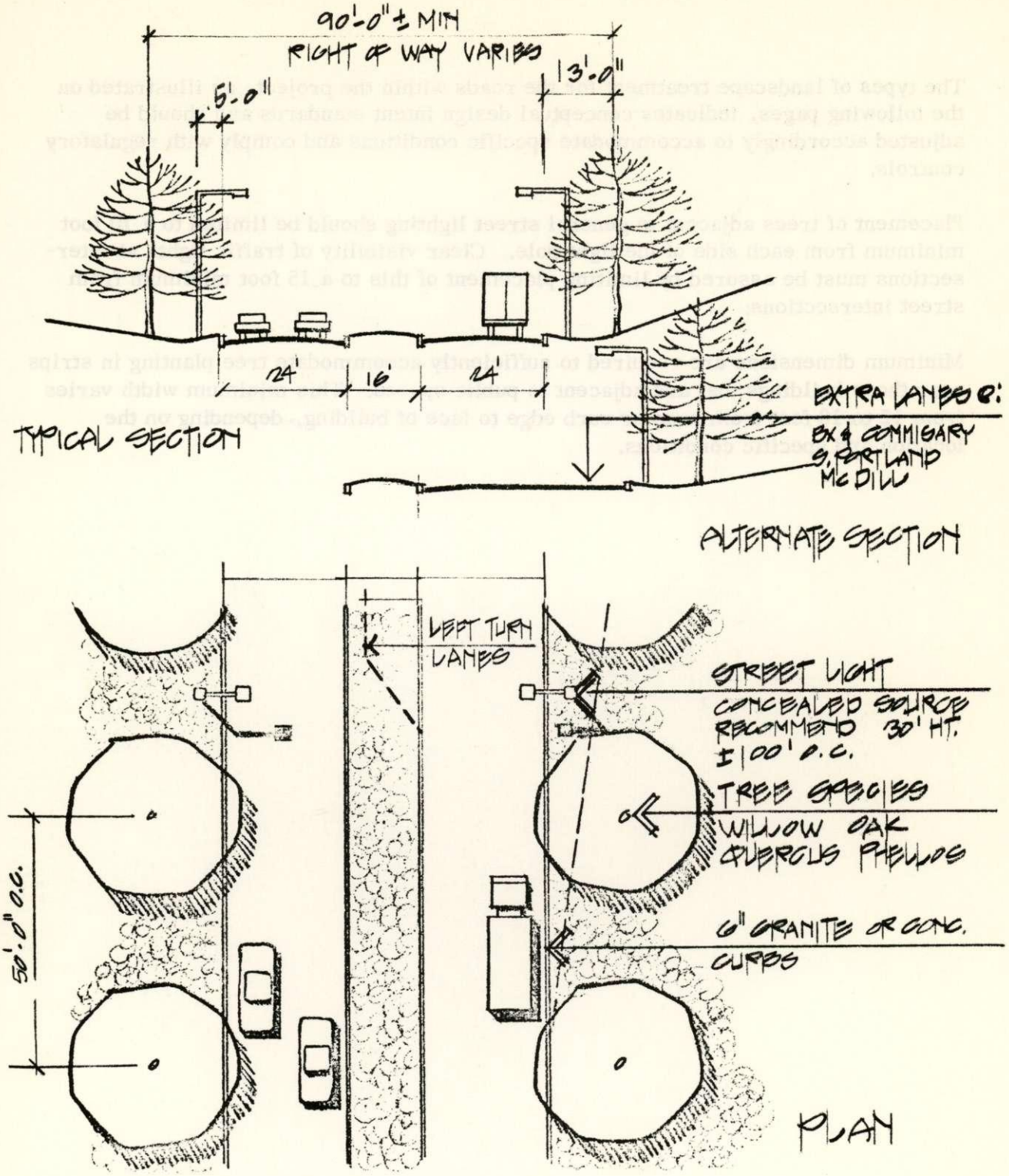
The primary and secondary housing roads should have a more informal tree grouping treatment to differentiate their surrounding function from that of the spine road. This informal treatment would be in the form of alternation. In a given length several trees sould be planted on one side of the road only. Then, down the road trees would be planted only on the other side so that both economy and a three dimensional design is created in sympathy with the informality of the housing arrangement. Trees chosen for this use are Platanus Acerifolia (London Plane Tree).



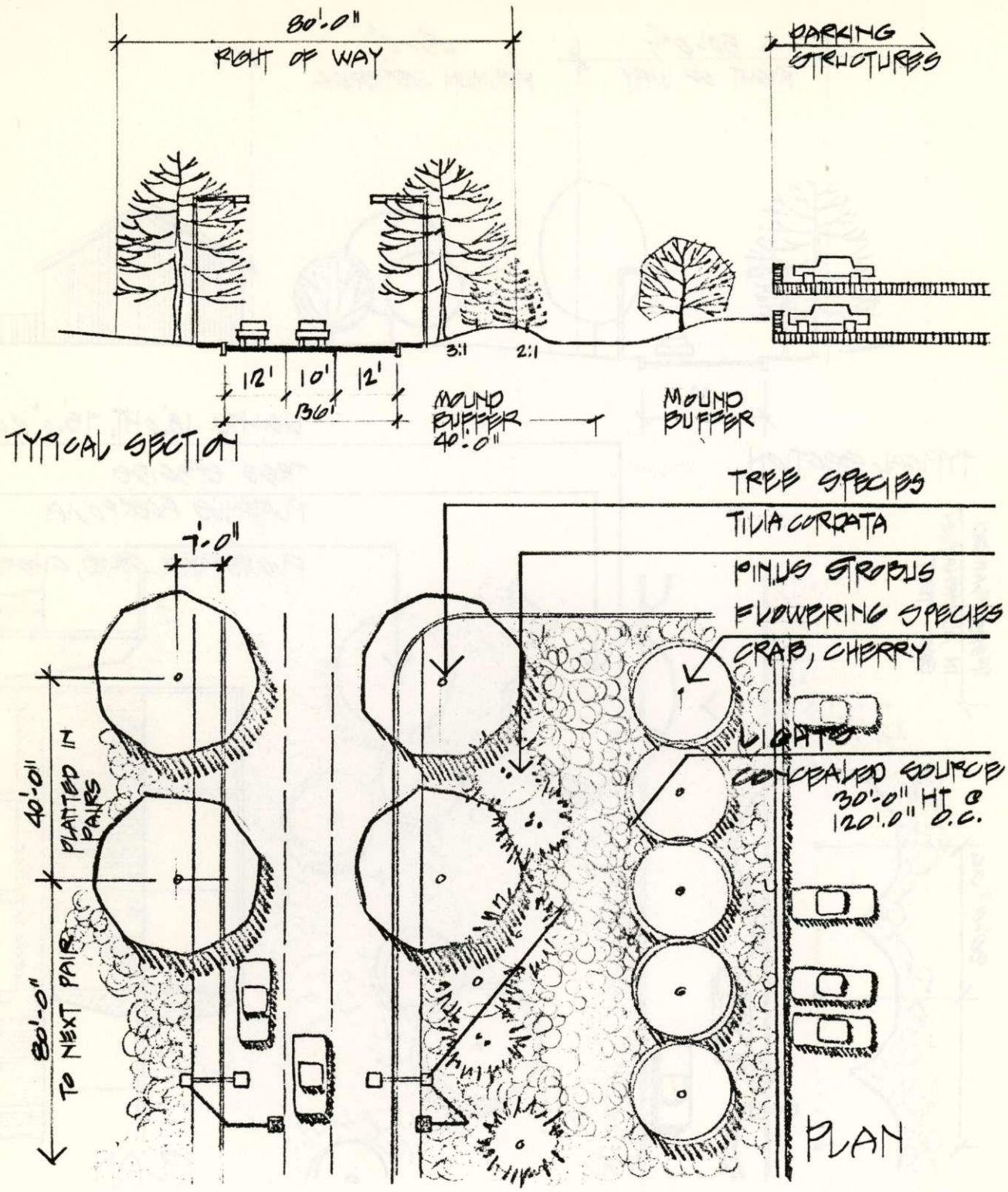
The types of landscape treatment for the roads within the project, as illustrated on the following pages, indicates conceptual design intent standards and should be adjusted accordingly to accommodate specific conditions and comply with regulatory controls.

Placement of trees adjacent to general street lighting should be limited to a 10 foot minimum from each side of the light pole. Clear visibility of traffic lights at intersections must be assured by limiting placement of this to a 15 foot minimum from street intersections.

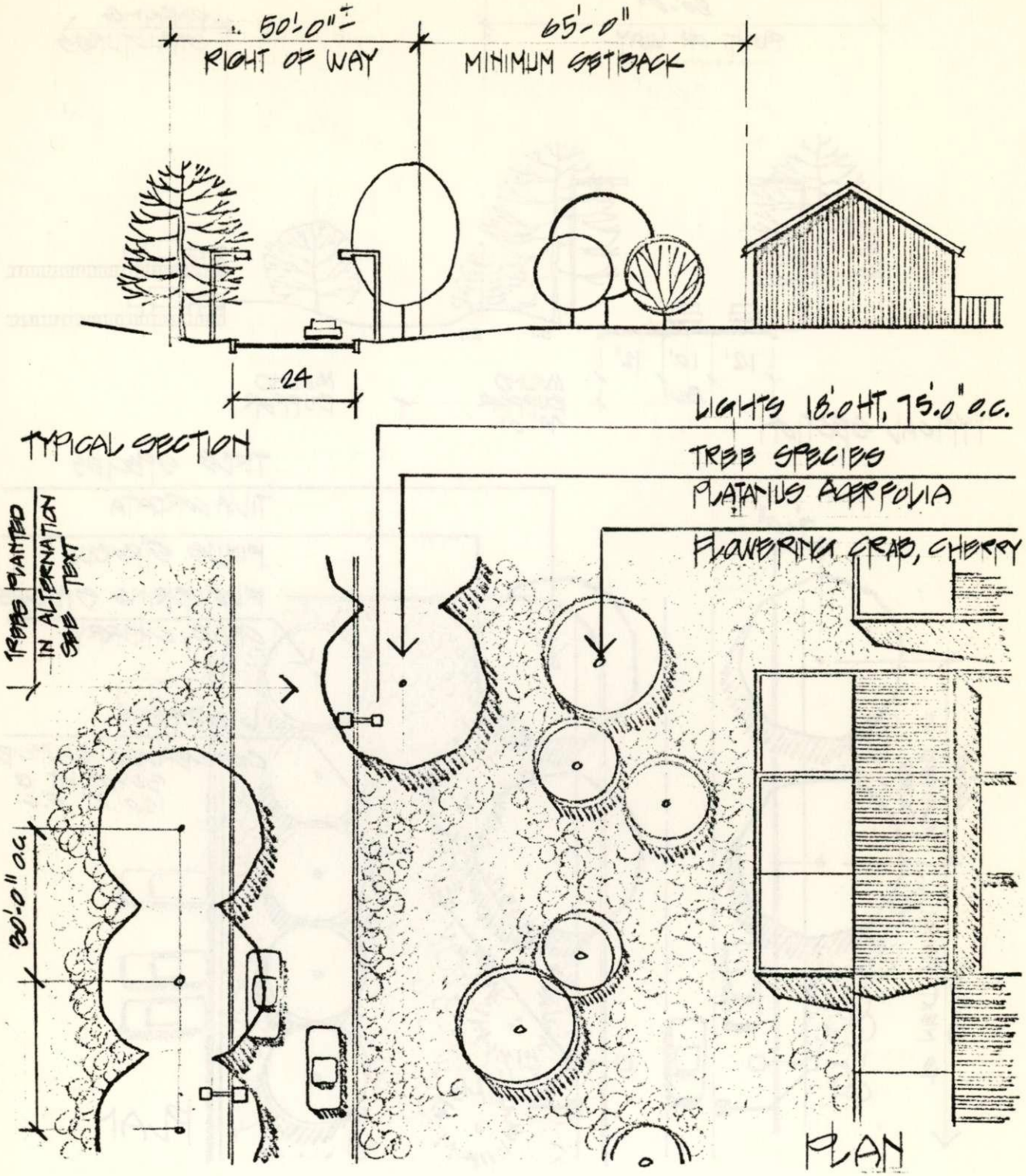
Minimum dimensions are required to sufficiently accommodate tree planting in strips near those buildings that are adjacent to public spaces. This minimum width varies from 12 to 18 feet from road or curb edge to face of building, depending on the location and specific conditions.



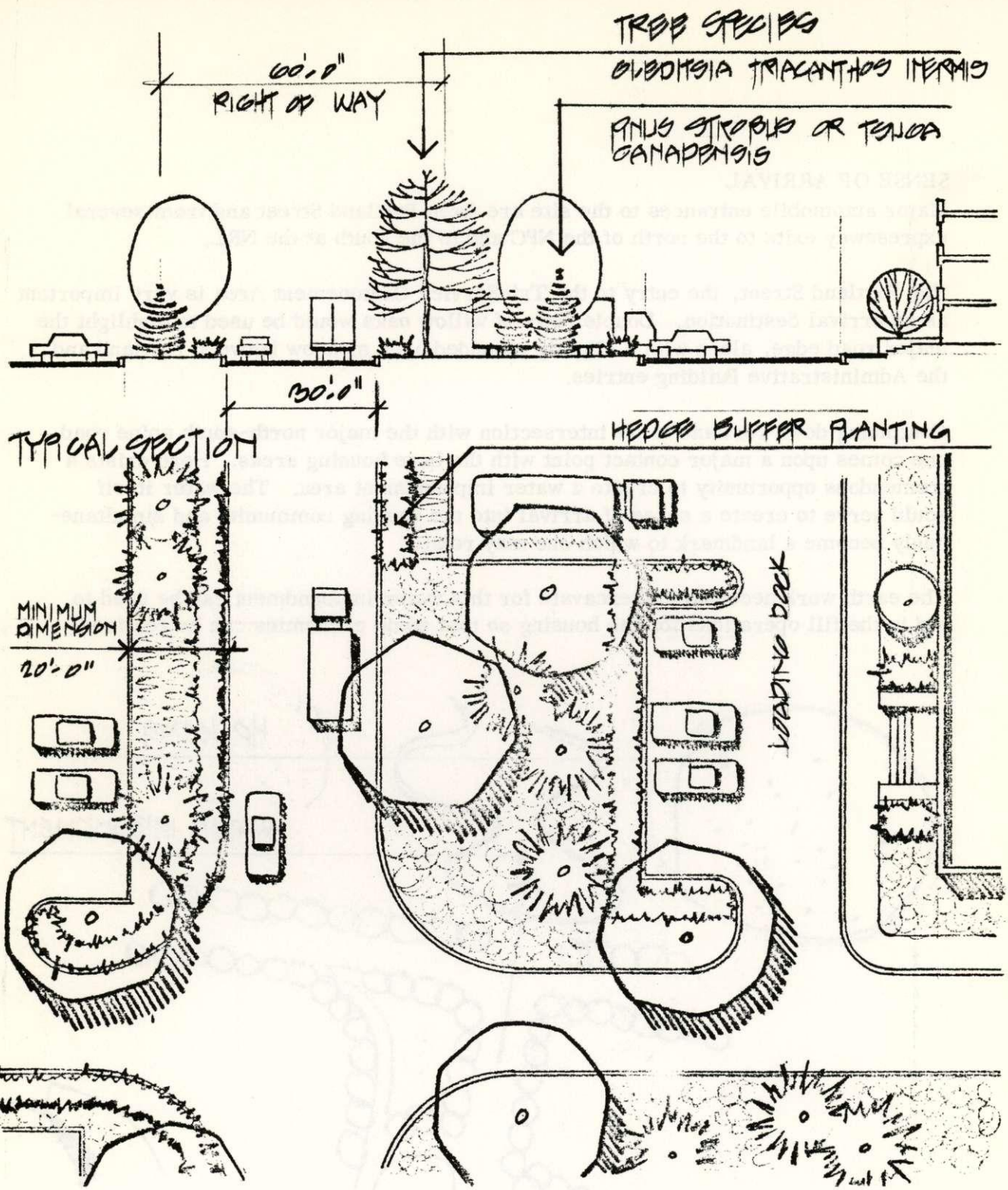
LANDSCAPE TREATMENT
SPINE ROAD



ROAD SECTION AT DUNCAN AVENUE



ROAD SECTION IN HOUSING AREAS



TRI-SERVICE CANTONEMENT AREA
SERVICE ROAD

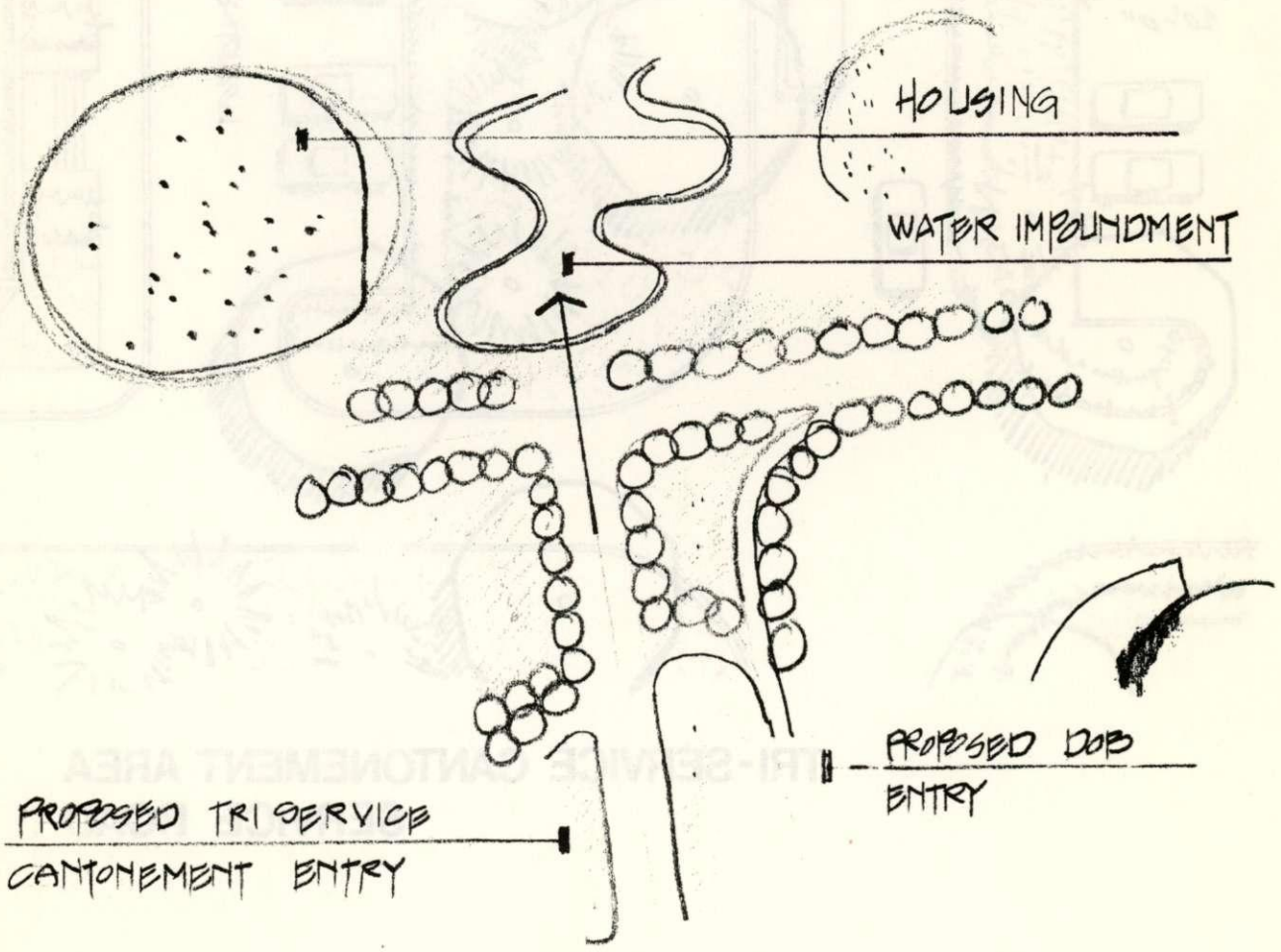
SENSE OF ARRIVAL

Major automobile entrances to the site are from Portland Street and from several expressway exits to the north of the NPC and to the south at the NRL.

For Portland Street, the entry to the Tri-Service Cantonement Area is very important as an arrival destination. Double rows of willow oaks would be used to highlight the major road edge, along with a slightly mounded open meadow between Portland and the Administrative Building entries.

Continuing down Portland to its intersection with the major north-south spine road, one comes upon a major contact point with the base housing areas. Here exists a tremendous opportunity to create a water impoundment area. The water itself sould serve to create a sense of arrival into the housing community and simultaneously become a landmark to which one may relate.

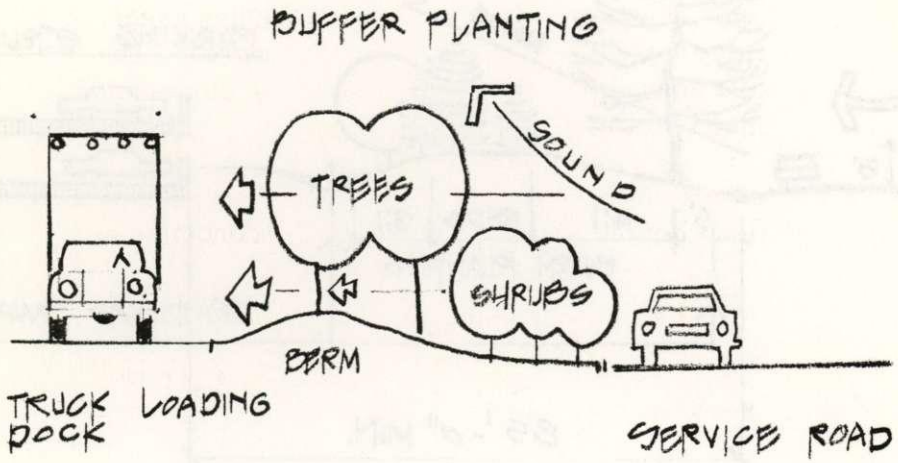
The earth work necessary to excavate for this water impoundment can be used to aid in the fill operations for the housing so that some economies can be realized.



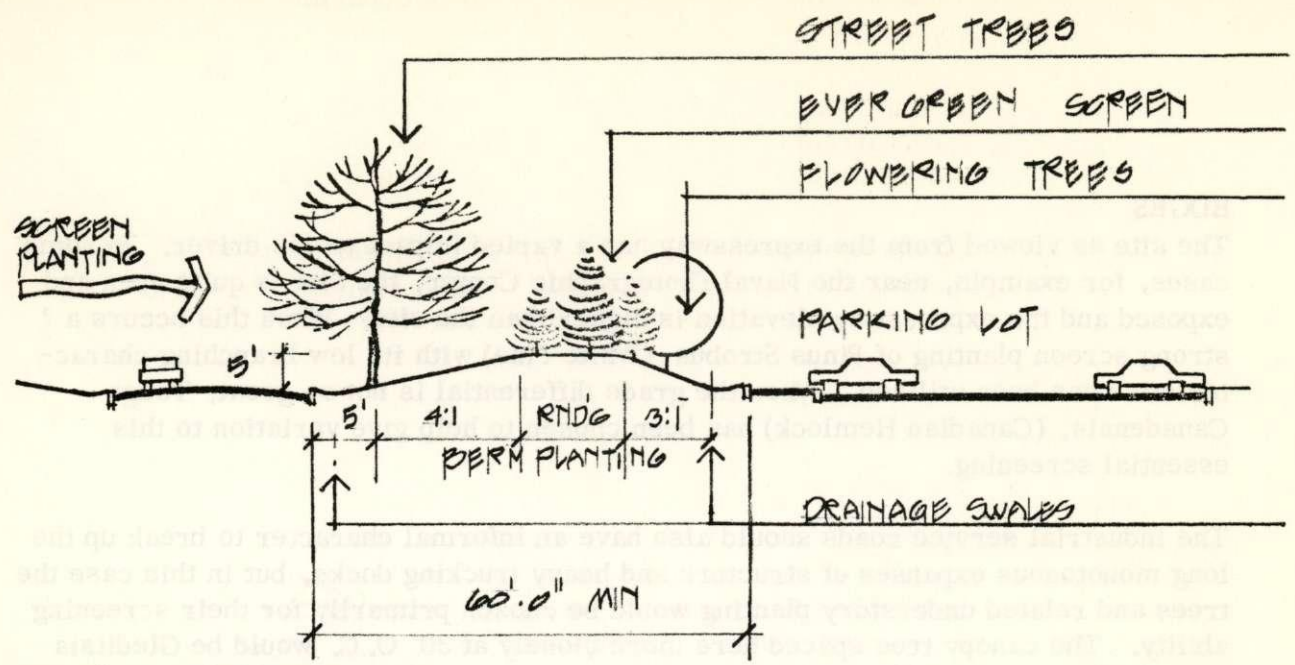
EDGES

The site as viewed from the expressway has a varied impact on the driver. In some cases, for example, near the Naval Photographic Center, the site is quite open and exposed and the expressway elevation is higher than the site. When this occurs a strong screen planting of Pinus Strobus (White Pine) with its low branching characteristics has been utilized. When the grade differential is not so great, Tsuga Canadensis, (Canadian Hemlock) has been chosen to help give variation to this essential screening.

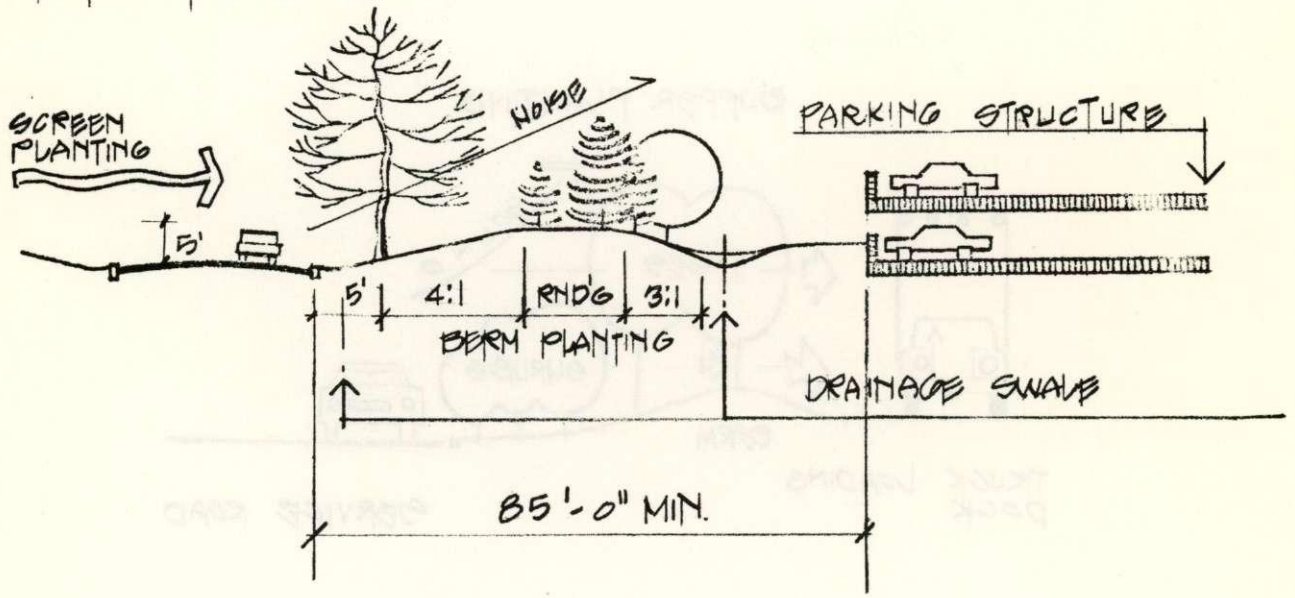
The industrial service roads should also have an informal character to break up the long monotonous expanses of structure and heavy trucking docks, but in this case the trees and related understory planting would be chosen primarily for their screening ability. The canopy tree spaced here more closely at 30' O. C. would be Gleditsia Triacanthos Inermis (Honey Locust).



The general service roads would be planted in a similar fashion but they would not need to have as formal street tree arrangement as the other more important roads. Instead, more of an evergreen palette to screen out certain stretches would be appropriate. Of prime importance is the rear areas of the industrial zone facing the Anacostia expressway from NPC proceeding south. The backs of these kinds of uses with a railroad as a foreground usually become unsightly scrap yards and neglected stretches. Plant species organized informally in large drifts to screen out this view would be a continuation of the Tsuga Canadensis (Canadian Hemlock) with a possible second row of Crateagus Phaenopyrun (Washington Hawthorne) on the service road side of the tracks.



SECTION PARKING LOT



SECTION PARKING STRUCTURE

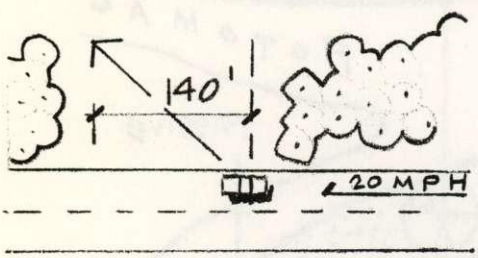
LANDSCAPE EDGES AT PARKING AREAS

LINEAL PARK CONCEPT

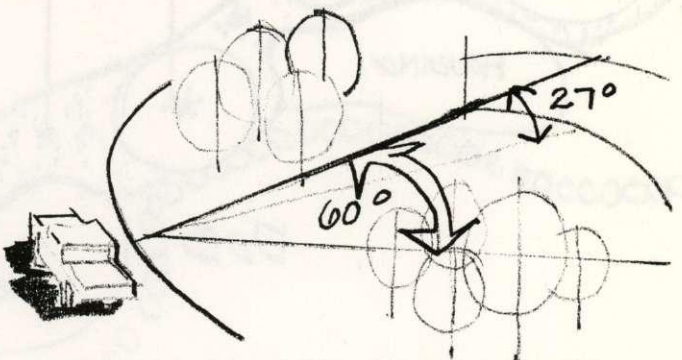
The three mile lineal river-edge park is the prime element for most of the planned recreational facilities of the proposed program on the site. It would provide an opportunity for relaxation in the pursuit of recreational activity in sharp contrast to the activity program planned for the rest of the site. The design intent is to create an environment as free from surrounding distractions as possible while providing a well balanced program of recreational variety.

Automobile access would be provided by secondary roads which loop to the north-south spine road. Pedestrian bicycle access from the housing areas would be provided in selected locations in coordination with the planned pedestrian way system.

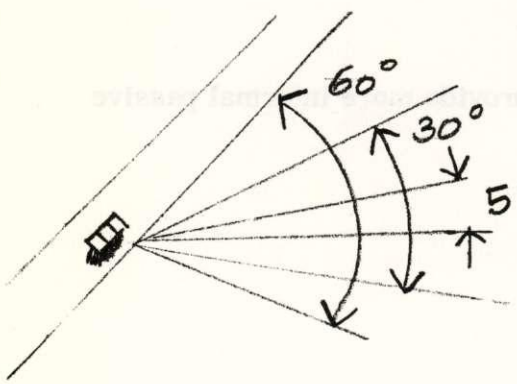
As one drives along the perimeter road adjacent to this lineal park, the intent is that he will be able to get an occasional glimpse through the trees to the river beyond. Anticipated views have been designated by KLC as mentioned earlier. These openings can be determined by multiplying the design speed of the road times 7 in order to achieve a 5 second viewing period. This can be diagrammed as follows:



FIVE SECOND VIEWING AT 20 M.P.H.



MAXIMUM HUMAN PERCEPTION



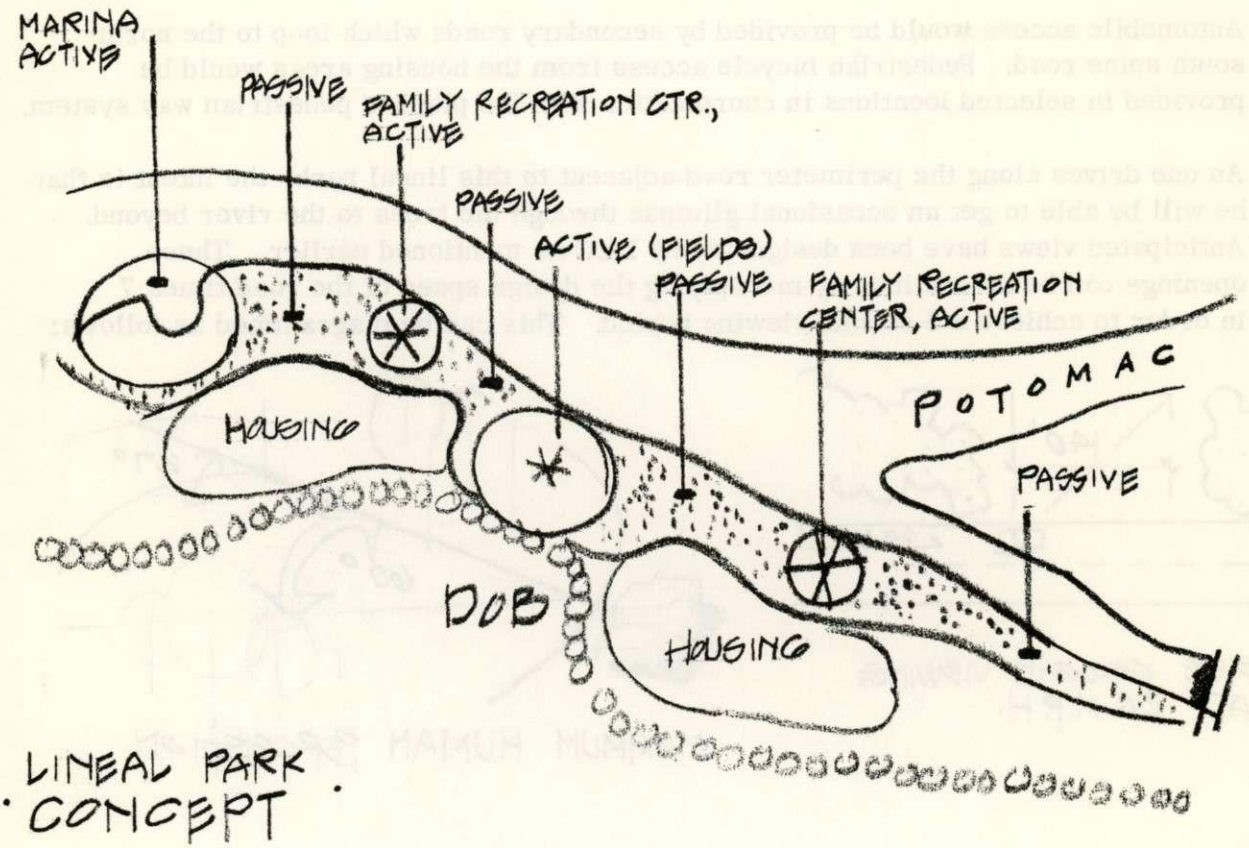
PERCEPTION

60 DEGREE HORIZONTAL @ 60 MPH
30 " " 30 MPH
5 " " 5 MPH

ANGLE/SPEED RATIO

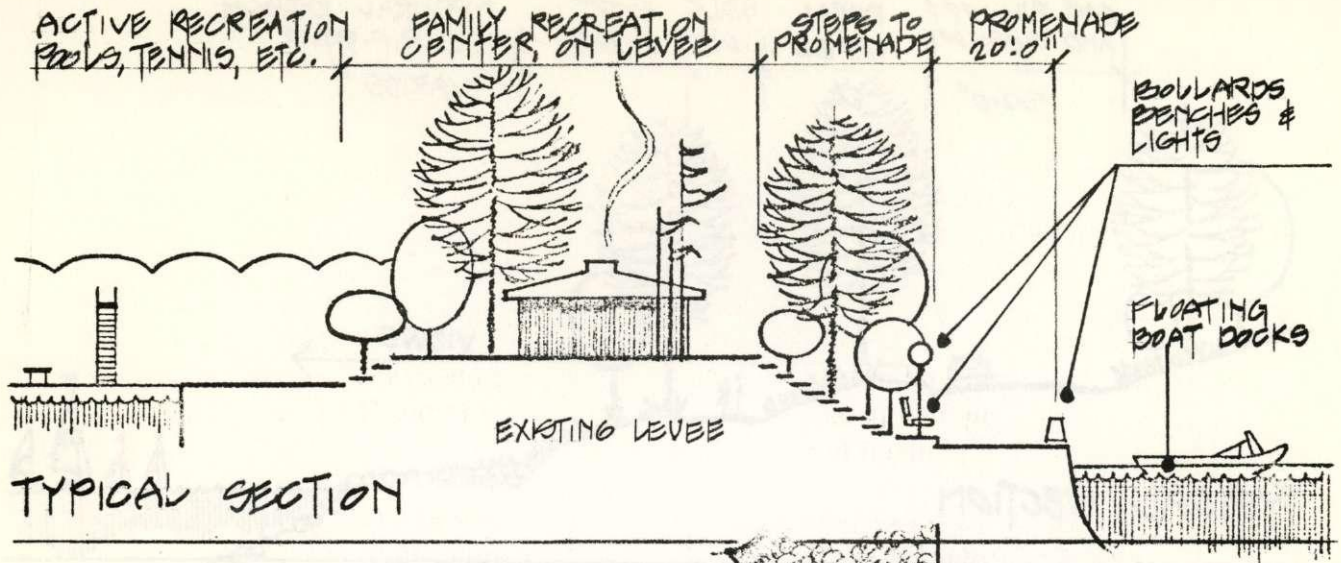
The park itself is visualized to be a series of contrasting spaces of active and passive recreation so that at any one point along the park the user is not far from a variety of experiences that are planned for the park.

The three major active recreational focal points of the park are two family recreation community facilities adjacent to the north and south communities, and one major area containing sports fields midway to the park near the DOB site.

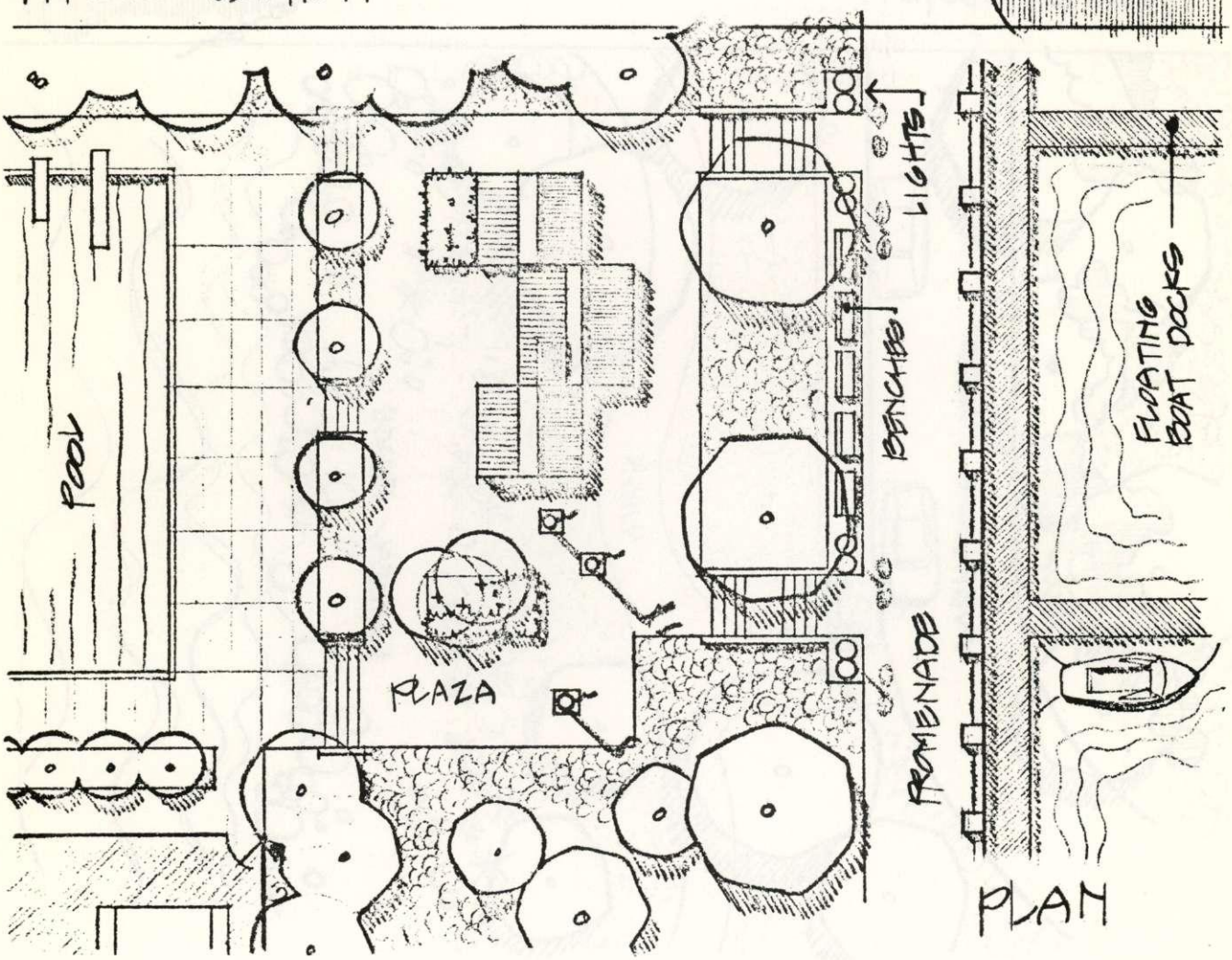


LINEAL PARK CONCEPT

The park areas between these focal points would provide more informal passive recreation space.

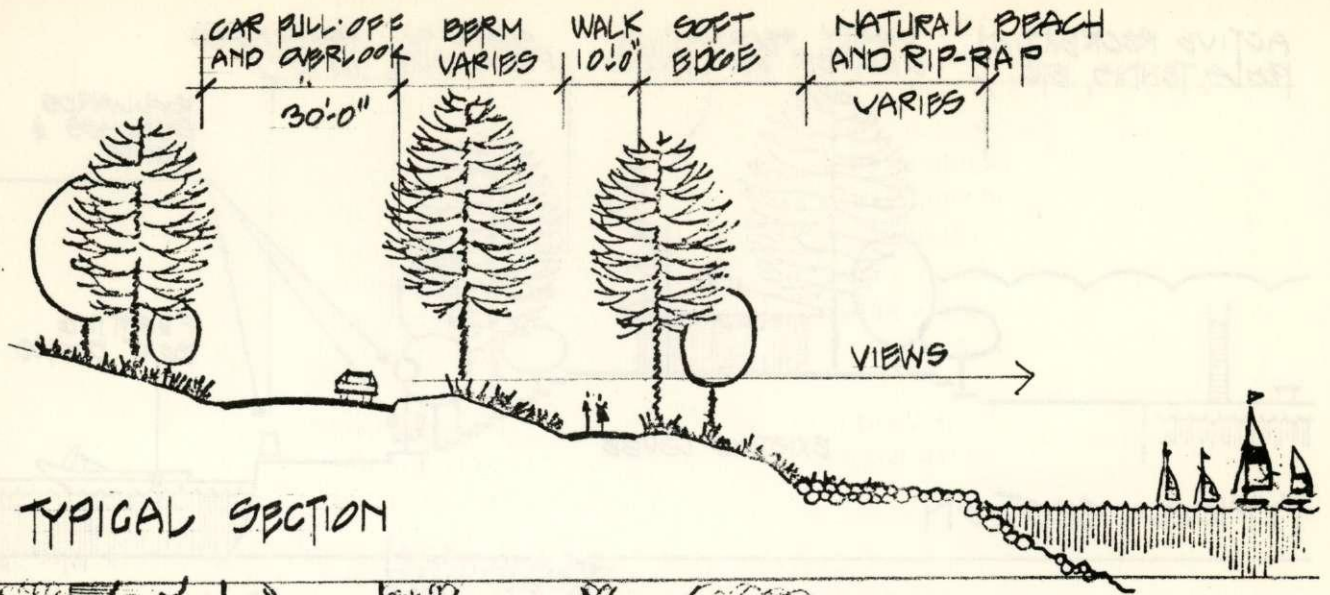


TYPICAL SECTION

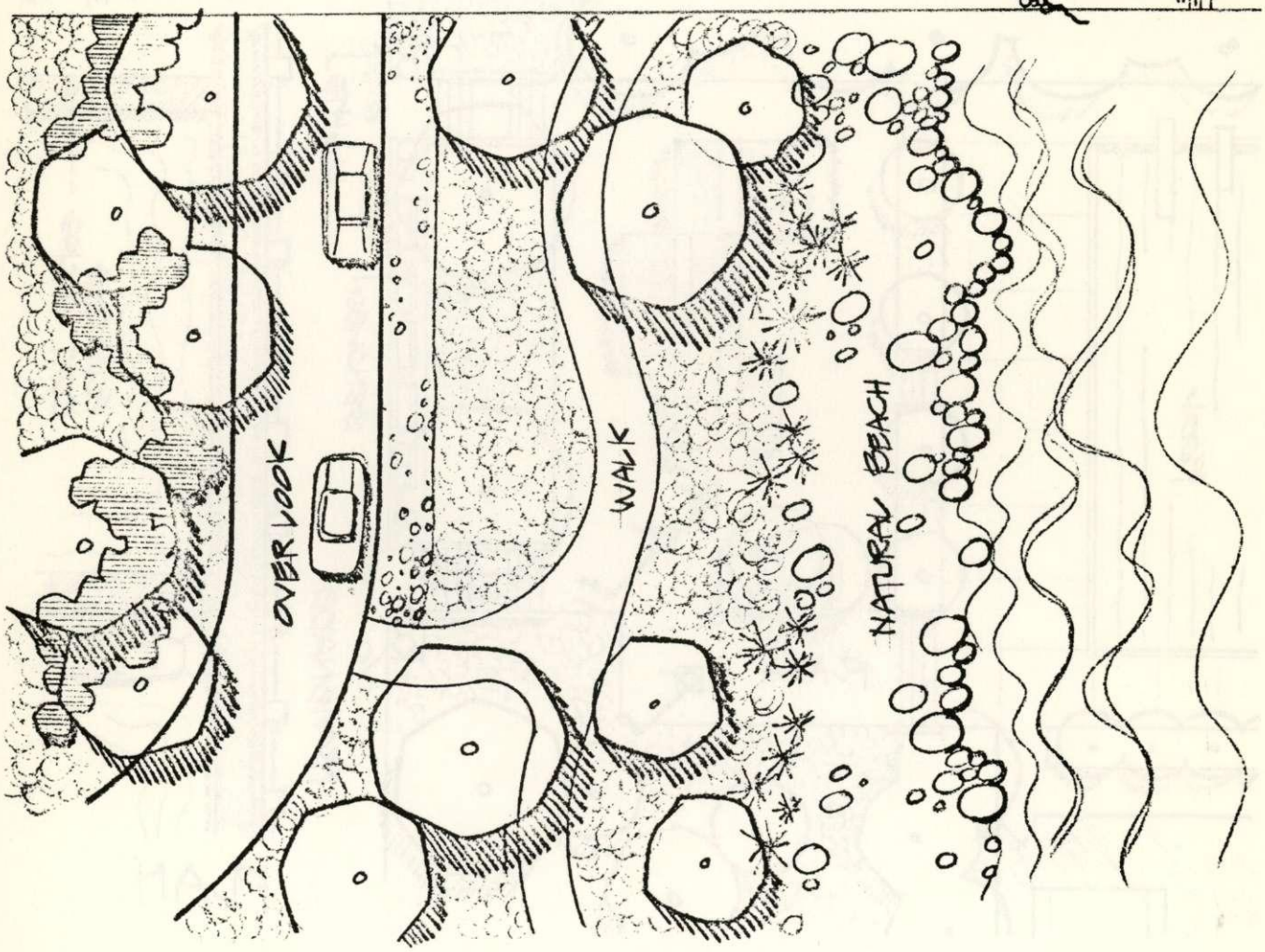


PLAN

FAMILY RECREATION CENTER



TYPICAL SECTION



OVERLOOK AT LINEAL PARK

PEDESTRIAN CIRCULATION

The three mile long pedestrian way was conceived as a connection to and a way between housing clusters. It would provide internal circulation and recreation space for pedestrians and bicyclists free from auto traffic hazards as well as a planning structure defining sub-community organization. Its proposed elevation would essentially be at the existing grade of the site. In this way, a valley floor would be flanked between mounded-up housing plateaus (necessitated by flood level requirements.) Needless to say, this approach requires little fill material for the pedestrian way and would be a very economical approach. In addition, the roads also would be on a raised mounted plateau to satisfy flooding provisions. The pedestrian way connection across roads would be by underpass structures. This would hopefully create a safe and direct distraction from connection for pedestrians of all ages as well as allow more continuity of automobile traffic.

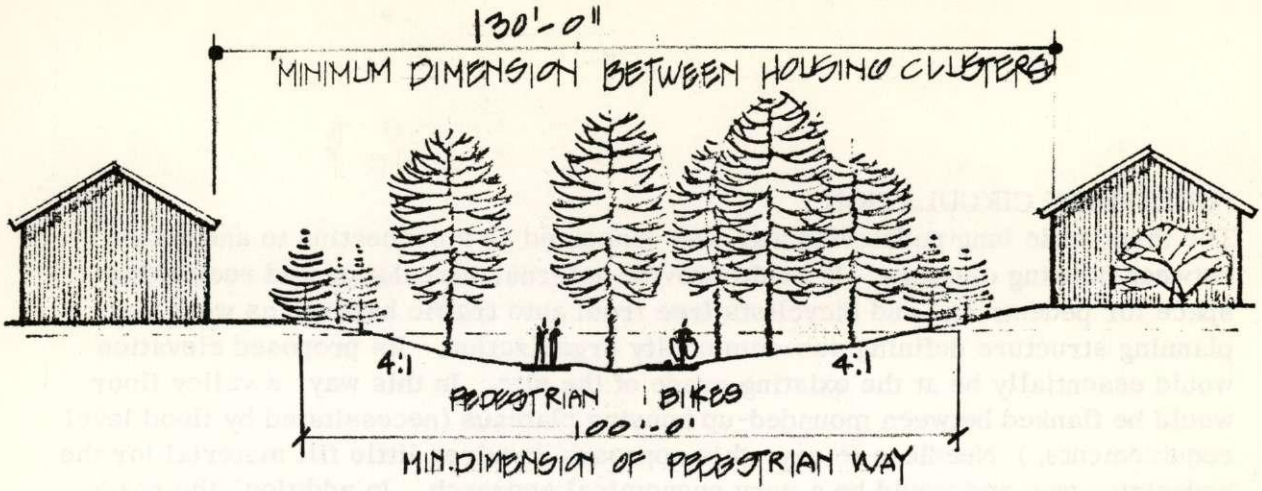
The walks within the pedestrian way were designed as a dual system. It would be better to have two more narrow walks separated by mounding and plant material than it would be to have a single wide walkway that does not allow much freedom of movement.

It is envisioned that one walk would be used mainly by pedestrians while the other would be used by bicycle riders. It is entirely possible that both would be used by bicycle riders, but additional design features could be incorporated at a later stage to keep them separated. By building two parallel walks it is hoped that more design flexibility is possible.

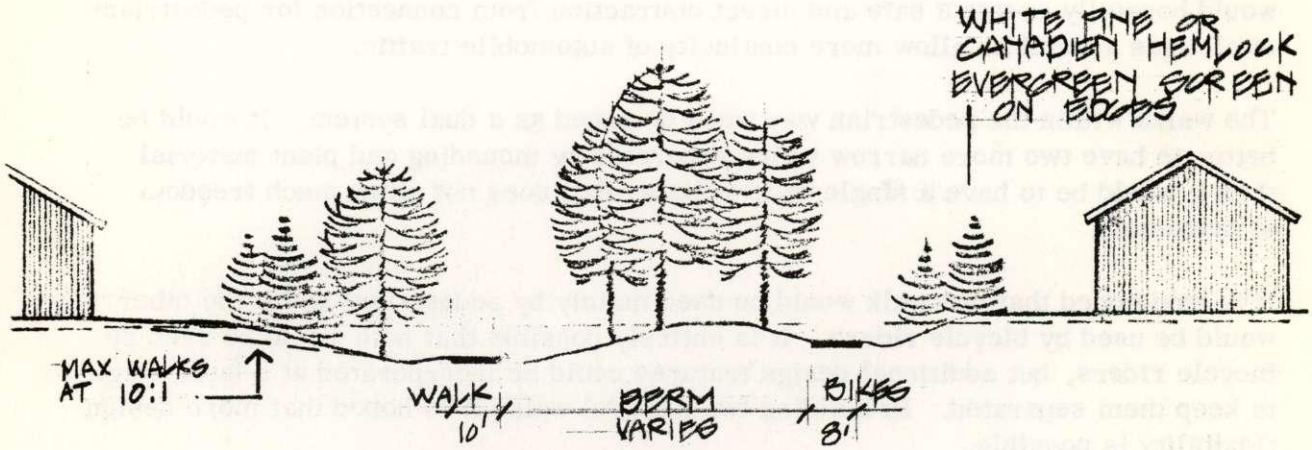
The plant material palette for the pedestrian way would essentially be shade trees, under story trees, evergreens and rough grasses. Their choice requires low maintenance characteristics, a necessity for an area such as this. Though a sophisticated maintenance program could be instituted either through a home owners type association or by private means, a material section and layout which requires anything more than routine minimal maintenance can quickly deteriorate in quality.

Rough grasses should be chosen so that even if only mowed a few times a year they would always be presentable.

The use of plant material in combination with mounding is the least expensive way to create an attractive meaningful environment that would accomplish most of the before mentioned goals for a pedestrian oriented system of this magnitude.



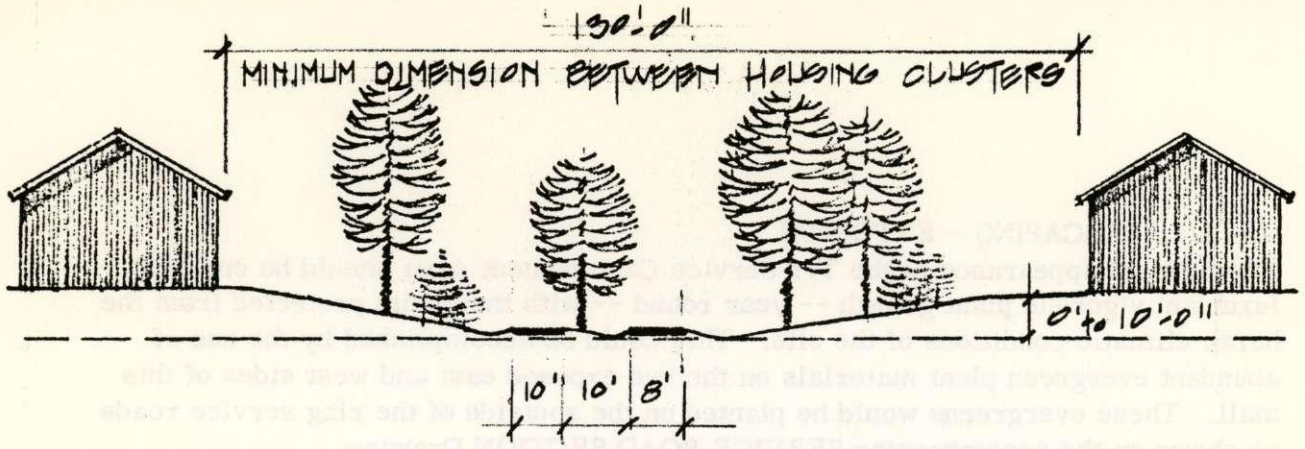
TYPICAL BIKE PEDESTRIAN WAY



TYPICAL MOUNDED GRADE SEPERATION

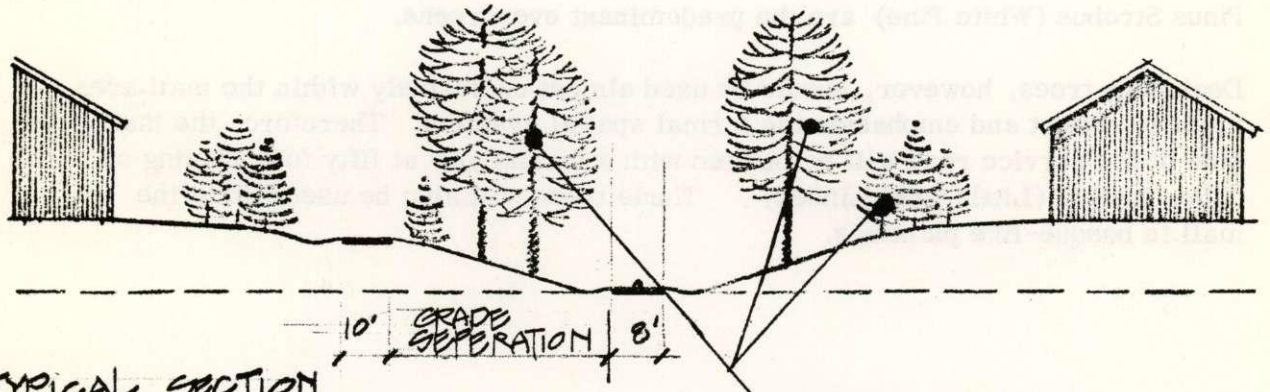
NOTE: WHENEVER WIDTH OF PEDESTRIAN WAY IS NARROW, WALKS ARE CLOSE TOGETHER AND THERE IS NO GRADE SEPERATION. WHEN DIMENSION INCREASES, WALKS CAN SEPERATE WITH BERM PLANTING TO GIVE AN OPPORTUNITY TO ADD INTEREST AND GIVE SAFETY FROM BIKES.

TYPICAL PEDESTRIAN WAY



WALKS ARE KEPT CLOSE TOGETHER TO KEEP ENCLOSURE SPACE PLEASANT

TYPICAL SECTION
FILL - 0 TO 10 FT



TYPICAL SECTION
FILL 10 FT AND OVER

TREE SPECIES

QUERCUS BOREALIS
RED OAK

QUERCUS ROBUR
ENGLISH OAK

FAGUS GRANDIFLORA
AMERICAN BEECH

PINUS STROBUS
WHITE PINE

TSUGA CANADENSIS
CANADIEN HEMLOCK

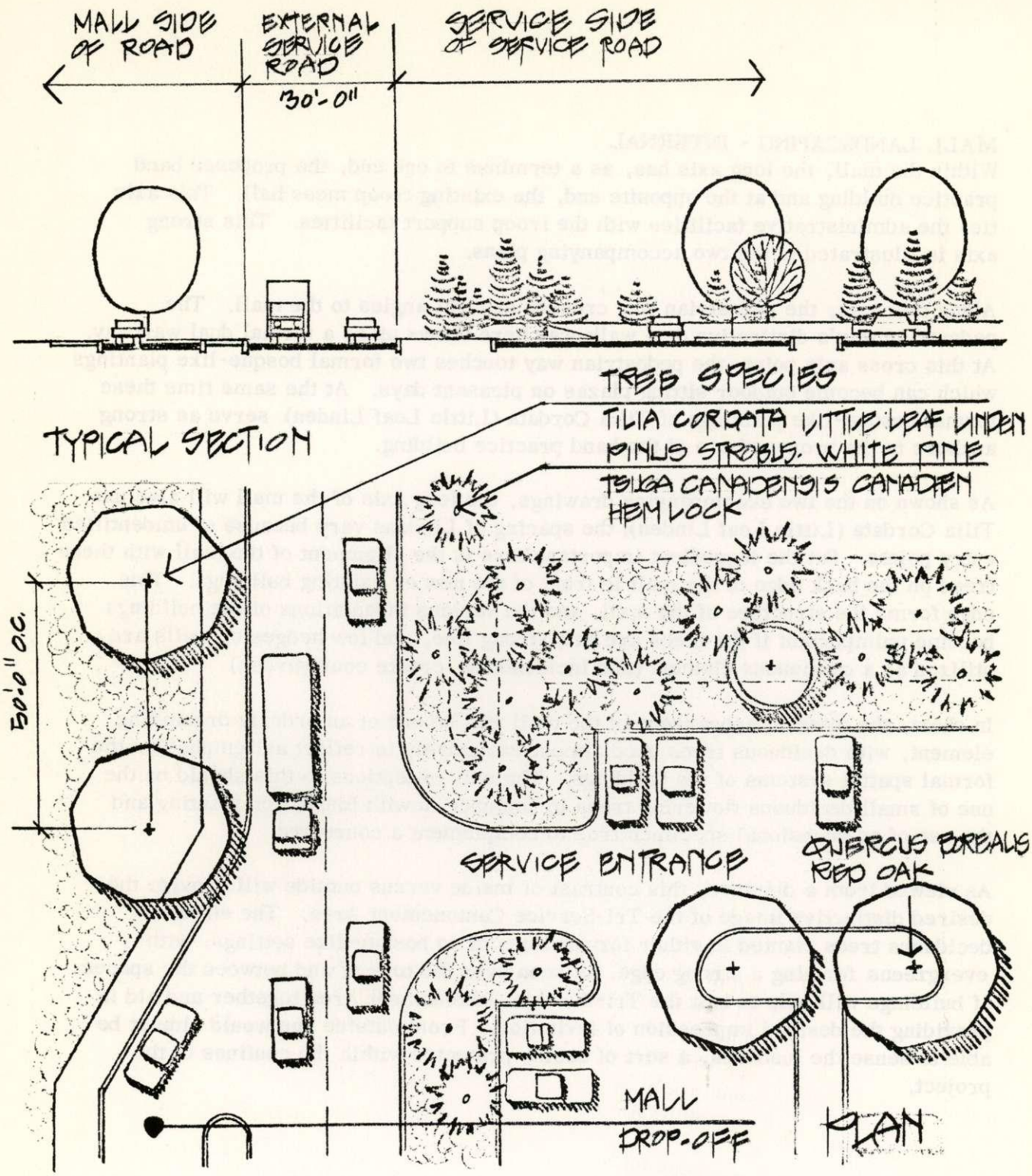
BERM PLANTING - PEDESTRIAN WAY

MALL LANDSCAPING - EXTERNAL

The internal appearance of the Tri-Service Cantonement Area should be one of a luxuriant vigorous plant growth -- year round -- with the plants protected from the harsh climatic conditions of the site. This could be accomplished by the use of abundant evergreen plant materials on the two exposed east and west sides of this mall. These evergreens would be planted on the soutside of the ring service roads as shown on the accompanying SERVICE ROAD SECTION Drawing.

Therefore, these evergreens on the exterior of the mall are important to the contract of lush planting that occurs within the mall. The evergreens have the added advantage of screening out service and other utilitarian elements such as parking, transformers, service stations, loading docks, etc., which usually are exposed and tend to detract from the visual quality of an area. Tsuga Canadensis (Canadian Hemlock) and Pinus Strobus (White Pine) are the predominant evergreens.

Deciduous trees, however, should be used almost exclusively within the mall area itself to reflect and emphasize the formal spatial systems. Therefore, the mall side of the service road will be planted with a formal row at fifty foot spacing of Tilia Cordata (Little Leaf Linden) . These trees will also be used within the mall in bosque-like plantings.



EXTERNAL SERVICE ROAD MALL AREA

MALL LANDSCAPING - INTERNAL

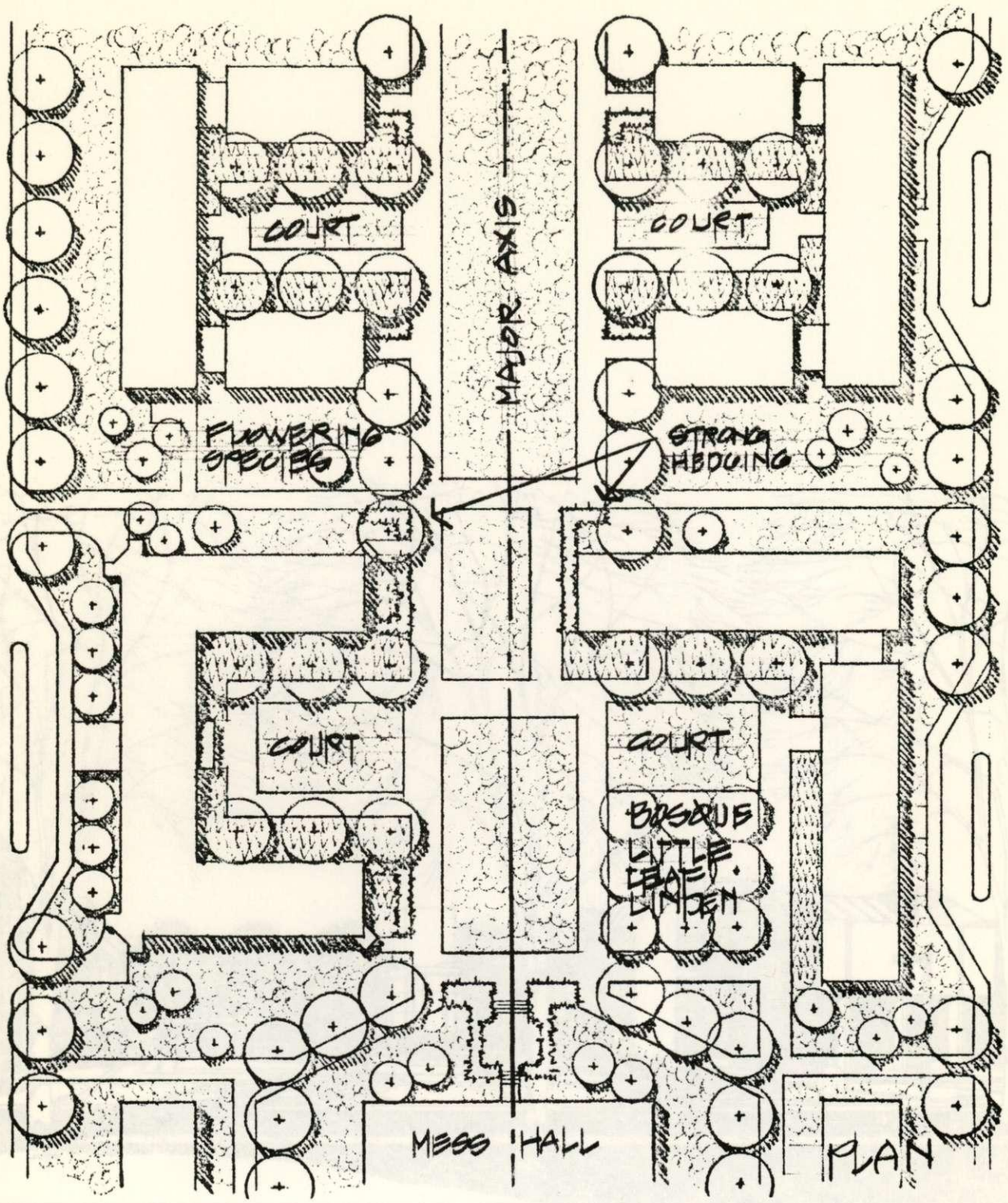
Within the mall, the long axis has, as a terminus to one end, the proposed band practice building and at the opposite end, the existing troop mess hall. This axis ties the administrative facilities with the troop support facilities. This strong axis is illustrated in the two accompanying plans.

Along this axis, the pedestrian way crosses at right angles to the mall. The pedestrian way's distinctive dual walk-way here shows up as a formal dual walkway. At this cross axis point, the pedestrian way touches two formal bosque-like plantings which can become outdoor sitting plazas on pleasant days. At the same time these formal bosque-like plantings of Tilia Cordata (Little Leaf Linden) serve as strong anchors to the proposed use of the band practice building.

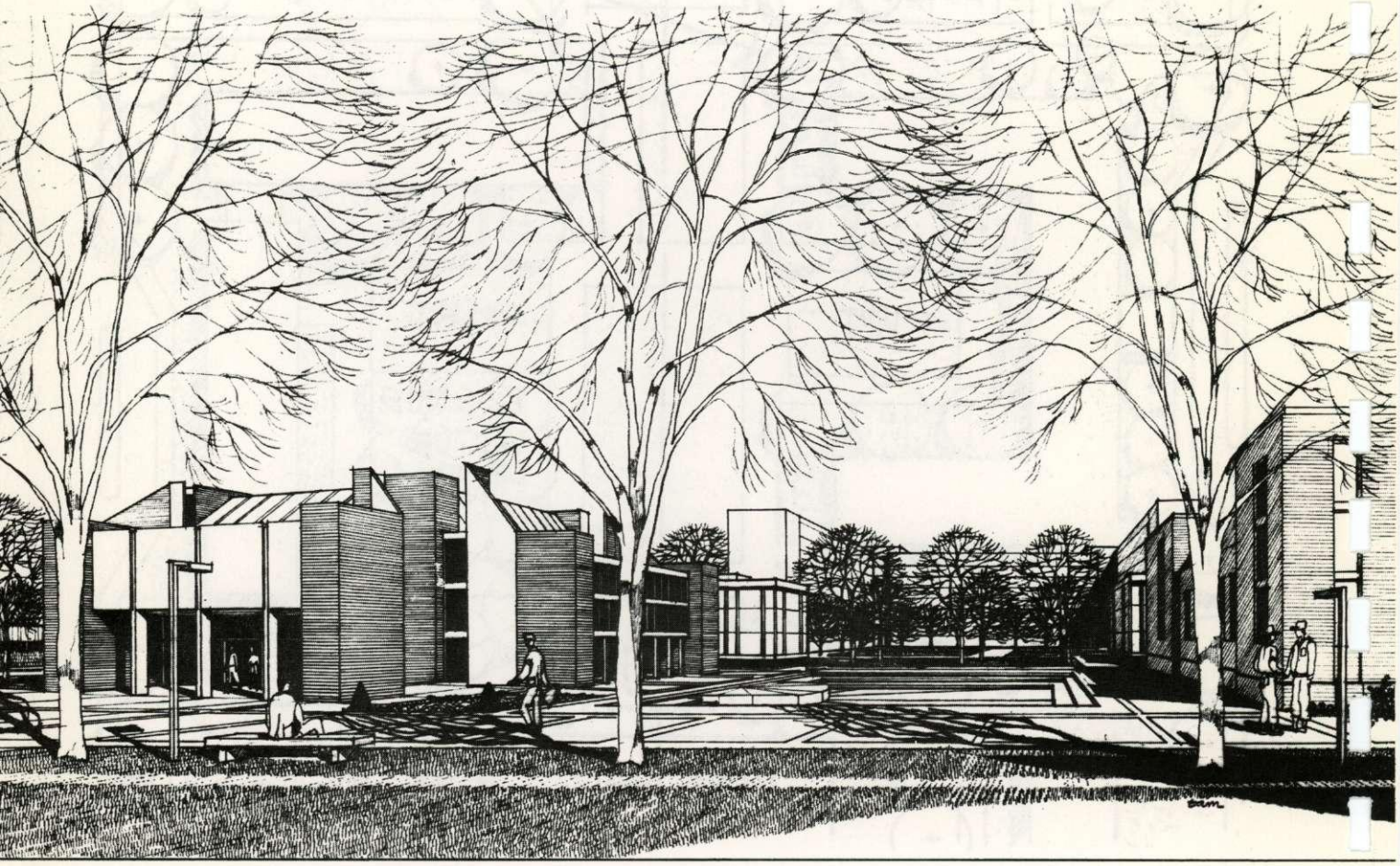
As shown on the two accompanying drawings, the long axis of the mall will also use Tilia Cordata (Little Leaf Linden); the spacing of Lindens vary because of unidentified entry points. But the ingredient important here is the alignment of the mall with these trees on the back edge of the mall in front of the new or existing buildings. This edge forms the structure of the mall, and the various indentations of the buildings become unimportant if the trees are in a strong line, and low hedges or walls are utilized as a continuous element (and incidentally, create courtyards.)

In short, the internal appearance of the mall will be one of an orderly organizing element, with deciduous trees used almost exclusively to reflect and emphasize the formal spatial systems of the buildings. The only exceptions to this should be the use of small deciduous flowering trees in conjunction with foundation planting and the use of an occasional specimen tree to complement a courtyard.

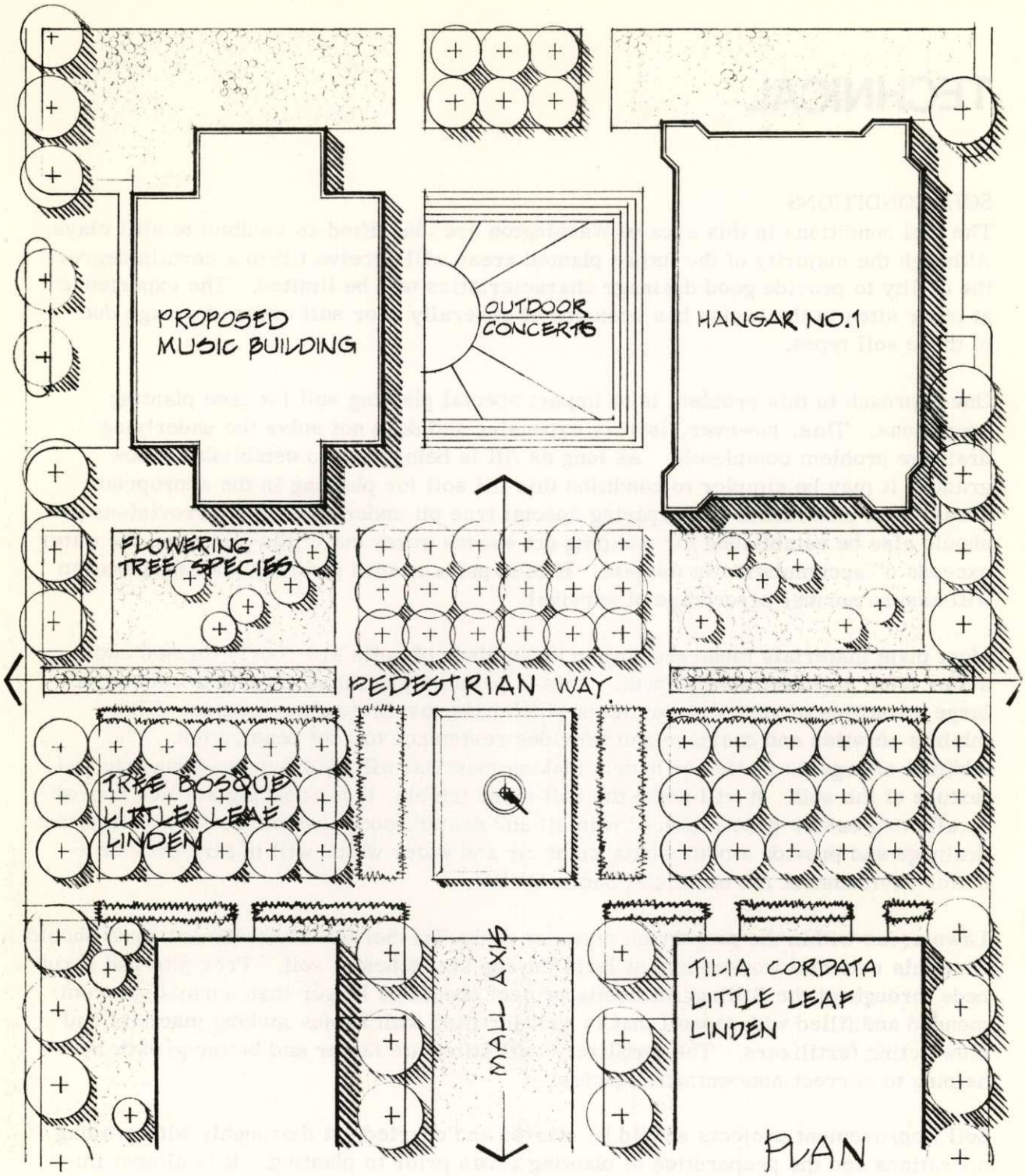
As viewed from a distance, this contrast of inside versus outside will provide the desired distinctive image of the Tri-Service Cantonement Area. The effect of deciduous trees planted in either formal lines or in bosque-like settings, with evergreens forming a strong edge, as seen over the tops of and between the spaces of buildings will help to knit the Tri-Service Cantonement Area together and aid in providing the desired impression of invitation. From outside one would almost be able to sense the lushness, a sort of oasis, protected within the confines of the project.



LANDSCAPE TREATMENT
MAJOR MALL AXIS



TRI-SERVICE CANTONEMENT AREA



LANDSCAPE TREATMENT
MUSIC BUILDING AREA

TECHNICAL

SOIL CONDITIONS

The soil conditions in this area of Washington are classified as medium to stiff clays. Although the majority of the future planted areas will receive fill to a certain degree, the ability to provide good drainage characteristics will be limited. The experience at other sites in the region has been one of generally poor soil under-drainage due to these soil types.

One approach to this problem is to import special planting soil for tree planting operations. This, however, is very expensive and does not solve the underlying drainage problem completely. As long as fill is being used to establish the new grades, it may be simpler to condition this fill soil for planting in the appropriate areas, then underdrain by preparing special tree pit under-drainage. Provisions should also be established for pumping out excess water out of the pits when the water exceeds 6" accumulation in the pits. If done prior to tree planting, this preparation will assure normal percentage of survival.

Most plant materials found growing in these kinds of soils are poorly formed and suffer from apparent slow growth. This is primarily because clay soils consist of large quantities of very fine particles which have insufficient pore space. This inhibits aeration and drainage and provides resistance to root penetration. The addition of organic matter or humus making material will improve the structure and texture of the soil. It will make the soil more friable, thus reducing surface run-off by allowing easier penetration of rainfall and easier root penetration. It will improve drainage and provide a better balance of air and water which will in turn provide a better environment for beneficial bacterial life.

Lawn areas within the pedestrian precinct of the Tri-Service Cantonement Area should have this material worked into at least the top six inches of soil. Tree pits and shrub beds throughout the Bolling/Anacostia project should be larger than normally recommended and filled with topsoil that is well fortified with humus making material and slow acting fertilizers. The fertilizers will stimulate faster and better growth by helping to correct nutrient deficiencies.

Soil improvement projects should be started and carried out thoroughly with grading operations and the preparation of planting areas prior to planting. It is almost impossible to do it well after plants have been installed. This may be laborious and incur a high initial expense but it will provide better plants and continue to produce them without much additional feeding for a longer period of time than soil not properly or thoroughly prepared.

SIZE OF PLANT MATERIAL

Much discussion is usually given in trying to decide whether to do small size planting in groves or large size individual planting treatments. The most flexible design approach is to choose a smaller size caliper tree. The minimum caliper recommended for all tree species should be not less than 2-1/2" in caliper. Although this size caliper is an inch larger than most minimum standards it is more easily transplanted with smaller root ball. It can be replaced readily without sacrificing size over the first four or five years, yet it has great adaptability, a high survival rate, and sufficient hardiness to comply with clearance and trimming standards.

The smaller intermediate scale trees and ornamentals contemplated for Bolling / Anacostia are planned for grove-like planting also. In essence, it is a tighter spacing than normal, with again a small caliper size, but placed in large broad stroke massing, in order to define and enrich spaces.

MAINTENANCE CHARACTERISTICS

Once a tree is planted, further low maintenance methods should be employed such as the use of a good high percentage mixture of peat or humus and a berm saucer of 4 inches placed around the trees in such a way as to divert surface water run-off. By all of these methods, flooding conditions can be minimized in the tree pits. All of the trees chosen in the list are based on the "Street Tree Study for the District of Columbia" by the Barlett Tree Expert Company, and correlated with the Wallace, McHarg, Roberts and Todd Preliminary Study for Developing a Comprehensive Plan for the National Capital Planning Commission with an eye towards two maintenance tree types.

Since watering without irrigation is a costly and time consuming operation and would have to be limited to specific areas, we recommend that irrigation only be provided to all landscaped areas within the pedestrian precinct of all the Tri-Service Cantonement Area to create a luxurious effect. All plant materials outside that area should be encouraged to adapt to existing conditions, however, supplemental watering will be required for the first few years since newly planted material requires more moisture than existing plants. Anything that can be done to increase or conserve moisture in these areas or make plants more self-reliant should be done to reduce not only the work of maintenance but also the cost. This might include surface mulches or the close planting of material which will expose less open space to the sun's rays and thus reduce the evaporation rate.

Irrigation of course is unavoidable in certain key areas which must have a manicured attended look. In weighing the comparative merits of manual and automatic irrigation methods, we feel that the automatic system has far more advantages. A manual system is normally operated during the day because of the cost of night labor. This requires an increased amount of water because of the higher evaporation rate during the day. Manual control also usually means that water will be applied for inaccurate lengths of time resulting in wasted water and/or injured plants. On the other hand, an automatic system greatly limits all these waste factors. It applies the precise amount of water needed at a time when the least amount of people will be inconvenienced. There is also a lower evaporation rate and usually less wind during the evening or early morning hours. With this type of system one can normally expect a twenty to twenty-five percent savings in the amount of water used.

PLANTING PALETTE

As mentioned earlier, the site is at the terminus of a coastal plain ecology. Mixed Oak, Hickory and Pine forest is generally found within the vicinity of the coastal plain. In addition to ecological concerns, plants chosen should reflect hardiness and be the kinds of trees, which once introduced to this environment, will thrive and encourage a higher order of communities.

Canopy Trees

Species	
Quercus Phellos (Willow Oak)	Spine Road
Zelkova Serrata (Japanese Zelkova)	Lineal Park
Quercus Borealis (Red Oak)	Pedestrian Way/Surface Parking Lots
Quercus Robur (English Oak)	Pedestrian Way/Lineal Park
Fagus Grandfolia (American Beech)	Pedestrian Way/Lineal Park
Tilia Cordata (Little Leaf Linden)	Duncan Street/Tri-Service Cantonement Area

Platanus Acerifolia (London Plane Tree)	Primary and Secondary Roads
Gleditsia Triacanthos Inermis "Moraine" (Moraine Honey Locust)	Industrial and Service Roads
Intermediate Zone Trees	
Amelanchier Candensis (Shadblow Service Berry)	Pedestrian Way
Acer Campestree (Hedge Maple)	Lineal Park
Acer Ginnala (Amur Maple)	Lineal Park
Crataegus Phaeno pyrum (Washington Hawthorne)	Industrial and Service Roads
Lagerstroemia Indica (Crepe Myrtle)	Mall/Tri-Service Cantonement Area
Accent Trees and Shrubs	
Cornus species	
Malus species	
Siberian Crabapple	
Radiant Crabapple	
Prunus Species	
Amanogawa Flowering Cherry	
Sekiyama Flowering Cherry	
Yedoewsis Flowering Cherry	
Viburnum Species	

Accent Trees and Shrubs (Cont'd.)

Azalea Species

Ilex Species

Evergreen Trees

Pinus Nigra
(Austrian Pine)

Pinus Strobus
(White Pine)

Tsuga Canadensis
(Canadian Hemlock)

BOLLING·ANACOSTIA
MASTER PLAN

LEGEND

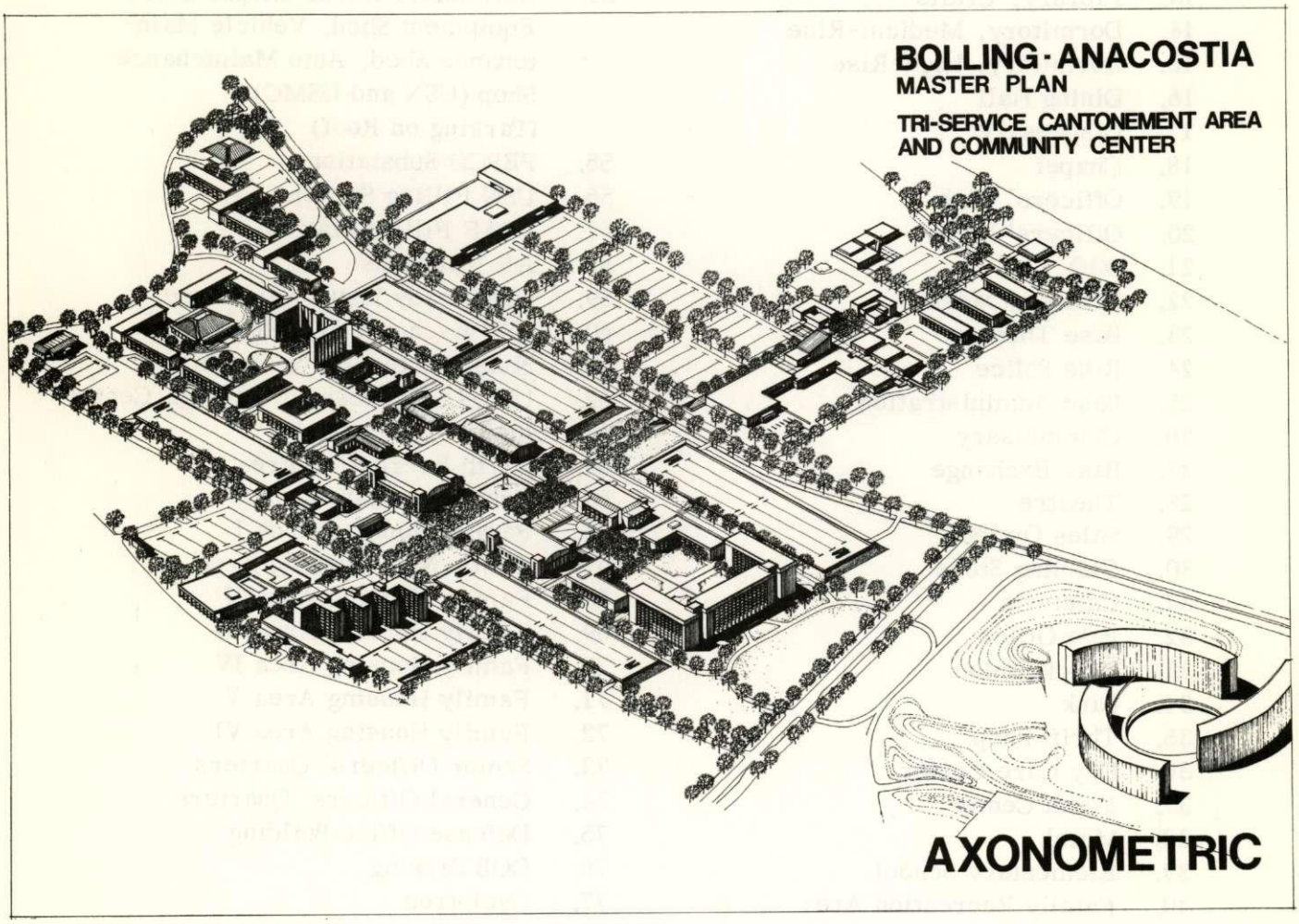
1. SPINE ROAD
2. DUNCAN STREET AND MALL
3. PRIMARY AND SECONDARY ROADS
4. SERVICE AND INDUSTRIAL ROADS
5. PEDESTRIAN WAY
6. LINEAL PARK
7. VIEWS AND VISTAS

0 200 500 900 1000

LANDSCAPE CONCEPT

Section Four

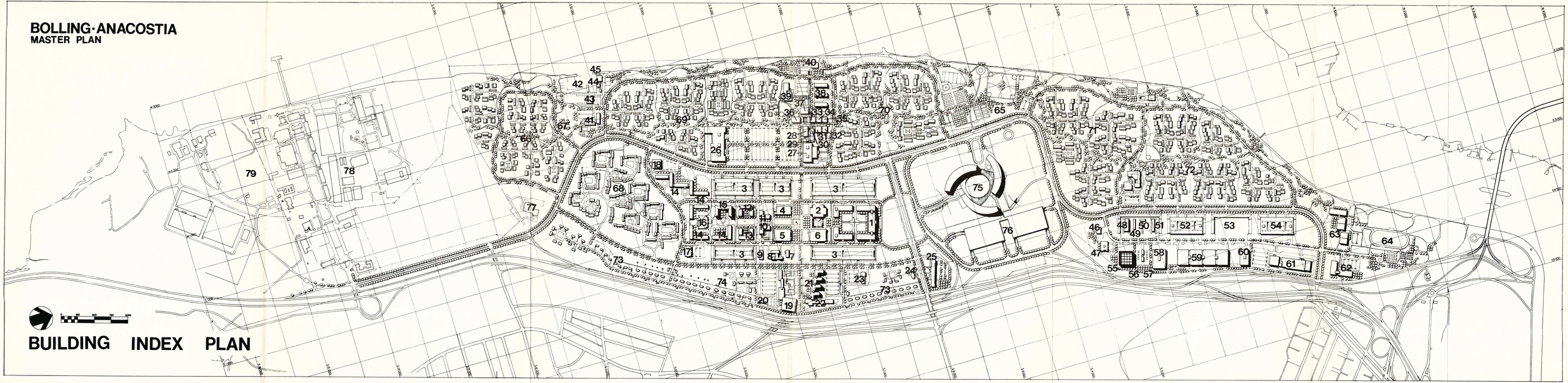
SUPPORTING DATA


BOLLING · ANACOSTIA
MASTER PLAN
TRI-SERVICE CANTONEMENT AREA
AND COMMUNITY CENTER
AXONOMETRIC

BUILDING INDEX

1. Administration
2. Band Practice Building
3. Parking Structure
4. Bowling Alley
5. Gymnasium
6. Hangar
7. Photo Recon. Lab.
8. Heating Facility Building
9. Heating Facility Building Extension
10. Airmen's Club
11. NCO Academy
12. Squadron Headquarters
13. Library, Crafts
14. Dormitory, Medium-Rise
15. Dormitory, High-Rise
16. Dining Hall
17. Dispensary
18. Chapel
19. Officers' Club
20. Officers' Mess
21. BOQ
22. Officers' Mess
23. Base Theatre
24. Base Police
25. Base Administration
26. Commissary
27. Base Exchange
28. Theatre
29. Sales Outlet
30. Clothing Store
31. Cafeteria
32. Post Office
33. Credit Union
34. Bank
35. Thrift Shop
36. Day Care Center
37. Youth Center
38. Motel
39. Elementary School
40. Family Recreation Area
41. NCO Club
42. Marina
43. Marine Maintenance Shop
44. Boat Storage
45. Crash Boat Crew Station
46. Fire Station
47. Unspecified Building
48. Car Care Center
49. Car Wash
50. Gas Station
51. Auto Hobby Shop
52. AF Base Engineer, B. E. Maintenance, Auto Maintenance (Parking on Roof)
53. Open Storage
54. USN Public Works Shops, Store Equipment Shed, Vehicle Maintenance Shed, Auto Maintenance Shop (USN and USMC) (Parking on Roof)
55. PEPCO Substation
56. USN Filling Station
57. USAF Filling Station
58. AF Warehouse
59. USN Ready Issue Warehouse
60. USN Exchange Warehouse
61. Naval Photographic Center
62. USN/USMC Reserve Training Center
63. Junior High School
64. North Recreation Area
65. Troop Recreation Area
66. Family Housing Area I
67. Senior NCO Housing Area
68. Family Housing Area II
69. Family Housing Area III
70. Family Housing Area IV
71. Family Housing Area V
72. Family Housing Area VI
73. Senior Officers' Quarters
74. General Officers' Quarters
75. Defense Office Building
76. DOB Parking
77. Cyclotron
78. Naval Research Laboratory
79. Blue Plains Sewage Treatment Plant

BOLLING·ANACOSTIA
MASTER PLAN



BUILDING INDEX PLAN

APPENDIX I

SUMMARY: COMPONENT SITE AREAS

TRI-SERVICE CANTONEMENT AREA		142.47 ACRES
INDUSTRIAL/TECHNICAL COMPLEX		74.21
COMMUNITY CENTER		33.35
SOUTH NEIGHBORHOOD CENTER		6.26
NORTH NEIGHBORHOOD CENTER		6.11
	SUB-TOTAL	262.40 ACRES
OFFICERS' HOUSING AREA		55.00
SOUTH COMMUNITY		203.13
NORTH COMMUNITY		114.06
SENIOR NCO HOUSING AREA		9.13
	SUB-TOTAL	381.32 ACRES
OPERATIONAL MARINA		14.43
SOUTH FAMILY RECREATION AREA		23.64
NORTH FAMILY RECREATION AREA		24.70
WEST TROOP RECREATION AREA		37.31
NORTH RECRFATION AREA		19.11
	SUB-TOTAL	119.19 ACRES
JUNIOR HIGH SCHOOL		24.00
TOTAL NET AREA (Exclusive of Portland St.& main spine road)		786.91 ACRES
TOTAL GROSS AREA		801.40 ACRES

DEFENSE OFFICE BUILDING SITE		114.31 ACRES
(less area required for road realignment)		4.38
	SUB-TOTAL	109.93 ACRES
BELLEVUE HOUSING AREA		58.83
NAVAL RESEARCH LABORATORY		129.24
NAVY CYCLOTRON		8.08
	SUB-TOTAL	196.15 ACRES

SUMMARY: HOUSING UNITS

GENERAL OFFICERS' QUARTERS	Existing	24 DU
	Proposed	19
	SUB-TOTAL	43 DU
SENIOR OFFICERS' QUARTERS	Existing	8 DU
	Proposed	32
	SUB-TOTAL	40 DU
FIELD GRADE OFFICERS' QUARTERS	Proposed	221 DU
CO. GRADE OFFICERS' QUARTERS	Proposed	286 DU
SENIOR NCO QUARTERS	Proposed	3 DU
NCO QUARTERS	Existing	300 DU
	Proposed	41
	SUB-TOTAL	341 DU
	Proposed	326
	SUB-TOTAL	667 DU
NCO & ENLISTED MENS' QUARTERS	Proposed	688 DU
TOTAL FAMILY HOUSING UNITS	EXISTING	332 DU
	PROPOSED	1,616
	TOTAL	1,948 DU

NON-FAMILY HOUSING

BOQ		1,100 MN
DORMITORY - AIRMEN	Existing	1,100 MN
	Proposed	2,376
	SUB-TOTAL	3,476 MN
	TOTAL	4,576 MN

SUMMARY: PARKING

NON-HOUSING	STRUCTURED		350 CARS
	DECKED		5,798
	OPEN		3,343
		SUB-TOTAL	9,491 CARS
HOUSING	COVERED		1,634 CARS
	OPEN		922
		SUB-TOTAL	2,556 CARS
		TOTAL	12,047 CARS

EXISTING COMPONENT SITE AREAS

U.S. NAVAL STATION			333.81 ACRES
(less area returned to District of Columbia)			34.40
		TOTAL	299.41 ACRES
includes: Naval Photographic Center	10 ACRES		
HMX - 1	50 ACRES		
DEFENSE OFFICE BUILDING SITE			114.31 ACRES
BOLLING AIR FORCE BASE			620.00 ACRES
including easement	9.33 ACRES		
excluding right-of-way Baltimore and Ohio Railroad Alexandria Branch Line	4.41		
excluding D.C. sewer area	2.02		
(less proposed Urban Renewal Area)		252.40 ACRES	
proposed river crossing		10.89	
		9.42	
	TOTAL	20.31 ACRES	
proposed NRL expansion		38.98	
		5.38	
	TOTAL	44.36 ACRES	
as per 1965 NCPC approved plan		302.89 ACRES	
as per 1969 Air Force Scheme III		410.00 ACRES	
BELLEVUE HOUSING			58.83 ACRES
(less NRL expansion area)		17.41 ACRES	41.42
NAVAL RESEARCH LABORATORY			103.37 ACRES
includes PEPCO easement		1.00 ACRES	
plus miscellaneous additions			25.87
		TOTAL	129.24 ACRES
TOTAL AREA BOLLING/ANACOSTIA			1,107.48 ACRES

TRI-SERVICE CANTONEMENT AREA

HEADQUARTERS ADMINISTRATION AREA — 53.87 ACRES

EXISTING:	Administration Facility - Building #20		64,128 SF
	Parking - Open		150 CARS
	GROSS AREA		4.90 ACRES
PROPOSED:	Headquarters Administration Complex		799,000 SF
	Band Practice Facility - USAF		82,000
	TOTAL		881,000 SF
	PARKING: Decked (2 levels)		2,472 CARS
	Structured (Under HQ Complex)		350
	TOTAL		2,822 CARS
	GROSS AREA		48.97 ACRES

TROOP SUPPORT AREA — 65.55 ACRES

EXISTING:	Dispensary - USAF		37,680 SF
	Dormitory - Airmen	1,100 MN	180,000
	Dining Hall - Airmen	1,500 MN	18,600 SF
	proposed expansion	1,500	9,000
	SUB-TOTAL	3,000 MN	27,600 SF
	HQ Squadron		22,172 SF
	proposed expansion		18,000
	SUB-TOTAL		40,172 SF
	Bowling Alley	16 lanes	13,600 SF
	proposed expansion	16 lanes	14,000
	SUB-TOTAL	32 lanes	27,600 SF
	Service Club - Airmen		27,800 SF

	Photo Lab Reconnaissance		10,432 SF
	Heating Facility Building		12,068
	Gymnasium (in converted hanger)		46,230
		TOTAL	409,582 SF
PROPOSED:	Lowrise Dormitories - Airmen		
	11 three-story structures @ 216 MN		2,376 MN
	@ 30,000 SF		330,000 SF
	Chapel Center - 400 seats		18,500 SF
	Library and Craft Hobby Shop		45,000
	NCO Adademy - USAF		27,800
		TOTAL	421,300 SF
		GRAND TOTAL	830,882 SF
	PARKING: Decked (2 levels)		2,292 CARS
	Open		223
		TOTAL	2,515 CARS
	RECREATIONAL FACILITIES:		
	Exterior - Softball Fields		2
	Swimming Pool		1

OFFICERS' CLUB - BOQ AREA — 23.05 ACRES

EXISTING:	Officers' Club		73,819 SF
	Officers' Open Mess		6,262
	Recreational Facility		11,546
		SUB-TOTAL	91,627 SF
PROPOSED:	BOQ - 1,100 MN		343,700 SF
	Recreational Facility		21,300
		SUB-TOTAL	365,000 SF
		TOTAL	456,627 SF

PARKING:	Open - BOQ		252 CARS
	Officers' Club/Recreational Facilities		214
	TOTAL		466 CARS
RECREATIONAL FACILITIES:			
	Exterior - Tennis Courts		4
	Swimming Pools		2

SUMMARY

TOTAL EXISTING CONSTRUCTION TO REMAIN			478,107 SF
TOTAL PROPOSED EXPANSION & CONVERSION			87,230 SF
TOTAL PROPOSED CONSTRUCTION			1,667,300 SF
	GRAND TOTAL		2,245,147 SF
TOTAL PARKING:	Structured		350 CARS
	Decked (2 levels)		4,764
	Open		839
	GRAND TOTAL		5,903 CARS
TOTAL HOUSING:	Dormitories - Airmen		
	Existing:	1,100 MN	180,000 SF
	Proposed:	2,376	330,000
	SUB-TOTAL	3,476 MN	510,000 SF
	BOQ	1,100 MN	343,700 SF
	TOTAL	4,576 MN	853,700 SF
TOTAL GROSS AREA TRI-SERVICE CANTONEMENT AREA			142.47 ACRES

NOTE: All facilities are for Consolidated Services unless otherwise noted.

INDUSTRIAL/TECHNICAL COMPLEX

NAVAL PHOTOGRAPHIC CENTER SITE		**10.00 ACRES**
	Existing Building to Remain	140,376 SF
	Proposed Warehouse Annex	14,000
	PARKING: Open	347 CARS
USN/USMC RESERVE TRAINING CENTER SITE		**7.92 ACRES**
	Proposed Building	84,000 SF
	Open Training Area	3.00 ACRES
	PARKING: Open	81 CARS
MAINTENANCE AREA		**66.29 ACRES**
PROPOSED:	USN STRUCTURE	
	Public Works Shops	41,700 SF
	Public Works Shops Store	16,000
	Pavement and Grounds Equipment Shed	10,000
	Vehicle Maintenance Shed	16,800
	Auto Maintenance Shop - USN	25,620
	Auto Maintenance Shop - USMC	12,090
	SUB-TOTAL	122,210 SF
	USAF STRUCTURE	
	Base Engineering Administration	15,061 SF
	BE Pavement and Grounds Facility	6,400
	BE Shed Storage - Lumber	1,500
	BE Storage - Covered	14,362
	BE Maintenance Shop	15,977
	Supplies and Equipment Shed	13,250
	Miscellaneous Storage	2,520
	Auto Maintenance Shop - USAF	38,382
	SUB-TOTAL	107,452 SF
	Exchange Warehouse - USN	60,000 SF
	Warehouse Ready Issue - USN	352,910 SF
	(including Btn. Whse. USMC - 7,910 SF)	
	Warehouse - Supplies & Equipment - USAF	106,370 SF

Filling Station - 6 island - USN		2,600 SF
Filling Station - 6 island - USAF		2,600
Filling Station - 11 island - CONS		4,950
Car Wash - 5 bays		
Car Care Center		11,400
Fire Station		10,400
PEPCO Substation - 200' x 200' x 90'		
Non-Specified Buildings - one @ 108,000 SF		108,000
	SUB-TOTAL	659,230 SF
PARKING: Roof - USN Structure		459 CARS
USAF Structure		575
	SUB-TOTAL	1,034 CARS
Open		172
	TOTAL	1,206 CARS
ADDITIONAL OPEN STORAGE (UNCOVERED)		124,800 SF

SUMMARY

TOTAL EXISTING CONSTRUCTION TO REMAIN		140,376 SF
TOTAL EXPANSION PROPOSED TO EXISTING FACILITIES		14,000 SF
TOTAL PROPOSED CONSTRUCTION		972,892 SF
	GRAND TOTAL	1,127,268 SF
TOTAL PARKING: ROOF		1,034 CARS
OPEN		600
	GRAND TOTAL	1,634 CARS
TOTAL GROSS AREA INDUSTRIAL/TECHNICAL COMPLEX		74.21 ACRES

COMMUNITY CENTER

PROPOSED:	Commissary		104,200 SF
	Base Exchange		54,200
	Sales Outlets and Clothing Store		13,300
	Theatre - 500 seats		8,700
	Cafeteria		7,500
	Post Office		6,300
	Credit Union		4,800
	Bank		4,800
	Thrift Shop		4,800
	Day Care Center		9,600
	Youth Center		12,600
	Gas Station - 6 islands		2,250
	Motel - 125 UNITS - 3 Increments @ 21,000 SF ea.		63,000
		TOTAL	296,050 SF
	PARKING:		
	Open - Commissary, Base Exchange,		1,080 CARS
	Motel Units		118
		TOTAL	1,198 CARS
	GROSS AREA		33.35 ACRES

SOUTH NEIGHBORHOOD CENTER

PROPOSED:	Elementary School (Gross Area)	6.26 ACRES
	PARKING: Open	90 CARS
	GROSS AREA	6.26 ACRES

NORTH NEIGHBORHOOD CENTER

PROPOSED:	Elementary School	
	Chapel	
	PARKING: Open	92 CARS
	GROSS AREA	6.11 ACRES

FAMILY HOUSING

OFFICER'S AREA

NORTH COMPONENT

DETACHED HOUSES - GENERAL OFFICERS' QUARTERS

EXISTING:	11 DU @ 2.7 DU/ACRE (net)		
	2.2 DU/ACRE (gross)		4.9 ACRES
	2,956 SF (gross)		32,516 SF
Parking:	7 Garage Units @ 3 cars		21 CARS
	704 SF		4,928 SF
PROPOSED:	6 DU @ 3.2 DU/ACRE (net)		
	1.7 DU/ACRE (gross)		4.1 ACRES
	2,100 SF (net)		12,600 SF
Parking:	6 Attached Garage Units @ 1 car		6 CARS
	240 SF		1,440 SF
EXISTING NON-HOUSING:	Security Police Building		6,448 SF
	Base Theatre - 460 seats		8,160
	SUB-TOTAL		14,608 SF
SUB-TOTAL EXISTING CONSTRUCTION TO REMAIN (GROSS)			52,052 SF
SUB-TOTAL PROPOSED CONSTRUCTION (NET)			14,040 SF
SUB-TOTAL PARKING	Covered		27 CARS
	Open		100
	TOTAL		127 CARS
SUB-TOTAL GROSS AREA			14.88 ACRES

SOUTH COMPONENT

DETACHED HOUSES - GENERAL OFFICERS' QUARTERS

EXISTING:	13 DU @ 2.0 DU/ACRE (net) 1.2 DU/ACRE (gross)	10.9	ACRES
	11 DU @ 2,406 SF (gross)	26,466	SF
	2 DU @ 2,792 SF (gross)	5,584	
	SUB-TOTAL	32,050	SF
Parking:	6 - 2 car - 506 SF Garage Units	3,036	SF
	1 - 4 car - 1,006 SF Garage Unit	1,006	
	1 - 4 car - 952 SF Garage Unit	952	
	2 - 5 car - 1,850 SF Garage Units	3,700	
SUB-TOTALS	30 CARS	8,694	SF
Miscellaneous Recreation Facilities:		13	
PROPOSED:	13 DU @ 1.1 DU/ACRE (net) 2.2 DU/ACRE (gross)	5.9	ACRES
	2,100 SF (net)	27,300	SF
Parking:	13 Attached Garage Units @ 1 car	13	CARS
	240 SF	3,120	SF
Miscellaneous Recreation Facilities		8	

SEMI-DETACHED HOUSES - SENIOR OFFICERS' QUARTERS

EXISTING:	8 DU @ 6.5 DU/ACRE (net) 4.2 DU/ACRE (gross)	1.9	ACRES
	3,910 SF (gross)	15,640	SF
Parking:	1 Garage Unit @ 5 cars	5	CARS
	1,850 SF	1,850	SF
PROPOSED:	32 DU @ 3.9 DU/ACRE (net) 2.2 DU/ACRE (gross)		
	1,670 SF (net)	53,440	SF

Parking:	16 Attached Garage Units @ 2 cars	32	CARS
	400 SF	6,400	SF
SUB-TOTAL EXISTING CONSTRUCTION TO REMAIN (GROSS)		58,234	SF
SUB-TOTAL PROPOSED CONSTRUCTION (NET)		90,260	SF
SUB-TOTAL PARKING	Covered	80	CARS
SUB-TOTAL GROSS AREA		40.12	ACRES

SUMMARY

TOTAL EXISTING CONSTRUCTION TO REMAIN		110,286	SF
TOTAL PROPOSED CONSTRUCTION		104,300	SF
	GRAND TOTAL	214,586	SF
TOTAL EXISTING HOUSING UNITS	General Officers	24	DU
	Senior Officers	8	DU
	TOTAL	32	DU
TOTAL PROPOSED HOUSING UNITS	General Officers	19	DU
	Senior Officers	32	DU
	TOTAL	51	DU
	GRAND TOTAL	83	DU
TOTAL PARKING - GARAGE UNITS	Existing	56	CARS
	Proposed	51	
	TOTAL	107	CARS
TOTAL GROSS AREA		55.00	ACRES

FAMILY HOUSING

SOUTH COMMUNITY

AREA I - ROWHOUSES - FIELD GRADE OFFICERS' QUARTERS

PROPOSED: 221 DU @ 8.7 DU/ACRE (net)
4.1 DU/ACRE (gross) 49.32 ACRES

@ 1,400 SF (net) for 4 BR Units
1,354 SF (net) for 3 BR Units
(Unit mix to be determined)

AREA II - ROWHOUSES - NCO QUARTERS

EXISTING: 300 DU @ 9.1 DU/ACRE (net)
6.8 DU/ACRE (gross) 43.97 ACRES

PROPOSED: 41 DU @ 10.6 DU/ACRE (net)
6.4 DU/ACRE (gross) 6.40 ACRES

@ 1,250 SF (net) for 4 BR Units
1,080 SF (net) for 3 BR Units
1,000 SF (net) for 2 BR Units
(Unit mix to be determined)

TOTAL 341 DU

AREA III - ROWHOUSES - NCO QUARTERS

PROPOSED: 326 DU @ 10.5 DU/ACRE (net)
5.8 DU/ACRE (gross) 55.89 ACRES

AREA IV - COMPANY GRADE OFFICERS' QUARTERS

PROPOSED: 286 DU @ 10.8 DU/ACRE (net)
6.0 DU/ACRE (gross) 47.55 ACRES

@ 1,361 SF (net) for 4 BR Units
1,250 SF (net) for 3 BR Units
1,080 SF (net) for 2 BR Units
(Unit mix to be determined)

TOTAL SOUTH COMMUNITY

1,174 DU — 203.13 ACRES

PARKING	EXISTING:	Open		377 CARS
	PROPOSED:	Open	@ 1 CAR/DU	41
		Covered	@ 1 CAR/DU	833
		Open	@.5 CAR/DU	437
			TOTAL	1,688 CARS

NORTH COMMUNITY

AREA V - NCO & ENLISTED MENS' QUARTERS - MIXED BY CLUSTER

PROPOSED: 301 DU @ 9.8 DU/ACRE (net)
5.8 DU/ACRE (gross) — 52.18 ACRES

@ 1,250 SF (net) for 4 BR Units
1,080 SF (net) for 3 BR Units
1,000 SF (net) for 2 BR Units
(Unit mix to be determined)

AREA VI - NCO & ENLISTED MENS' QUARTERS - MIXED BY CLUSTER

PROPOSED: 387 DU @ 9.5 DU/ACRE (net)
6.2 DU/ACRE (gross) — 61.88 ACRES

TOTAL NORTH COMMUNITY

688 DU — 114.06 ACRES

PARKING	PROPOSED:	Covered	@ 1 CAR/DU	688 CARS
		Open	@.5 CAR/DU	344
			TOTAL	1,032 CARS

SENIOR NCO HOUSING AREA

DETACHED HOUSES - SENIOR NCO QUARTERS

PROPOSED:	3 DU @ 3.0 DU/ACRE (net) 1.8 DU/ACRE (gross)		1.67 ACRES
	1,670 SF (net)		5,010 SF
Parking:	3 Detached Garage Units @ 2 cars		6 CARS
		400 SF	1,200 SF
	NCO Club		15,600 SF
Parking:	Open		21 CARS
TOTAL GROSS AREA			9.13 ACRES
RECREATIONAL FACILITIES	Softball Field		1

OPERATIONAL MARINA AREA

EXISTING:	Crash Boat Crew Station		280 SF
	Marine Maintenance		1,066
	Boat Storage		6,308
	Boat Storage		1,200
		SUB-TOTAL	8,854 SF
PROPOSED:	Marine Maintenance Shop		16,200 SF
		TOTAL	25,054 SF
Parking:	Open		27 CARS
TOTAL GROSS AREA (including Marina)			14.43 ACRES

SOUTH FAMILY RECREATION AREA

PROPOSED:	Family Recreation Center	14,400	SF
	Exterior Recreation Facilities:		
	Swimming Pool	1	
	Wading Pool	1	
	Playfields		
	Picnic Grounds		
	PARKING: Open	72	CARS
	GROSS AREA	23.64	ACRES

NORTH FAMILY RECREATION AREA

PROPOSED:	Family Recreation Center	14,400	SF
	Exterior Recreation Facilities		
	Swimming Pool	1	
	Wading Pool	1	
	Playfields		
	Picnic Grounds		
	PARKING: Open	132	CARS
	GROSS AREA	24.70	ACRES

TROOP RECREATION AREA

PROPOSED:	Exterior Recreation Facilities:		
	Softball Fields	5	
	Tennis Courts	8	
	Basketball Courts	8	
	Volleyball Courts	16	
	Baseball Field	1	
	Football Field	1	
	PARKING: Open	204	CARS
	GROSS AREA	37.31	ACRES

NORTH RECREATION AREA (ADJACENT TO JUNIOR HIGH SCHOOL)

PROPOSED:	Exterior Recreation Facilities		
	Softball Fields	1	
	Basketball Courts	4	
	Volleyball Courts	8	
	PARKING: Open	16	CARS
	GROSS AREA	19.11	ACRES

JUNIOR HIGH SCHOOL

	PARKING: Open	68	CARS
	GROSS AREA	24	ACRES

DEFENSE OFFICE BUILDING

Building Area (gross)	2,800,000	SF
Office Space (net)	1,522,000	
PARKING - 3 levels	1,000,000	SF
GROSS SITE AREA	109.93	ACRES

APPENDIX II

TRAFFIC ANALYSIS

Basic assumptions in determining peak hour traffic volumes entering and leaving the Base were as follows:

1. Assumptions regarding the exterior freeway system and employee trip distribution were based on the Voorhees study of 1965 for the Defense Office Building as shown on Figure I.

2. Existing peak hour traffic volumes were determined from cordon counts conducted in December 1971. These are shown in Figure II. To do this update of traffic conditions, a line was drawn around Bolling Air Force Base including the Naval Research Laboratory. All traffic crossing this cordon line was counted for both in and out movements. The counts were taken on the same day from 6:30 to 9:00 A. M. and from 4:00 to 6:00 P. M. In addition, intersection counts were taken at Portland Street, Chesapeake Street and the NRL Interchange (Laboratory Road). These counts, showing all existing turning movements for both A. M. and P. M. peak hours, are diagrammed in Figures 6 through 13.

   The cordon counts were used in forecasting future volumes; the intersection counts were used to develop required future modifications to intersections at each entrance. It was assumed that traffic destined for NRL entered and exited at the Chesapeake and Laboratory entrances.

3. Using the existing counts, the following factors were developed for projecting the external evening peak hour traffic generated by the expanded base facilities:

Non-resident parking spaces		0. 4 trip/parking space outbound 0. 06 trip/parking space inbound
Residential family		0. 50 trip/unit inbound 0. 25 trip/unit outbound
Resident non-family		0. 25 trip/unit inbound 0. 125 trip/unit outbound
Community Center -	External (outside of base)	450 trips inbound and 450 outbound
	Internal (on base)	450 trips each way between Community Center & residential areas.

   Table I indicates future external trips resulting from these factors.

4. No increase in traffic volume was assumed for NRL.

5. The above ratios were used to project the traffic generated by the end position base loading shown in the Master Plan. Table II gives these volumes at the access points under several combinations of the alternative access distributions. Distribution "A-A" is assumed to be most representative of current conditions. The volumes at the access points and the traffic generated on principal external access routes is shown in Figure III.

6. The volumes generated by various areas of the base were assigned to the internal road system to develop the functional design shown on the Master Plan. Existing volumes plus generated volumes where applicable along with lane requirements are shown in Figures 4 through 13. The lanes shown for each intersection are sufficient to provide operations at design volumes as shown by the CRITICAL MOVEMENT TABULATION.

7. No effort was made to re-evaluate DOB traffic or access.

TABLE I

FUTURE EXTERNAL TRIPS

	TRIPS PM PEAK HOUR IN		OUT	
Res. Family - 2046 Units*	0.50	1020	0.25	510
Res. Non-Family - 4576 Units	0.25	1140	0.125	570
Less Internal Trips		-450		-450
Res. External Trips		= 1710		= 630
Non-Residential - 8319 Parking Spaces*	0.06	500	0.40	3330
Subtotal External		= 2210		= 3960
Plus External Shopping		450		450
Total Ext. A. F. B. Traffic		= 2660		= 4410
*Plus NRL Traffic (Existing)		305		1960
Total Future Trips		= 2965		= 6370

* NOTE: These numbers were used to develop generated traffic and trip distribution. Existing traffic used in the intersectional analyses was obtained from the intersectional counts.

TABLE II

PEAK HOUR VOLUMES AT ACCESS POINTS UNDER ALTERNATIVE DISTRIBUTION ASSUMPTIONS*

EXCLUSIVE OF NRL TRAFFIC

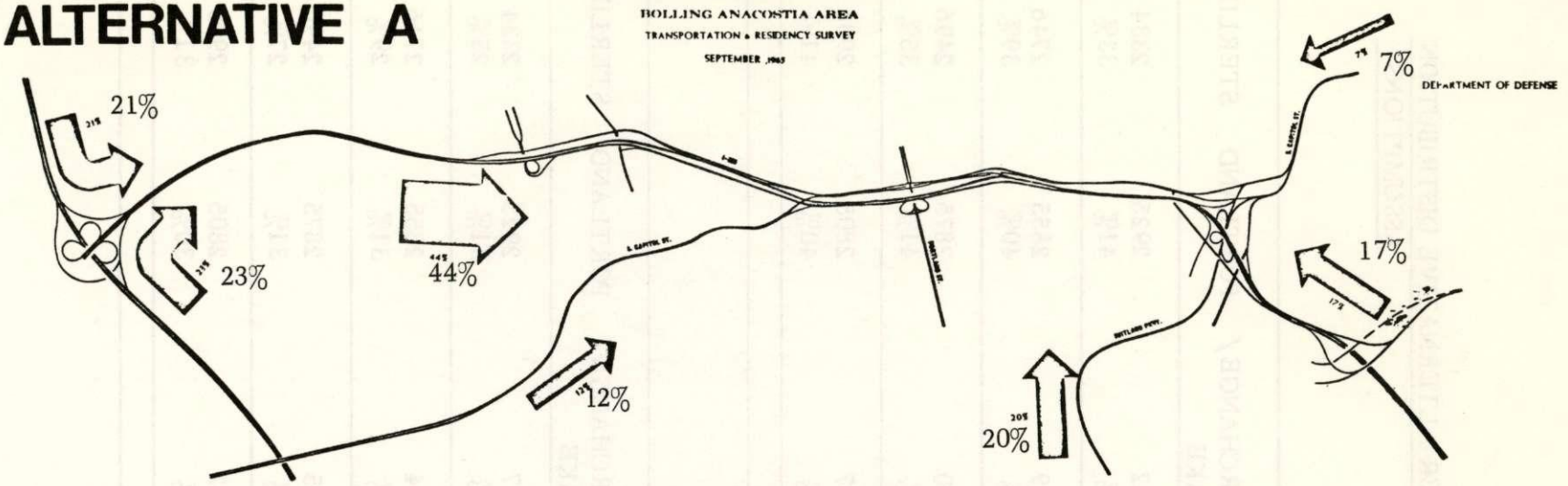
DISTRIBUTION (Fig. I) IN	OUT	TOTAL	NRL INTERCHANGE / CHESAPEAKE	PORTLAND	STERLING
A	A	7070 100%	1812 26%	2925 41%	2334 33%
A	B	7070 100%	1469 21%	2855 40%	2746 39%
B	A	7070 100%	1700 24%	2875 41%	2496 35%
B	B	7070 100%	1357 19%	2805 40%	2908 41%

INCLUDING NRL TRAFFIC

DISTRIBUTION IN	OUT	TOTAL	NRL INTERCHANGE / CHESAPEAKE	PORTLAND	STERLING
A	A	9335 100%	4077 44%	2925 31%	2334 25%
A	B	9335 100%	3734 40%	2855 31%	2746 29%
B	A	9335 100%	3965 42%	2875 31%	2496 27%
B	B	9335 100%	3622 39%	2805 30%	2908 31%

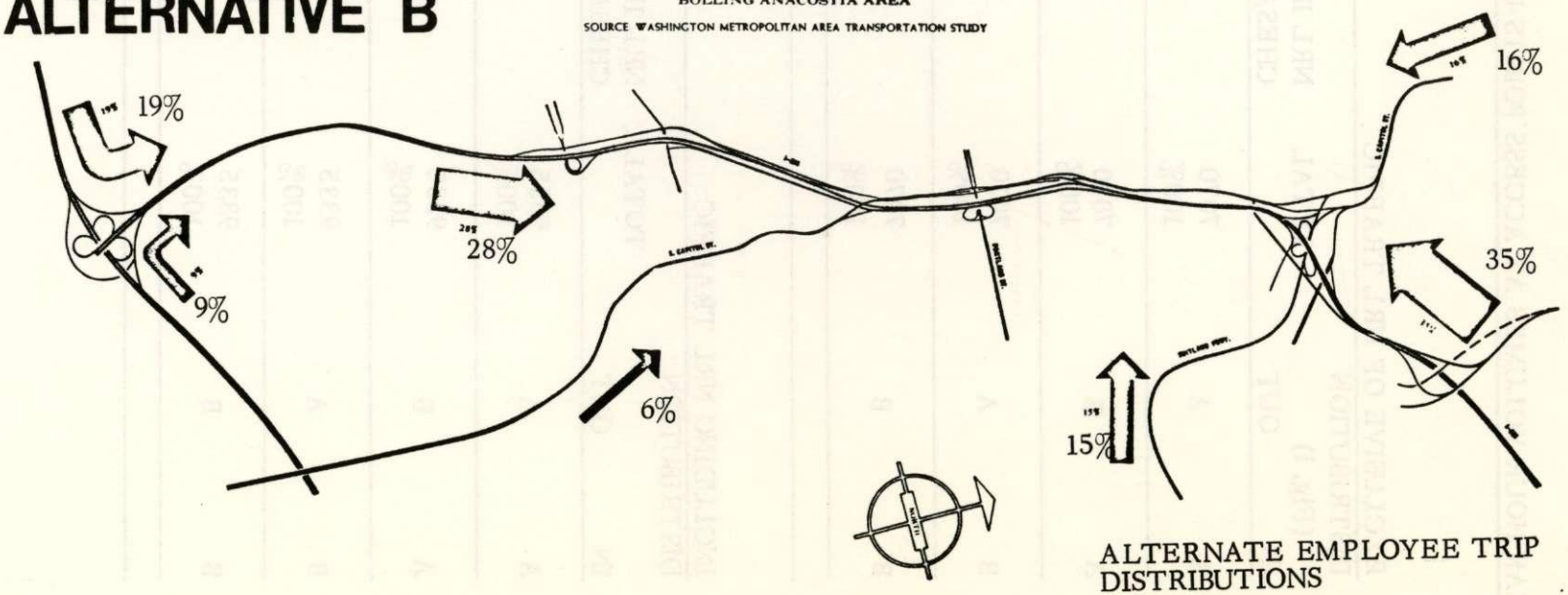
ALTERNATIVE A

1985 EMPLOYEE TRIP DISTRIBUTION
BOLLING ANACOSTIA AREA
TRANSPORTATION & RESIDENCY SURVEY
SEPTEMBER 1965

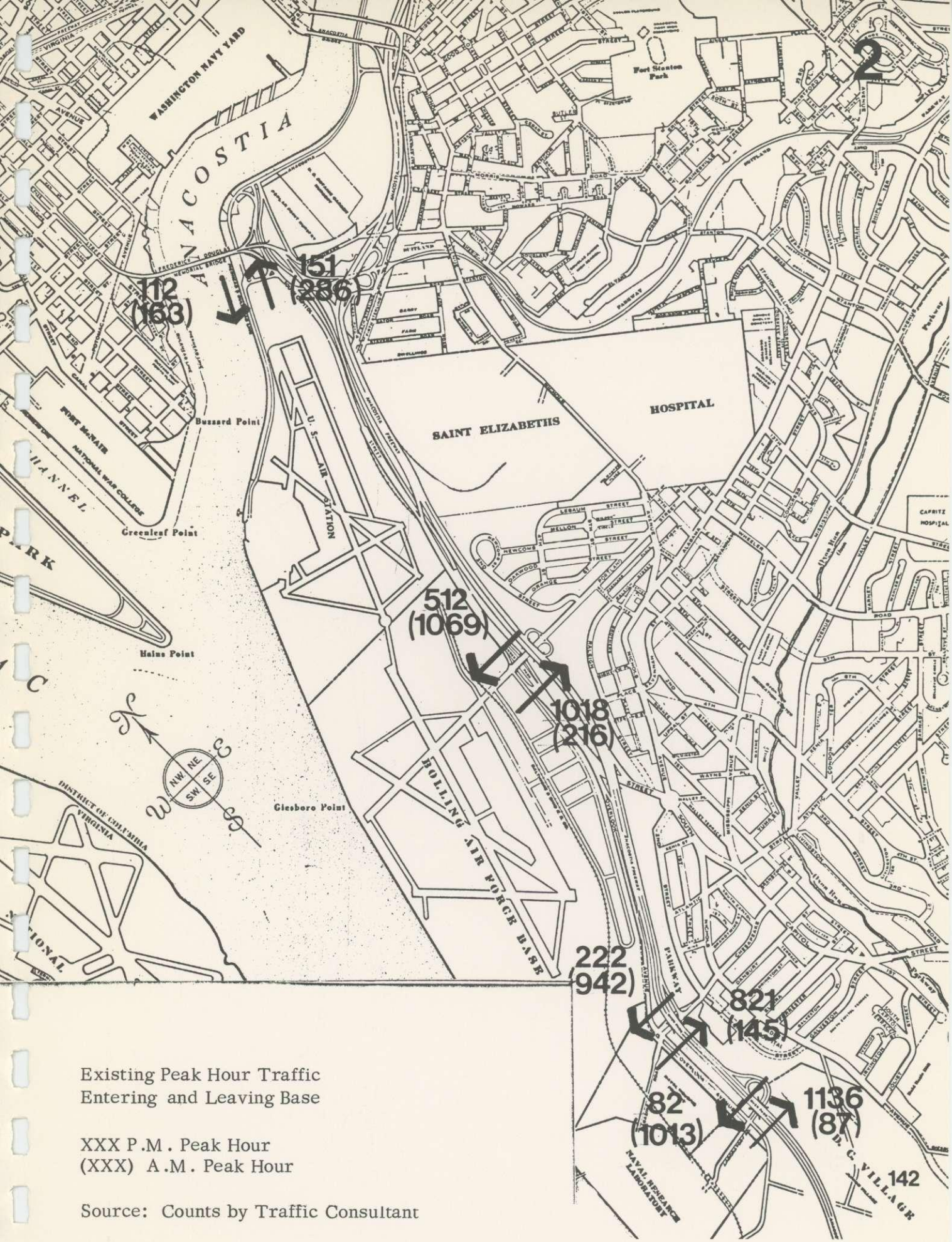


ALTERNATIVE B

FORECAST OF 1985 TRIP DISTRIBUTION
BOLLING ANACOSTIA AREA
SOURCE WASHINGTON METROPOLITAN AREA TRANSPORTATION STUDY



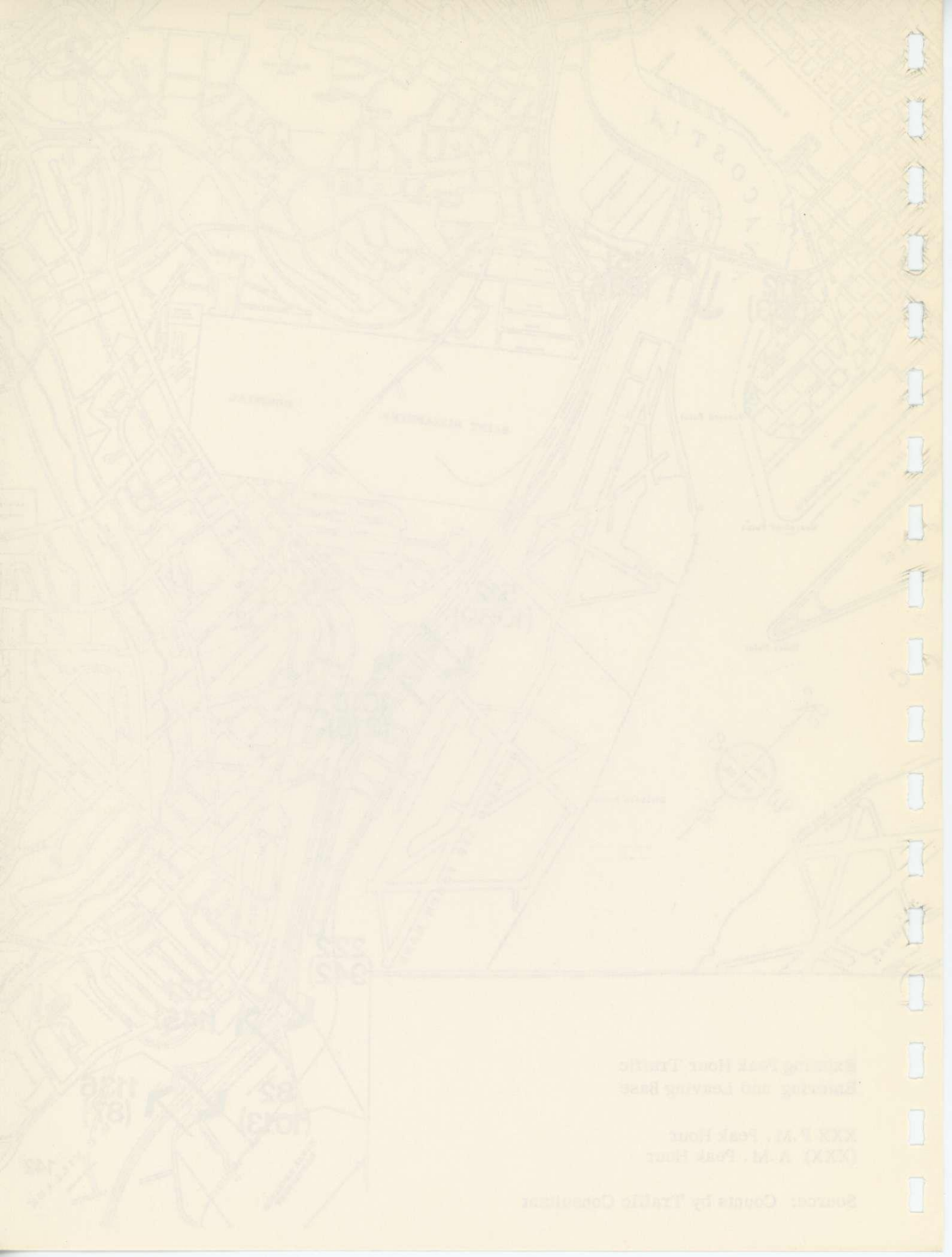
ALTERNATE EMPLOYEE TRIP DISTRIBUTIONS

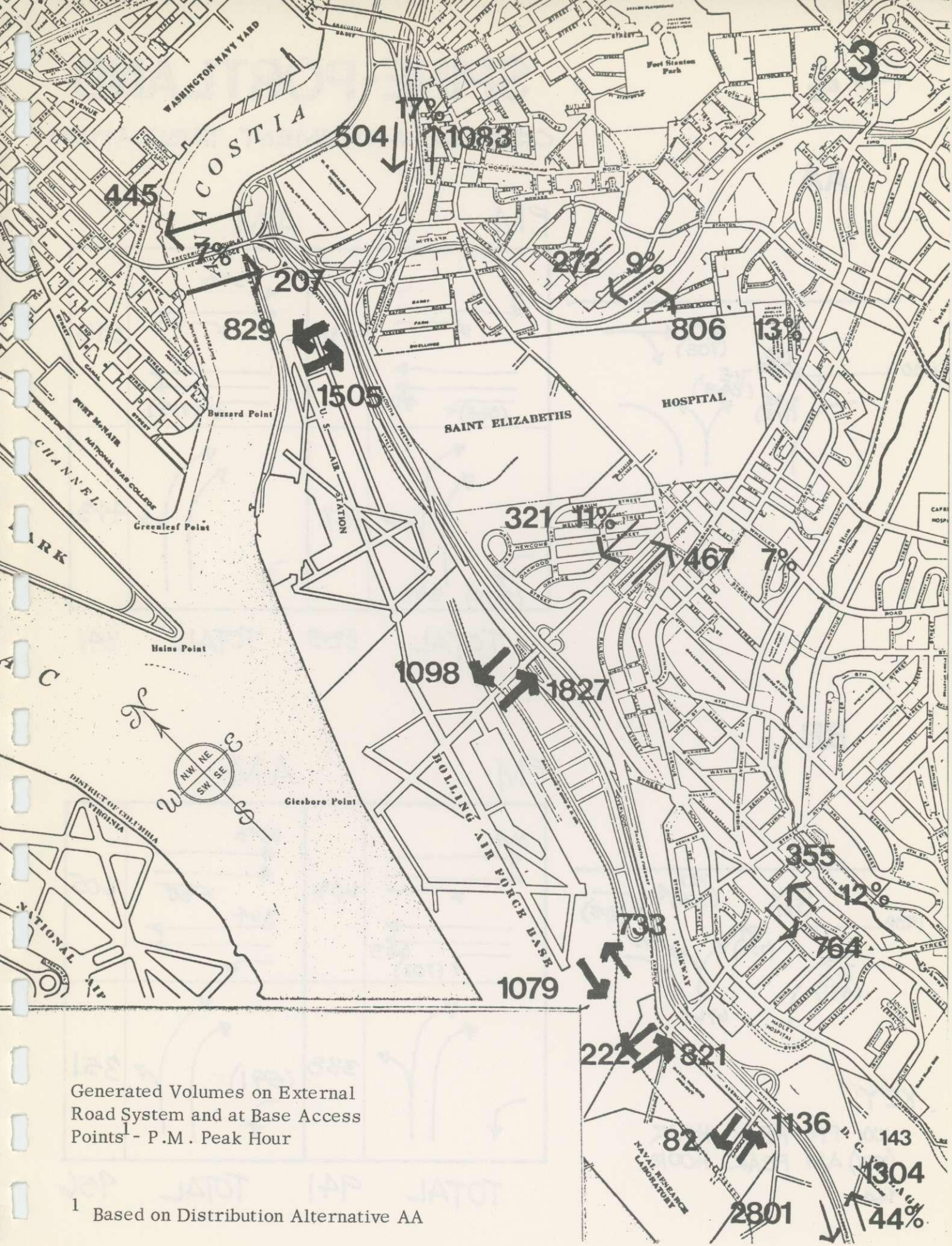


Existing Peak Hour Traffic
Entering and Leaving Base

XXX P.M. Peak Hour
(XXX) A.M. Peak Hour

Source: Counts by Traffic Consultant





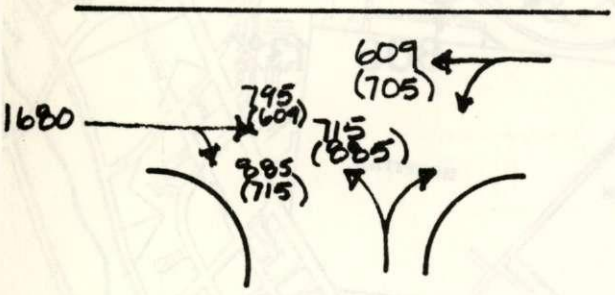
Generated Volumes on External Road System and at Base Access Points[1] - P.M. Peak Hour

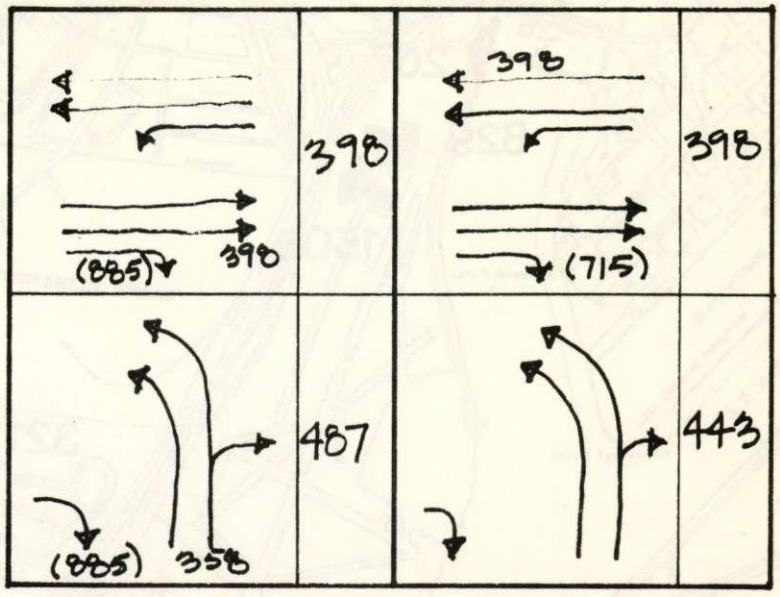
[1] Based on Distribution Alternative AA

4 SPINE-PORTLAND

CRITICAL MOVEMENT TABULATION

AA





TOTAL 885 TOTAL 841

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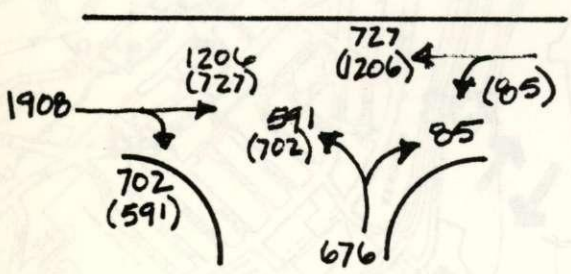

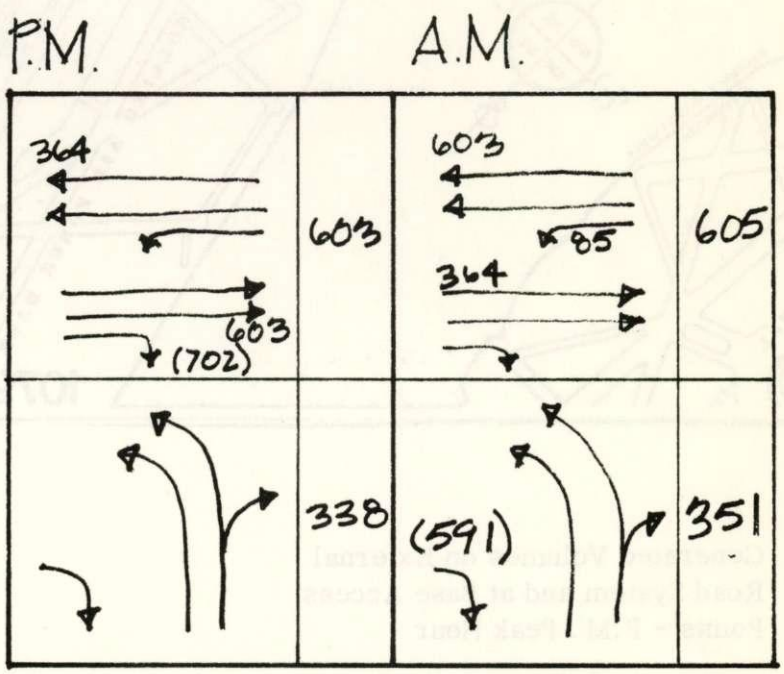

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KEY:

XXX PM PEAK HOUR
(XXX) AM PEAK HOUR

PORTLAND-W. DUNCAN 5

CRITICAL MOVEMENT TABULATION

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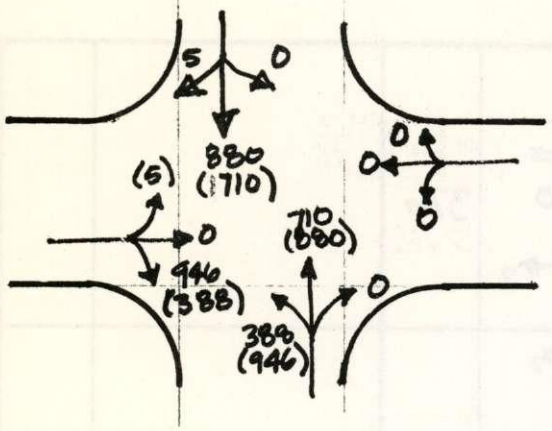

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473	473	194	194
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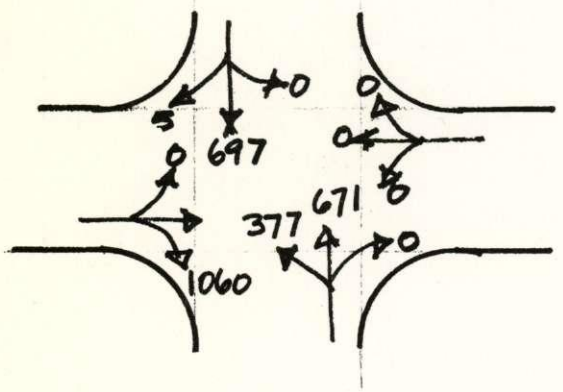

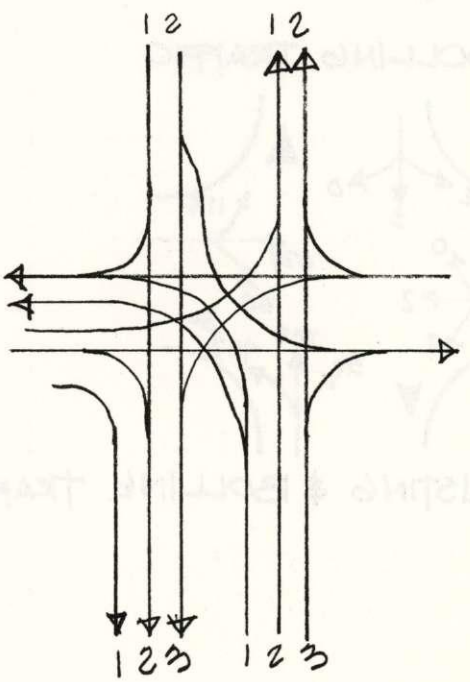

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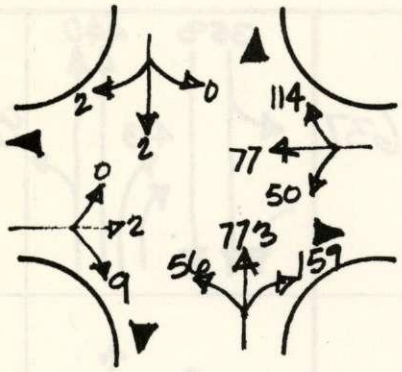

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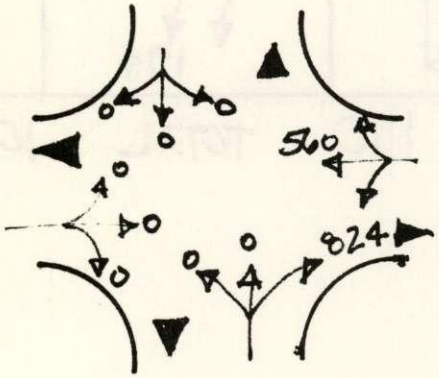

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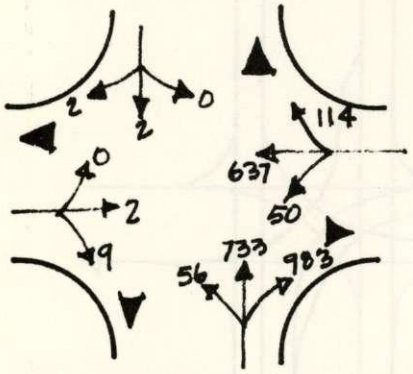

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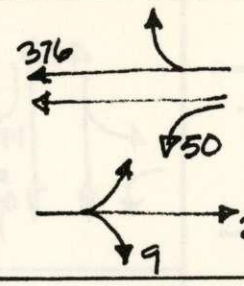
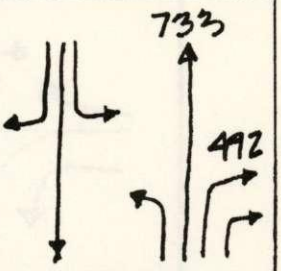
	376		
	733		
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CRITICAL MOVEMENT TABULATION

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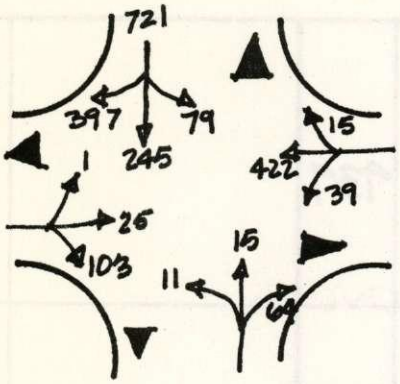

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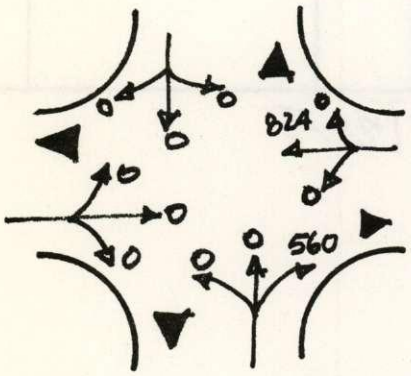

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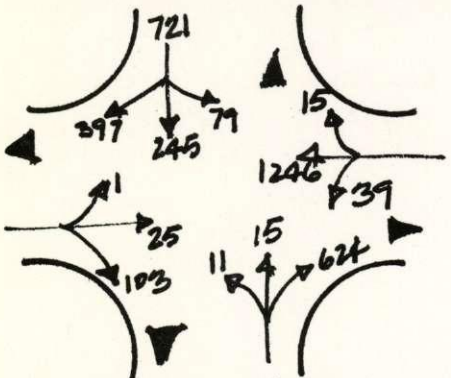

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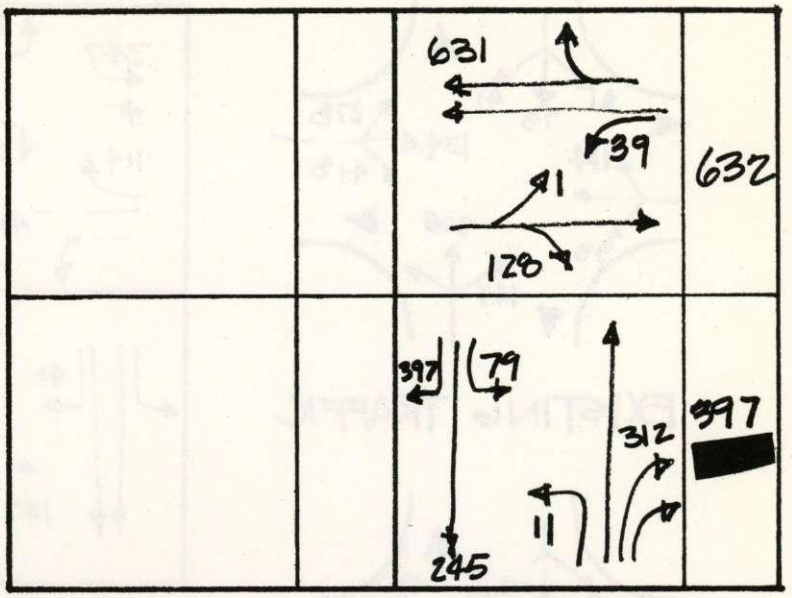

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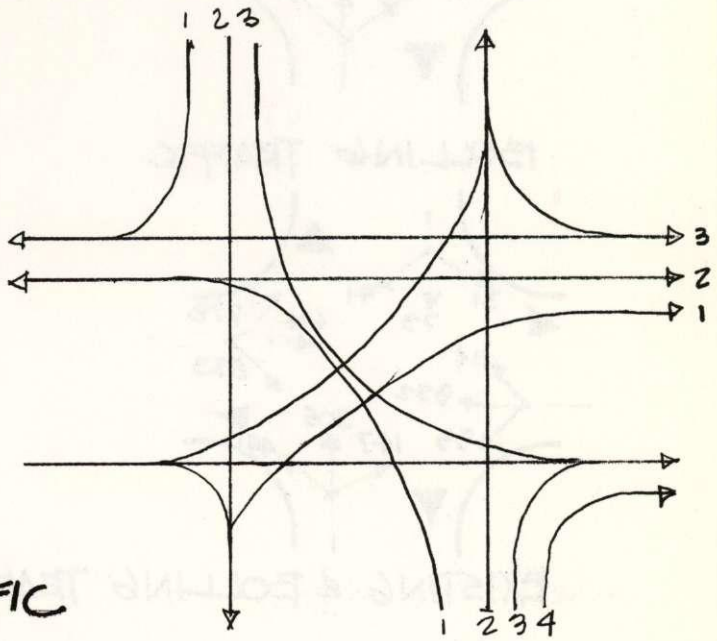

8 CHESAPEAKE

CRITICAL MOVEMENT TABULATION

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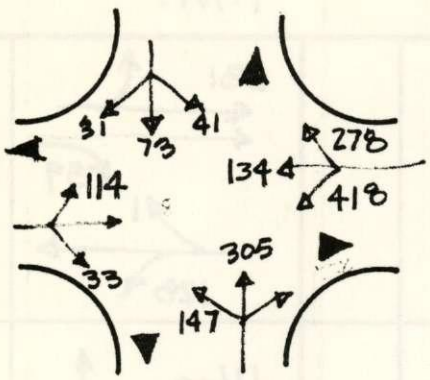

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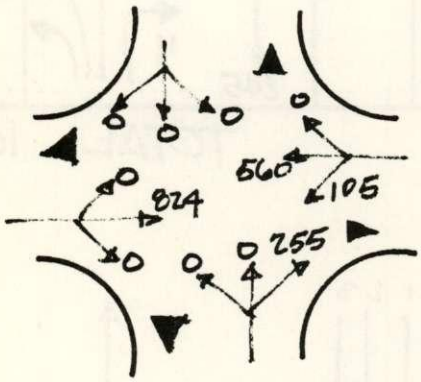

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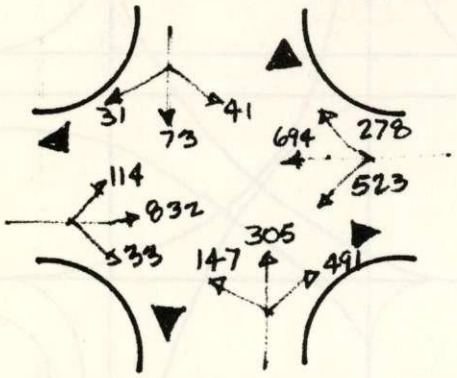

EXISTING & BOLLING TRAFFIC

A.M.

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305 41 (491) 147	346		

TOTAL 1285

CHESAPEAKE

9

CRITICAL MOVEMENT TABULATION

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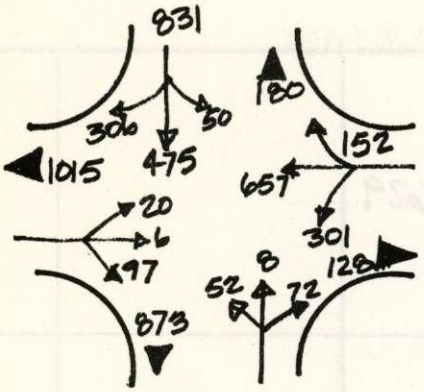

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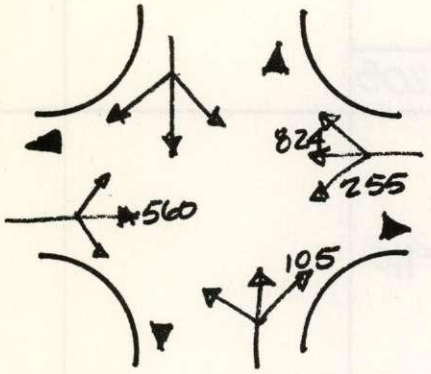

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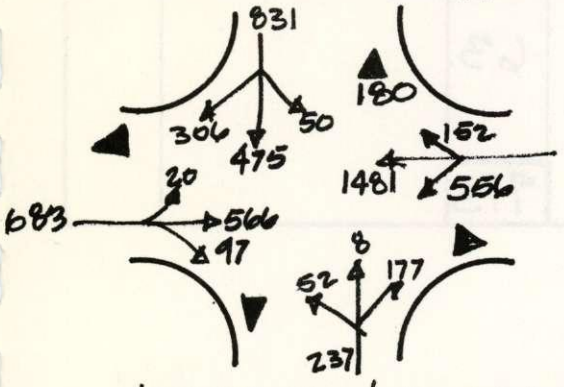

EXISTING & BOLLING TRAFFIC

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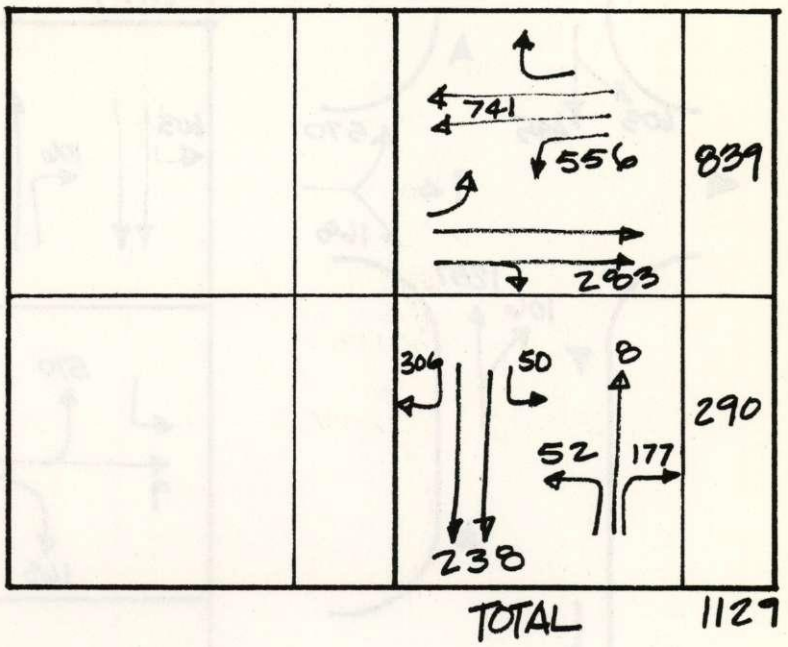

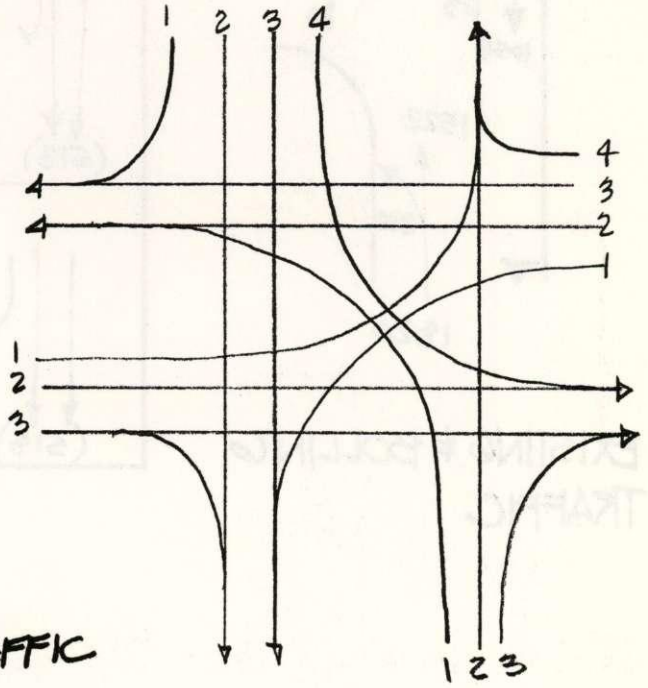

10 PORTLAND

CRITICAL MOVEMENT TABULATION

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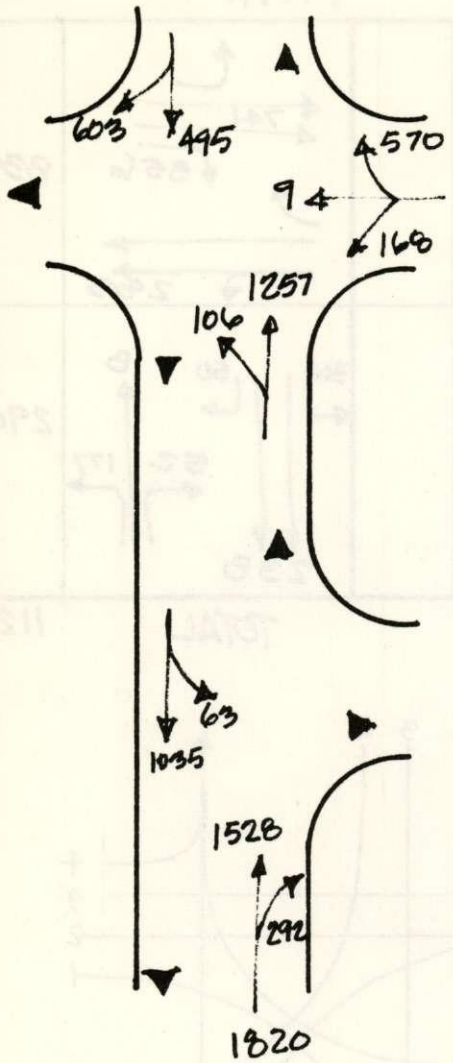

EXISTING & BOLLING TRAFFIC

A.M.

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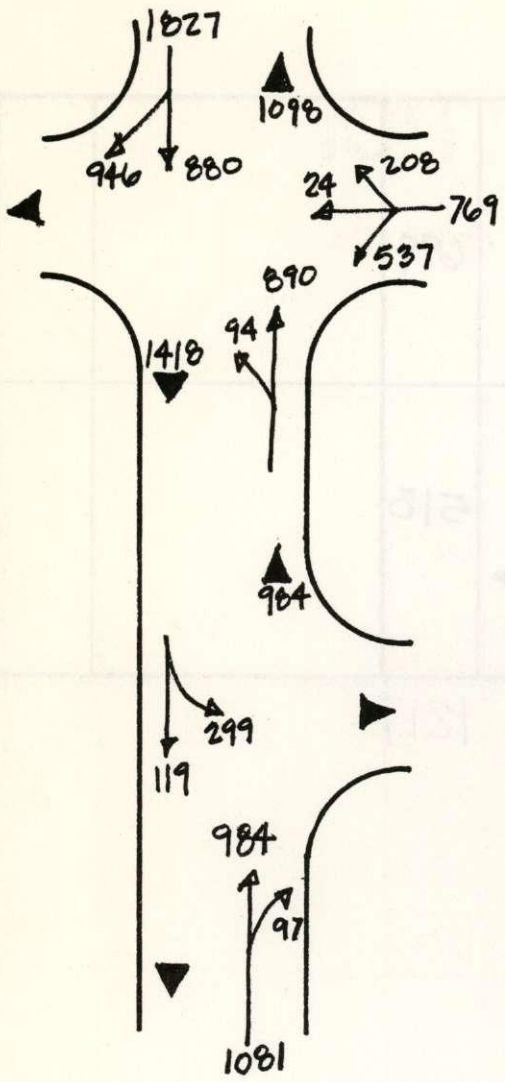
570 9 168	579 / 1208		
(518) 910	910		
63 (518)	63 / 973		

AA

CRITICAL MOVEMENT TABULATION



EXISTING & BOLLING TRAFFIC

P.M.

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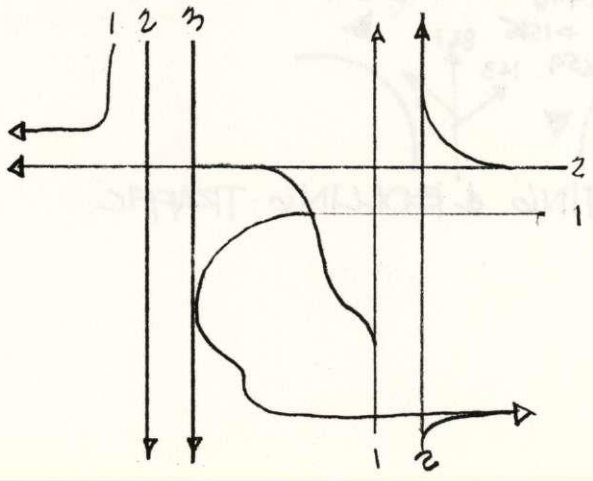
			537
		537	1072
		(566), 541	541
		299	299
			840



FIRTH STIRLING

CRITICAL MOVEMENT TABULATION

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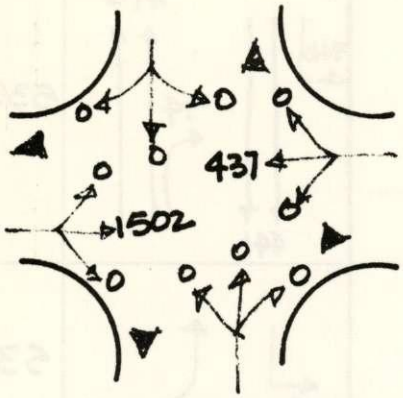

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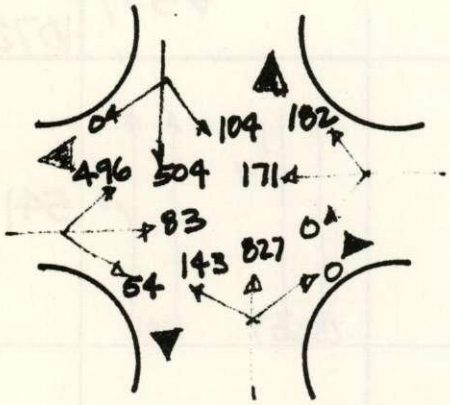

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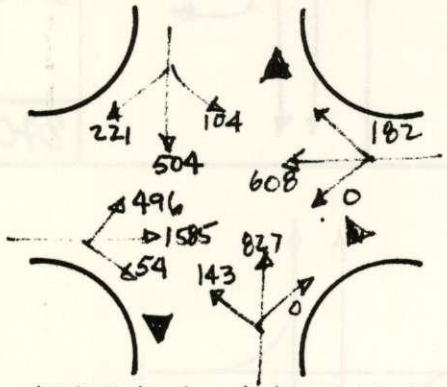

EXISTING & BOLLING TRAFFIC

A.M.

203 263 496 546	699		
221 414 252 143	518		

TOTAL 1217

FIRTH STIRLING

13

CRITICAL MOVEMENT TABULATION

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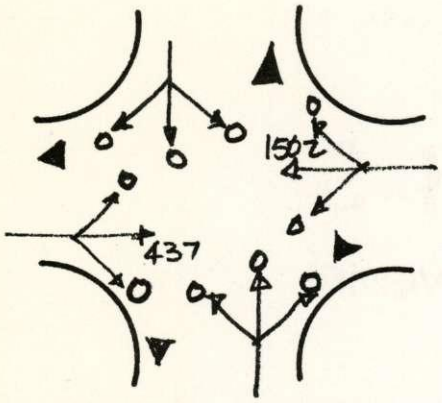

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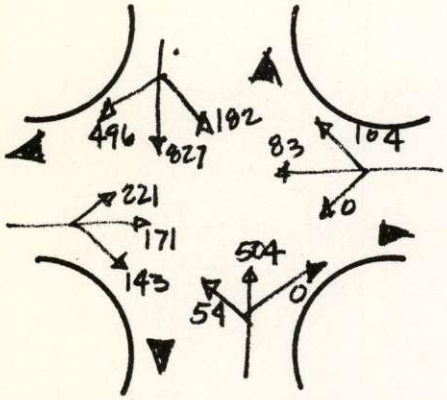

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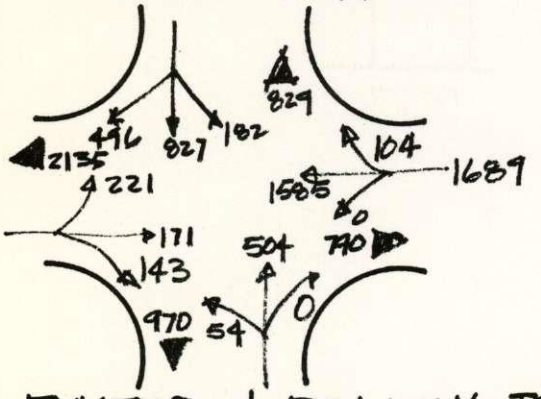
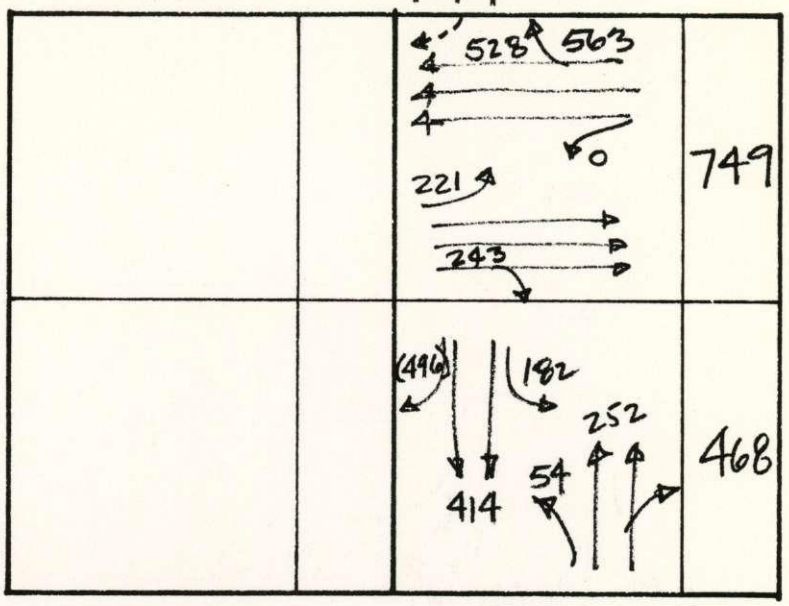
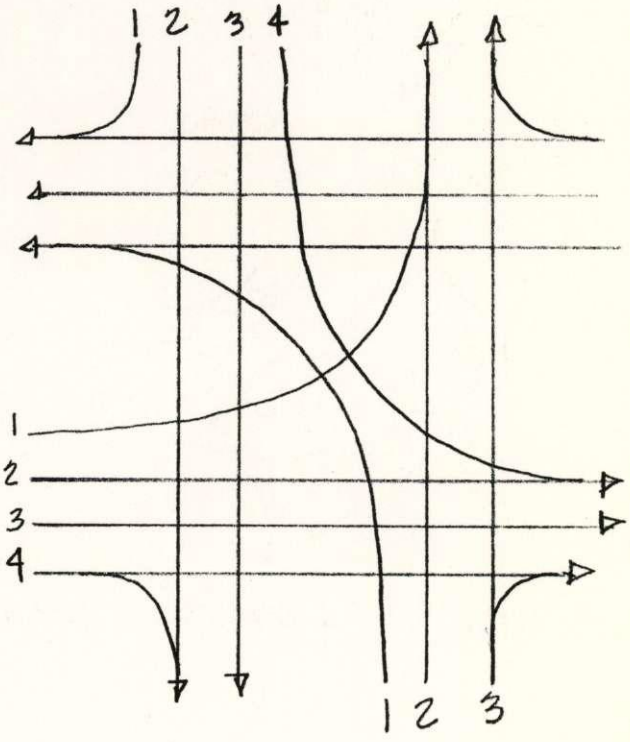


EXISTING & BOLLING TRAFFIC

P.M.



TOTAL 1217



APPENDIX III

APPENDIX III
AF - NAVY CONSTRUCTION PROGRAM
SITE PREPARATION AND DEMOLITION SCHEDULE

	PROJECT	SCOPE	1973	1974
*	NCO Club	19000 SF	Prepare site, extend utilities & access rd.	
*	DOB	Phased	Demolish structures, prepare site, extend utilities & access rd.	
*	Composite Exchange (NAF)	LS	Prepare site, extend utilities & access rd.	
*	Bowling Alley	13532 SF	Prepare site, extend utilities & access rd.	
	Utilities	LS		
*	VOQ	200 MN		Demolish Bldgs. 416, 417, 418, 419, 421, 426, 427, 428. Prepare site, extend utilities & access rd.
	Auto Maint. & Veh. Parking	38400 SF		Prepare site, extend utilities & access rd., check elec.power supply
*	Library (1)	8800 SF		Demolish Bldg. 520, prepare site, extend utilities & access rd.
	Supply Warehouse	100,000 SF		Demolish structures 727,160 & 158, prepare site, extend utilities and access rd.
	Supply Open Storage	LS		Prepare site, extend utilities & access rd.
*	Theatre (NAF)	500 Seats		Prepare site, extend utilities & access rd.
*	Rectn.Hobby Shop	9000 SF		Demolish Bldg. 520, prepare site, extend utilities & access rd.
NAVY	Navy Exchange Warehouse (2)	60000 SF		Demolish structures T-4, 155, prepare site, extend utilities & access rd.
	Motel (125 units)	63000 SF		Prepare site, extend utilities & access rd.

	PROJECT	SCOPE	1975	1976
	Band Practice	90000 SF	Prepare site, extend utilities & access rd.	
	NCO Academy (3)	7000 SF	Prepare site, extend utilities & access rd.	
	Civil Engr.	40000 SF	Prepare site, extend utilities & access rd. check elec.power supply	
*	Civil Engr. Open Storage	LS	Prepare site, extend utilities & access rd., check elec. power supply	
	Fire Station	4 ST	Prepare site, extend utilities & access rd.	
	Utilities	LS		
*	NCO Club Add'n.	7000 SF	Provision made in 1973	
*	Rectn Courts (NAF)	LS	Remove DOB fill prepare site	
*	Car Care Center (NAF)	LS	Prepare site, extend utilities & access rd.	
NAVY	Filling Station	2600 SF	Prepare site, extend utilities & access rd.	
NAVY	Add'n to NPC	14000 SF	Demolish structure 171, prepare site	
*	Admin. Bldg.	180, 000 SF		Prepare site, extend utilities & access rd.
*	Dormitory	500 MN		Prepare site, extend utilities & access rd.
	Utilities	LS		
*	Swimming Pool (NAF)	12332 SF		Prepare site, extend utilities & access rd.
*	Child Care Center (NAF)	10500 SF		Prepare site, extend utilities & access rd.
NAVY	Site Development	LS		
NAVY	Public Works Shop	122, 210 SF		Prepare site, extend utilities & access rd.

	PROJECT	SCOPE	1977	UNPROGRAMMED
*	Marina Facility (4)	LS	Demolish structures 925, 928, 924, 950, prepare site	
*	Clothing Sales	10,600 SF	Prepare site	
*	Post Office	6,500 SF	Prepare site	
*	Education Center	19,800 SF	Prepare site	
	Utilities	LS		
*	Administration Bldg.	90,000 SF	Demolish structures 19, 515, 516, 517, 518, Prepare site	
*	VOQ	200 Men	Demolish Structures 422, 424, 425, 429, 431, 54. Prepare site, extend access rds.	
	TLQ (NAF)	60 units	Prepare site	
NAVY	Ready Issue Warehouse (5)	352,910 SF	Demolish Structures 157, 151, 161(5), 150, 154, 155, 164, 156, 162, 163(5), prepare site	
	USN/USMC Reserve Training Center	84,000 SF	Prepare site, extend utilities and access rd.	
*	Addn to Dispensary/ Dental Clinic			Demolish Structure 17
*	Conference Center	40,000 SF		Demolish Structure 415. Remodel Hangar #1
*	Dormitory	1,376 Man		Prepare site
*	Commissary	96,000 SF		Relocate from Hangar #2
*	Administration Facility	540,000 SF		Demolish Structures 5, 16, 14. Prepare site
*	Gymnasium	45,000 SF		Relocate Commissary from Hangar #2. Remodel Hangar #2. Structure 15 can then be demolished to allow parking structure construction

*	Dining Hall Addition	LS	Req'd. upon Dormitory Completion
*	Chapel		Prepare site, construct in connection w. north elementary school complex
*	Parking Structures		Three structures on spine road can be phased as req'd. Two structures on Duncan Ave. require demolition of structures 10, 11, 12, 502, 13, 41, 15, 504, 503, 501, 500. Also structures 3, 8, 9, 43. Structure 15 cannot be demolished until Commissary is relocated.
	Utilities		
*	VOQ	700 man	Prepare site
	Mogas Storage	LS	Prepare site
	Site Development	LS	
*	Family Rectn Center (NAF)	LS	Prepare site, extend utilities & access rd.
*	Senior Officers Housing	LS	Demolish structure 626 upon completion of composite exchange, demolish structures 409, 410, 412 upon completion of admin. space
*	Other Housing	LS	Demolish misc. structures, remove trailer park, relocate HMX-1, prepare sites, extend utilities & access rds.

* Navy/Air Force Joint Utilization

Footnotes:

1.) May be combined with NCO Academy.

2.) Will demolish NPC storage facility prior to programming NPC replacement.

3.) May include Library.

4.) Retain sewage pumping station.

5.) New Pepco substation must be in place.

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