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NAS WILLOW GROVE
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MASTER PLAN
FOR
NAVAL AIR STATION WILLOW GROVE, PA

FINAL
NOVEMBER 1990

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NAVAL AIR STATION WILLOW GROVE, PA
MASTER PLAN

Chain of Command Review Comments

Reviewer	Received Via	Comment	Action
BUMED	ltr 11000 Ser 433/0497 dtd 30 Jul 90	No comments.	No action required.
CG Fourth MARDIV	phoncon w/Mr. Ernce on 21 Sep 90		
CG Fourth MAW	phoncon w/Capt Hall on 21 Sep 90	Revise MAG-49 squadron descriptions on page IV-9.	Revised accordingly.
CO MAG-49	phoncon w/Capt Backman on 28 Aug 90	Revise MAG-49 squadron descriptions on page IV-9.	Revised accordingly.
		Adjust Table IV-2 to reflect current aircraft loading.	Revised accordingly.
		Revise PDS for P-162.	Revised PDS to provide a Marine Reserve Training Building.
CO NAS Willow Grove	ltr 11000 Ser 72/128 dtd 11 Sep 90	Various comments throughout draft plan.	Revised where appropriate.
CNO OP-0972C	ltr 11000 Ser 972C/0895 dtd 31 Jul 90	Change assessment of Building #38's condition from adequate to inadequate.	Changed assessment of Bldg. #38 to substandard. Deficiency Code B26.
		Re-site P-101 adjacent to the Chapel, Bldg #38.	Cannot re-site due to lack of available area.
CNO OP-12O	phoncon w/ LCDR VanDoren on 21 Sep 90	No comments.	No action required.
CNO OP-411	ltr 8020 Ser 410E/0U595407 dtd 13 Aug 90	No comments.	No action required.
CNO OP-441	phoncon w/CDR DeLauder on 6 Sep 90	No comments.	No action required.
CNO OP-554	ltr Ser 554K/0U604982 dtd 13 Jul 90	Revise Table X-1 to reflect the current OP-05 military construction program.	Revised where appropriate.
CMC LFF-1	ltr 11011/8 LFL/AAT dtd 27 Jul 90	Revise MAG-49 squadron descriptions on Page IV-9 and change MCNR Project P-162 to unprogrammed.	Revised accordingly.
COMNAVAIRSYSCOM	ltr 11000 Ser AIR-4223H/3255 dtd 2 Aug 90	Justify the violations associated with the proposed aircraft parking apron, P-206.	Revised the Project Data Sheet for P-206.

Chain of Command Review Comments (cont'd.)

Reviewer	Received Via	Comment	Action
COMNAVDAC	ltr N44/4141 dtd 20 Jul 90	No comments.	No action required.
COMNAVFACENGCOM	Facsimile transmission Code 2002MB dtd 19 Sep 90	Various comments to Sections IV, V-B, and IX.	Revised where applicable.
COMNAVMILPERSCOM	ltr 11000 N-656D dtd 16 Aug 90	No comments.	No action required.
COMNAVRESFOR	ltr 11000 Ser 8111/487 dtd 30 Jul 90	Various comments to Sections IV, V-B, VIII, and X.	Revised accordingly.
COMNAVSEASYSCOM	ltr 8020 OPR 6651 Ser 665/ 721 dtd 6 Aug 90	Revise Table V-B-1 to include approved explosive limits.	Revised accordingly.
		Revise scale of Plate V-D-8	Revised scale to 1"=200'.
		Revise paragraph V-D.2.g to describe basis for 400' ESQD arcs.	Revised accordingly.
COMNAVSECINVCOM	ltr Ser: NISCOM/24-0377 dtd 2 Aug 90	Revise NAS Security Dept. description on page IV-9.	Revised accordingly.
		Various physical security comments.	Revised where appropriate.
COMNAVSUPSYSCOM	ltr 11010 Ser 0622B/0278 dtd 1 Aug 90	No comments.	No action required.
COMNAVTELCOM	ltr 11010 Ser N44/4141 dtd 20 Jul 90	No comments.	No action required.
COMSPAWARSYSCOM	ltr 11010 Ser 005-31/724 dtd 6 Jul 90	No comments	No action required.
NAVPETOFF	ltr 34/LST/cac 4020.64 dtd 17 Jul 90	Include listing of RC13-88, Fuel Farm Repairs in Section X.	Revised Section X to include description and effects of Special Project RC13-88.
NAVRESSO Staten Island	ltr FD1:JJ:mj (718) 390-3971 dtd 5 Jul 90	No comments.	No action required.
NAVSEACENLANT	phoncon w/J. Daye on 2 Jul 90	No comments.	No action required.
TMD EAST	Memo 11010 Ser 32(TG)/ 0623 dtd 16 Jul 90	Individual P-Projects will be reviewed as they come on line.	No action required.

I. EXECUTIVE SUMMARY

This Master Plan is an update of the CNO approved Master Plan for the Naval Air Station Willow Grove, Pennsylvania dated October 1983. This plan is intended as a guide to insure the logical and efficient use of facilities and real estate assets, and to guide growth at the Station. In addition, this plan provides background data about the Station which is intended to assist personnel from all levels of the Navy in their planning, design, and execution of projects at NAS Willow Grove.

A. OBJECTIVES

The major objectives which have evolved during preparation of this plan are:

1. Improve upon the Station's *FUNCTIONAL RELATIONSHIPS.*
2. Provide cost effective solutions to satisfy facility *DEFICIENCIES and SHORTFALLS.*
3. Identify areas of potential *ENCROACHMENT* and suggest mitigating measures.
4. Maintain *EXPANSION POTENTIAL* for peacetime and mobilization scenarios.
5. Improve land utilization to achieve *OPERATIONAL and ENERGY EFFICIENCY.*
6. Improve *SAFETY and SECURITY* in operations and support areas.
7. Improve *CIRCULATION and PARKING.*
8. Review *INFRASTRUCTURE* systems ability to support development and improve reliability.
9. Review and update the *AICUZ.*

B. RECOMMENDATIONS

The following recommendations are put forth in an effort to fulfill the objectives presented above

1. The limited available land areas on-Station should be preserved and conservatively used to accommodate new or expanding missions. This recommendation is further reinforced as a result of the Secretary of Defense's announcement of candidate bases to be evaluated for possible closure/realignment. Under the proposed base closure/ realignment action, NAS Willow Grove was identified as a potential receptor location for activities at three locations.

2. Eliminate all facilities at the south end of the airfield by providing new facilities collocated with related functions in the developed core area. The vacated area will be redeveloped to accommodate expansion of aircraft parking apron and as a potential maintenance hangar site. Utility services in the south area will be phased out appropriately.

3. Develop the necessary project documentation required to begin the acquisition process for the facilities identified in the Capital Improvements Plan (CIP) which will satisfy the Station's deficiencies.

4. Build upon the proposed land use plan contained herein. This will improve functional relationships, reduce undesirable environmental conflicts, and eliminate intrusions into airfield safety zones.

5. Maintain an active community liaison program and participate as a land owner, in decisions that could affect the operations of the Station.

6. Evaluate recommendations from Utility Technical Studies for the utilities systems and develop new or revise existing projects to alleviate deficiencies identified within these studies.

7. When feasible, existing buildings should be rehabilitated to improve their energy efficiencies, extend their service life, and to consolidate compatible functions into intensified multiple use facilities in lieu of maintaining and operating small, inefficient, and dispersed facilities.

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III. INTRODUCTION

A. LOCATION

Naval Air Station, Willow Grove is located in the southeastern portion of Pennsylvania approximately twenty-five (25) miles north of center city Philadelphia. See Plate III-1, Location Map. The Station is in the southeast area of Montgomery County immediately adjacent to the boundary of Bucks County.

The immediate area surrounding NAS Willow Grove is primarily residential

Other related military installations in the regional area include: Philadelphia Naval Base; Philadelphia Naval Hospital; Defense Personnel Support Center; Navy Aviation Supply Office, Naval Air Development Center, Warminister; Naval Air Propulsion Center, Trenton; Naval Engineering Center, Lakehurst; and Naval Weapons Station, Earle.

B. PURPOSE AND USE OF THE MASTER PLAN

The Master Plan is a comprehensive guide to insure the logical and efficient use of facilities and real estate assets as well as to guide the orderly growth, change, and physical development of the Station.

This Plan is intended to be used as a decision making tool by all echelons of Navy personnel, both military and civilian. In order for the Master Plan to remain viable, it will be updated as necessary to reflect changes made necessary through mission or workload changes. The Capital Improvements Plan (CIP) section is updated every two (2) years to reflect progress made in the Station's development and to maintain the programming of Military Construction Projects in a current status.

C. OBJECTIVES

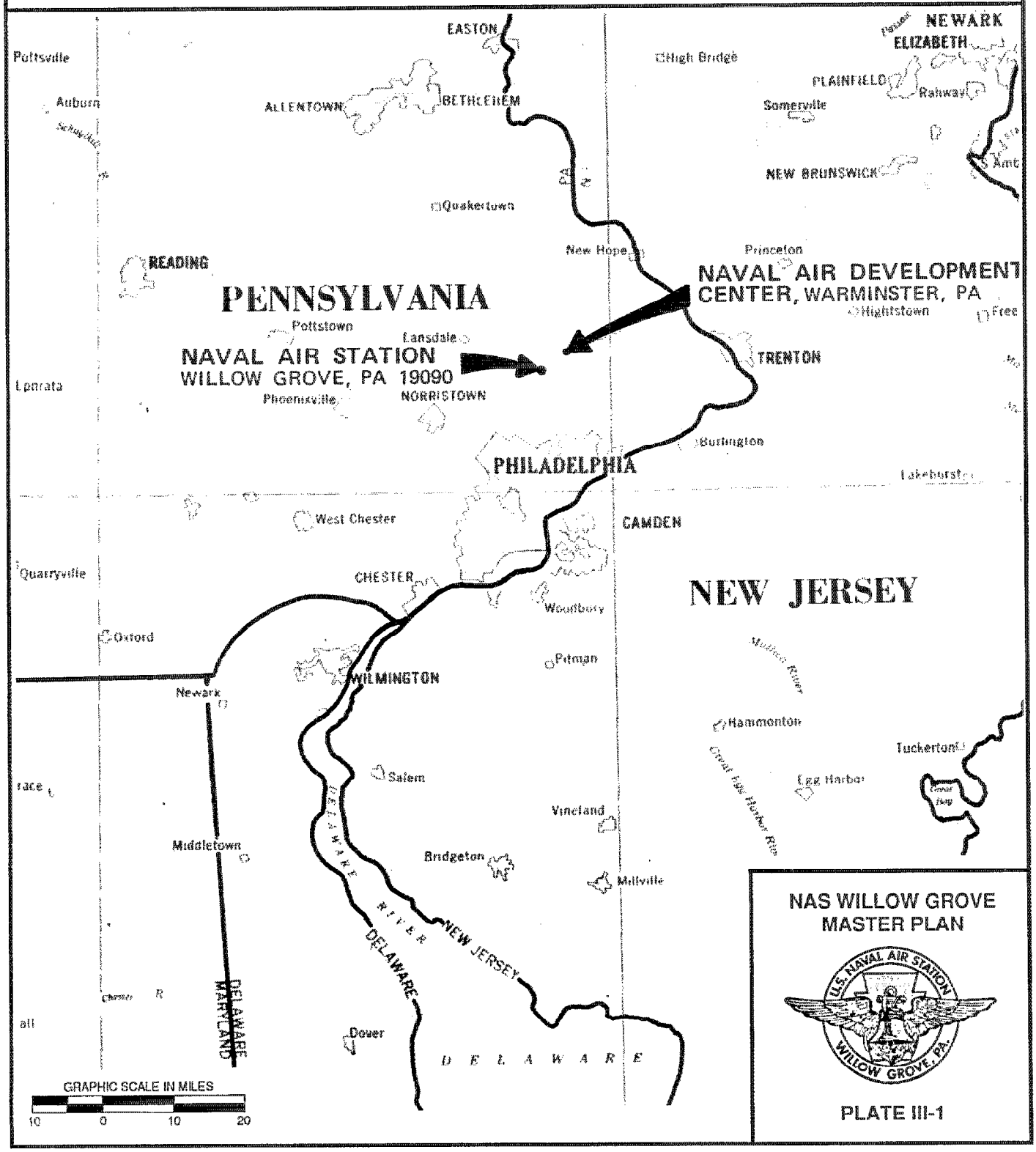
At the outset of this planning effort certain goals and objectives were established to provide a guide for the in-depth analysis which was to follow.

The basic objectives of this Master Plan are to:

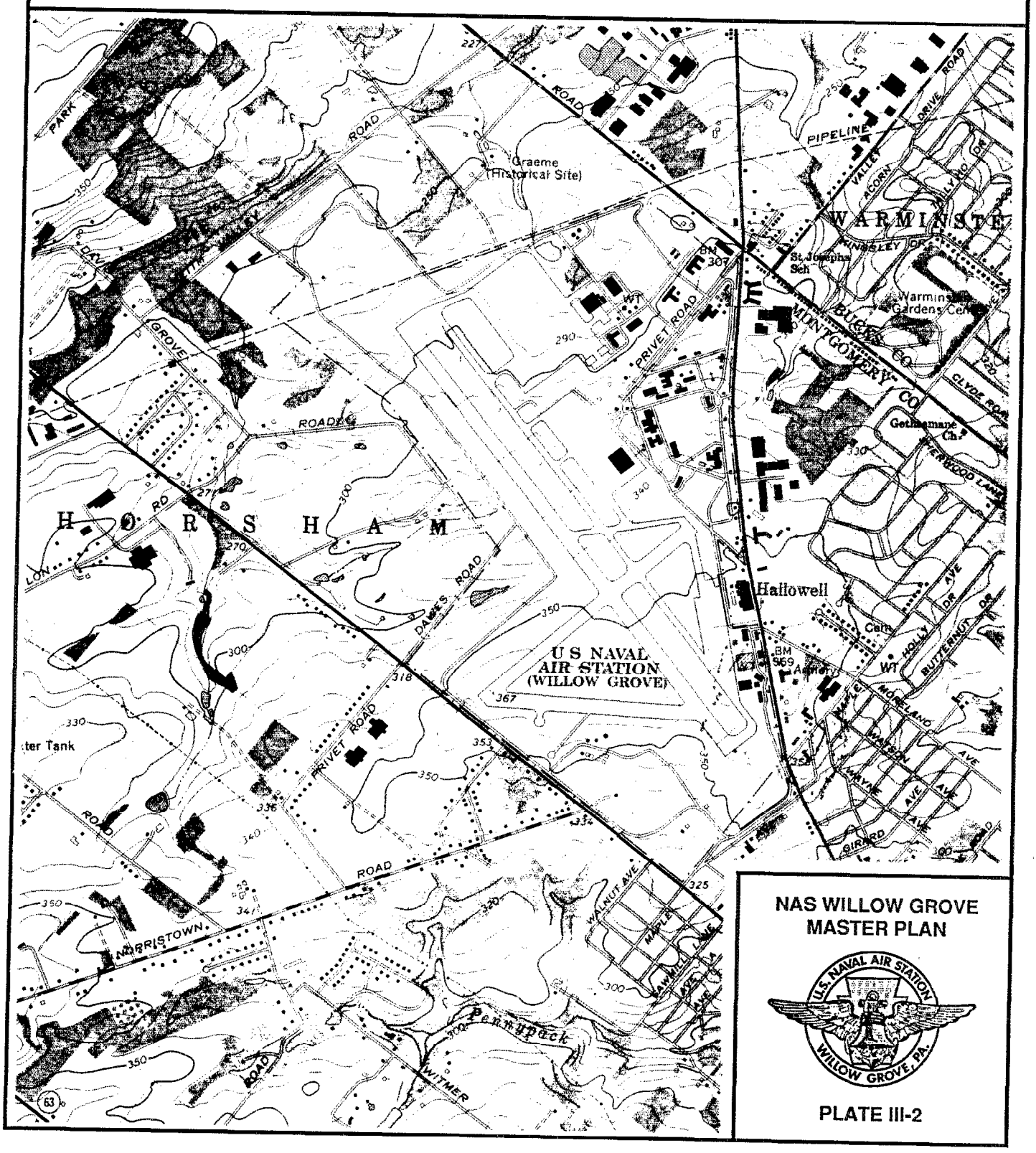
1. Improve upon the Station's *FUNCTIONAL RELATIONSHIPS.*

2. Provide cost effective solutions to satisfy facility *DEFICIENCIES* and *SHORTFALLS.*

LOCATION MAP



VICINITY MAP



3. Identify areas of potential *ENCROACHMENT* and suggest mitigating measures.

4. Maintain *EXPANSION POTENTIAL* for peacetime and mobilization scenarios.

5. Improve land utilization to achieve *OPERATIONAL* and *ENERGY EFFICIENCY.*

6. Improve *SAFETY* and *SECURITY* in operations and support areas.

7. Improve vehicular *CIRCULATION* and *PARKING.*

8. Review *INFRASTRUCTURE* systems ability to support development and improve reliability.

9. Review and update the *AICUZ.*

D. ASSUMPTIONS AND GROUND RULES

Many times changes occur at an activity which are impossible to foresee. This (unfortunately for the planner) is a fact of life which cannot be avoided. However, by carefully considering past development and projections of future growth in personnel and technological trends, it is possible to establish a foundation from which detailed planning can proceed. This is the basis for the assumptions and ground rules which follow.

1. BASE LOADINGS for personnel and aircraft will remain substantially the same as those reflected in Section IV.

2. MISSION AND TASKINGS of the Station and major tenants will remain substantially the same as reflected in Section IV during the time-frame of this Plan.

3. BASIC FACILITY REQUIREMENTS will remain essentially the same as presented in Section IV, unless otherwise noted.

4. UTILIZATION OF NAS WILLOW GROVE as a receptor location for candidate bases under the base closure/realignment action would necessitate an investigation of land use compatibilities prior to implementing the construction and/or expansion of facilities to accommodate the incoming activity.

IV. REQUIREMENTS ANALYSIS

A. GENERAL

Fundamental to any planning process is an understanding of the basic purpose of the various activities at an installation and any interface that exists between activities. The purpose of this section is to provide that information through a description of the mission and tasks, organization, departments, tenants, aircraft loading, and facilities requirement plan summary of Naval Air Station, Willow Grove, Pennsylvania.

B. MISSION AND TASKS

The mission of NAS Willow Grove is to maintain and operate facilities, to provide services, material, administrative coordination, and logistic support for operations involving aviation activities and units of the Commander Naval Reserve Force (COMNAVRESFOR) and other activities/units as designated by the Chief of Naval Operations, and to administer the Naval Air Reserve Training program as directed by the Chief of Naval Reserve. The mission also includes administering the Naval Air Reserve Program as directed by the Chief of Naval Reserve and to train all assigned units for their mobilization assignments in accordance with the specific mission and functions assigned in COMNAVRESFOR Instruction 5450.26.

C. ORGANIZATION

There are two formally structured echelons at NAS Willow Grove. One is the host organization of the Station itself, the other is the tenant and supported units structure of the squadrons and their command units. See Plate IV-1. The command relationships of both host and tenant structure flow from COMNAVRESFOR and essentially parallel each other. Functionally however, the two structures are interdependent in the sense that the host supports the tenant's activities. The most obvious overlap is in aircraft maintenance where the host conducts intermediate level maintenance (AIMD) and the squadrons conduct organizational level maintenance. However, squadron personnel are used to augment the AIMD shops and other departments when stationed at NAS Willow Grove. Direct support from the host, exclusively to the tenant squadrons, comes from the Air Operations and Weapons Departments of the Station. The squadrons are also among those directly supported by the Station's Supply and Communications departments. The remaining departments of the Host structure support all tenant activities indirectly by maintaining the physical assets of the base and providing personnel services.

D. DEPARTMENTS

COMNAVRESFORINST 5450.26 delineates the NAS organizational structure and functions for Naval Air Reserve Shore Activities. Deviations from the standard organizational structure is authorized to accommodate local conditions, variations in the mission and scope of operations. Deviations at the division level and below are delegated to the Commanding Officer of this Activity. The major departments and a description of their functions are listed below.

OFFICE OF THE COMMANDING OFFICER - Code 00

The Commanding Officer is responsible for overseeing all of the Departments and managing the staff to assure the mission and assignments of the Station are accomplished in the most professional, proficient, and timely manner. He is responsible for the safety and security of the entire Installation, its personnel, equipment, and material. He supports all tenant commands and provides services and materials to maintain and operate the facilities in support of assigned programs and for other activities and units designated by higher authority. He is the prime spokesman of the Station to higher echelons of command and other public officials and agencies.

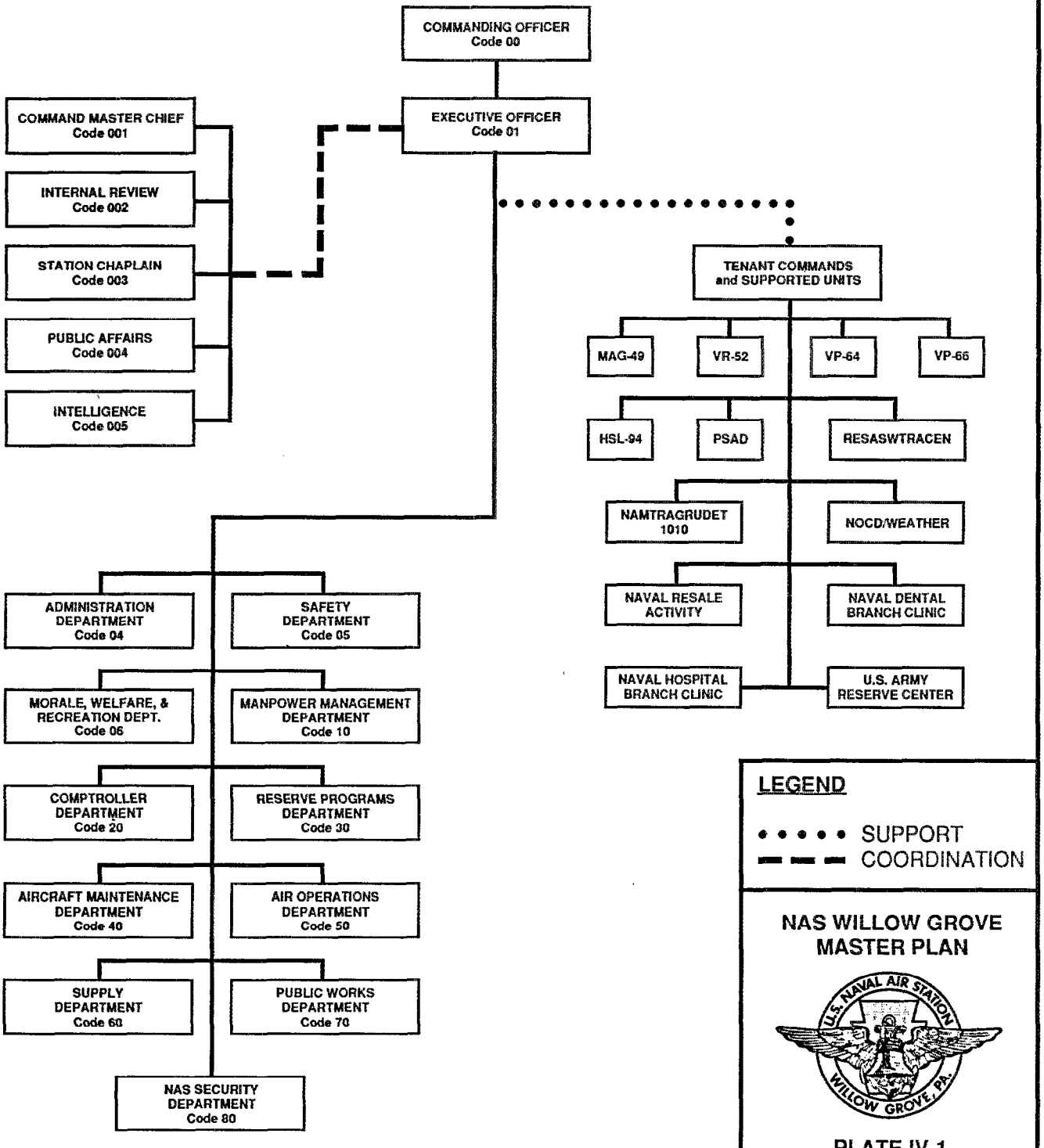
OFFICE OF THE EXECUTIVE OFFICER - Code 01

The Executive Officer is responsible for executive direction of the Station as delegated by the Commanding Officer. He has technical and administrative responsibility for daily operation of the Station and serves as NAS's chief spokesman with the Naval Air Systems Command, the technical sponsor, in connection with all significant issues regarding the technical missions of the Station; evaluates status and progress of current effort to ensure program efforts are being achieved and that current or anticipated results warrant the expenditure of time, money, and effort for optimum, use of available resources; he is also responsible for many other administrative/technical functions directed toward the mission of the Station.

COMMAND MASTER CHIEF - Code 001

Keeps the Commanding Officer apprised of existing or potential situations, procedures, and practices which adversely affect the welfare, morale or well-being of enlisted personnel and their dependents and recommends actions to eliminate such conditions and further enhance the attractiveness of the naval service. Member of Human Resources Council, Navy Resale Activity and BEQ advisory boards. Carries out responsibilities and duties as set forth in OPNAVINST 5400.37.

NAS WILLOW GROVE - CHAIN OF COMMAND



INTERNAL REVIEW OFFICE - Code 002

Provides internal reviews of various appropriated and non-appropriated fund activities/ areas. Serves as the management control program coordinator.

STATION CHAPLAIN - Code 003

Serves as a special staff officer to the Commanding Officer. Advises the Commanding Officer on matters of religion, morale and the welfare of personnel and their dependents. Administers the command's religious program, the chapel funds, the Chaplain's Office, and Chaplain's Office personnel attached to the command. Maintains a liaison with the religious activities and organizations in the civilian community.

PUBLIC AFFAIRS OFFICE - Code 004

Responsible for the implementation of a public affairs program concerning official activities of the personnel and units of the Station and tenant commands not possessing public affairs capability. Keeps the Commanding Officer appraised of trends in the public's attitude toward the Station and the Navy. Makes recommendations to improve the flow of public information and understanding and to resolve and/or respond to adverse publicity. Prepares and edits news copy, public statements and speeches; screens and/or makes news photographs prior to official release.

Conducts programs to promote mutual understanding between the Station and community. Produces the Station's monthly newspaper, base guide and directory, brochures, command history and programs for various events. Arranges news and photographic coverage of ceremonies, public events and official visits of dignitaries. Responsible for the origination of various programs to promote employee morale and the public's understanding of the Station and the Navy's mission (open house, guided tours, etc.). Writes and edits articles on selected approved subjects for military and historical journals.

INTELLIGENCE OFFICE - Code 005

Special Assistant to the Commanding Officer for matters involving intelligence, intelligence training and intelligence production.

ADMINISTRATION DEPARTMENT - Code 04

Provides general administrative services for the Activity; operates the centralized portion of the Activity mail, file, correspondence, directive, duplicating, messenger systems, and exercises technical coordination of such systems and services throughout the Activity; develops local policy and procedures for safeguarding classified material and monitors compliance; provides security and legal functions, and active duty services. Rapid communications, cryptographic and registered publications services are provided by a support agreement with COMSEC Custodian of OL/A, 1998 Communications Squadron, Willow Grove Air Reserve Facility, USAF Reserve.

SAFETY DEPARTMENT - Code 05

Plans and administers a comprehensive Navy Occupational Safety and Health (NAVOSH) Program. Reports directly to the CO of NAS Willow Grove as the primary consultant on matters relating to safety or health. Acts as an advisor to tenant Commanding Officers/officers in charge. Performs safety compliance reviews of department/office OSH performance, productions and test procedures, new construction, conversion, repair plans and requirements, and acceptance of new materials, chemicals, fuels and equipment.

Performs Preliminary Hazard Analyses (PHA's) on all MILCON scope projects prior to submission. Conducts inspection of buildings, grounds, sites, materials, equipment and devices to ensure compliance with Navy, Federal and Occupational Safety and Health Administration standards. Coordinates formal inspections conducted by higher authority. Conducts mishap investigations of accidents and injuries, maintains records and submits required reports.

Administers the Aviation Safety Program, which includes the review, evaluation and inspection of pertinent operations, procedures, equipment and facilities to ensure the proper allocation of appropriate safety standards and criteria where the safety of flight personnel and aircraft are involved. Conducts a continuous education program in all aspects of aviation safety. Investigates aircraft accidents and evaluates aircraft accident intelligence. Serves as a member of the Aircraft Mishap Board and coordinates the preparation of all endorsements to aircraft accident, incident, flight hazard and ground accident reports as necessary. Monitors all matters relating to aviation safety.

Conducts the Water Survival Training Program for aircrews of active duty and reserve commands. NAS Willow Grove is a CNO approved site for water survival training.

MORALE, WELFARE, AND RECREATION DEPARTMENT - Code 06

Responsible for management control and operation of the Morale, Welfare, and Recreation Department programs of the Navy/military personnel and dependents including operation and administration of the Special Services programs, the officer and enlisted open messes, Navy Exchange Retail Act, non-appropriated fund accounting, and NAFI employee personnel accounting. Also functions as the Recreational Services Division Officer.

MANPOWER MANAGEMENT DEPARTMENT - Code 10

Supervises and administers all manpower related functions including: recruiting; career counseling; retention; active duty and civilian manpower; active duty services; human goals; substance abuse; commercial activities; and equal employment opportunity.

COMPTROLLER DEPARTMENT - Code 20

Develops, coordinates, and maintains an integrated system of staff service in the financial management area. Translates the program requirements into the required financial plan and formulates the activity budgets. Compares program performance with the financial plans, analyzes variances therefrom and determines where financial adjustments may be required. Directs a progress and statistical reporting system and maintains an integrated financial information system to meet management needs at all organizational levels. Responsible for the conduct of accounting and for the effective coordination of budgeting, accounting, progress reports and statistics.

Maintains the official accounting records for the Station. Prepares, distributes, and monitors execution of the Station and flight OMNR and RPN Budgets. Maintains and reports Plant and Minor Property inventories. Maintains the financial inventory records for the Station Stock Funds, and maintains civilian time and attendence.

RESERVE PROGRAMS DEPARTMENT - Code 30

The Reserve Programs Department provides all administration functions including: RESFIRST, ACDUTRA, IDTT, Billet Control, Classification, Formal Training, and RTSS (AIR). The Reserve Programs Director provides for and coordinates the training of all reserve units and personnel of the active, inactive and reserve forces under the cognizance of the Activity, or assigned to the Activity for such training.

AIRCRAFT INTERMEDIATE MAINTENANCE DEPARTMENT - Code 40

Provides intermediate level aircraft maintenance and services in support of tenant activities, and up to and including intermediate level maintenance in support of assigned aircraft and support equipment. Model of aircraft serviced include the P-3, A-4, SH-2, H-53, C-9 and the Station's C-12 aircraft. Ensures optimum use of available manpower and material to maintain the productive output at the proper quantity and quality to support the tenant and NAS aircraft. Maintains and controls a central reporting and record keeping system for maintenance and correspondence.

Divisions and Work Centers within this major department include: Administration, W.C. 020; Production Control, Training, W.C. 040; Quality Assurance/Data Analysis, W.C. 050; Material Control, W.C. 300; Transient Line, W.C. 400; Engine Build-up, W.C. 500; Airframes, W.C. 600; Avionics, W.C. 610; Electronics, W.C. 620; Battery Locker, W.C. 62B; Instrument Repair, W.C. 640; Radar/ECM Repair, W.C. 660; ASW Repair, W.C. 670; Precision Measuring Equipment, W.C. 690; Micro-Mini Repair, W.C. 700; Armament Equipment Repair, W.C. 800; Life Support, W.C. 810; IMA Paraloft,, W.C. 820; LOX Farm-Cryogenics, and W.C. 900; Support Equipment.

AIR OPERATIONS DEPARTMENT - Code 50

Operates airfield and provides services to support operations of Activity, tenant, and transient aircraft; provides crash/rescue/structural firefighting functions; schedule Station aircraft; maintain ground electronics equipment; provide photographic services and line servicing functions for transient aircraft, and operate all Station munition functions.

1. **Administration Division - Code 51:** Provides the administrative support for all air operation divisions.

2. **Air Traffic Control Division - Code 52:** Responsible for the safe, orderly and expedicious movement of air traffic on the airport movement areas and designated air space. Federally licensed Navy air traffic controllers operate the control tower and Radar Operating Facility (ROF). In addition, complete flight planning and flight dispatch areas are maintained and operated.

3. **C-12 Aircrew/Flight Support Division - Code 53:** Provides flight schedules, maintains pilot log books, sends out monthly messages for program management, maintains currency for pilots on flights and training.

4. **Ground Electronics Maintenance Division - Code 54:** Safely lands/route aircraft, control aircraft movement and provide a safe environment to land aircraft during inclement weather. Provide communication between aircraft and ground, provide navigational aids for all aircraft in Station controlled airspace.

5. Fire Division - Code 55: Provides structural and aircraft fire suppression and rescue, inspection and testing of fire suppression systems including portable fire extinguishing equipment, water distribution systems, and hydrants. Reviews construction plans, operates and maintains aircraft arresting gear systems, and provides training in-house for other departments and reserve personnel.

6. Photographic Division - Code 56: Provides photographic support to the Station and its tenant commands. Photographic support includes; portraiture, public relations, investigative, aviation mishap, damaged equipment, and training aid photography.

7. Transient Line Division - Code 57: Responsible for recovery, servicing, launching and the performance of unscheduled maintenance on transient aircraft. Provides manifesting, screening, anti-hijack procedures, and cargo support for military and civilian transient aircraft.

8. Weapons Division - Code 58: Provides weapons storage/build-up for tenant commands. Provides technical and administrative training and support to reserve activities in the areas of weapons/small arms supply, storage, preparation, inspection, use, and Weapons Support Equipment (WSE) maintenance.

SUPPLY DEPARTMENT - Code 60

Provides material support to Station departments and tenant activities by procurement, receipt, storage, issue, and disposal of material and equipment. Receives, stores, issues and packs material for use on base or shipment off base. Advises the Commanding Officer and other Station managers in the planning for use of resources, materials, and facilities in support of Station programs.

Administers fuel services and storage contracts. Receives, stores, and issues jet fuel, AVGAS, MOGAS, AVLUBE and motor oil.

PUBLIC WORKS DEPARTMENT - Code 70

Operates, maintains and repairs all public works and public utilities at the Station; operates, assigns, maintains and repairs construction, transportation and weight-handling (material handling) equipment. Provides services, materials, and facilities to support the operations and missions of the Station, tenants, and various reserve activities. Divisions within this department include: Administration, Engineering, Production and Maintenance Control, Transportation, Military, and Facilities Support Contracts.

NAS SECURITY DEPARTMENT - Code 80

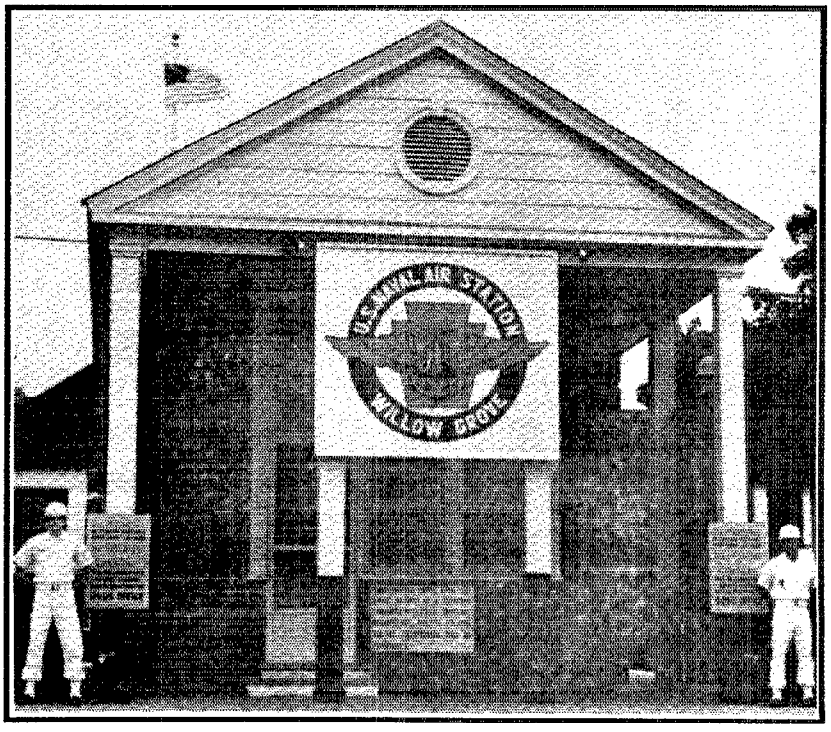
Trains and maintains a professional security force for the protection of the Station and all tenant activities and assets within the Station; deters hostile aggressive action against Station employees and critical assets; provides physical security upgrading to minimum standards as required by OPNAV Instructions.

E. TENANT ACTIVITIES

Naval Air Station, Willow Grove serves as host activity for tenant activities and provides support in accordance with negotiated Host/Tenant Agreements and Interservice Support Agreements. The following is a list of the tenants that are stationed at NAS Willow Grove and their mission descriptions:

FLEET LOGISTIC SUPPORT SQUADRON FIVE TWO (VR-52)

Provides medium logistic airlift support to various Naval Commands. Tasking, provided by the Navy Air Logistics Office (NALO), includes service to CONUS and overseas units. The squadron currently operates two (2) DC-9 air transports which can be configured for all passenger, all cargo, or mixed loads.



MAIN GATE BLDG. 39

HELICOPTER ANTI-SUBMARINE SQUADRON NINE FOUR (HSL-94)

The squadron's mission is to seek out, detect, and destroy enemy submarine forces. HSL-94 flies the SH-2A helicopter aircraft.

MARINE AIRCRAFT GROUP 49 (MAG-49)

Maintains aircraft and ground support equipment in order to adequately train SMCR drilling reservists that are apart of the seven (7) different squadrons that comprise MAG-49 at NAS Willow Grove.

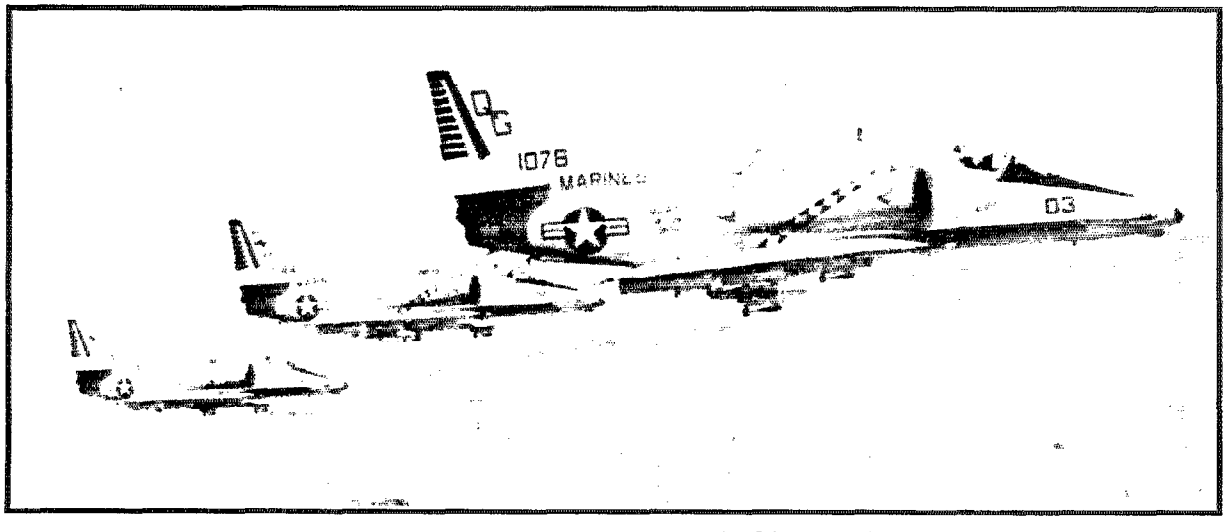
1. **Marine Attack Squadron (VMA-131):** Provides training for selected Marine Corps Reserves for the tactics operations and mission of THE A-4M attack aircraft in support of and in coordination with other Marine forces.

2. **Marine Air Logistics Squadron (MALS-49):** Maintains the A-4M and twinseat TA-4J Skyhawk attack aircraft.

3. **Marine Heavy Helicopter Squadron (HMH-772):** Operates the heavy-duty CH-53 Sea Stallion helicopters.

4. **Marine Air Traffic Control Squadron, Detachment B (MATCS-48):** Capable of setting up and operating a complete mobile air traffic control operation.

5. **Marine Wing Support Squadron (MWSS-473) DET A:** Involved in all aspects of ground airfield support, including communications and operation of aircraft arresting gear, used to train pilots for carrier landings.



MARINE A-4 ATTACK AIRCRAFT

6. Marine Wing Communications Squadron (MWCS-48) UNIT A: Responsible for setting up ground communications with HF capability for the MAG-49 unit.

7. MAG-49 HQ/Aviation Combat Element: Provides headquarters staff for the logistical, personnel, and supply aspects of MAG-49.

NAVAL AIR MAINTENANCE TRAINING GROUP DETACHMENT 1010 (NAMTGD)

Trains both TAR and selected reservists on P-3A/B avionics systems. The CNO approved curriculum taught at NAMTGD 1010 includes organizational and intermediate level courses.

NAVAL DENTAL BRANCH CLINIC

Provides routine dental care to all active duty personnel of NAS Willow Grove and NADC Warminster, emergency care for active duty and reserve personnel, and annual examinations for reservists. It provides oral diagnosis, preventive dentistry, operative dentistry, oral surgery, and endodontics.

NAVAL HOSPITAL BRANCH CLINIC

Supports the medical mobilization readiness of the Naval Reserve. Provides emergency treatment and ambulatory medical services to all active duty personnel and dependents, retired personnel and their dependents, and selected reservists. Emphasis is placed on preventive medicine, physical examinations, immunizations, occupational health, medical records maintenance, and supportive administrative functions.

NAVAL OCEANOGRAPHY COMMAND DETACHMENT (NOCD/Weather)

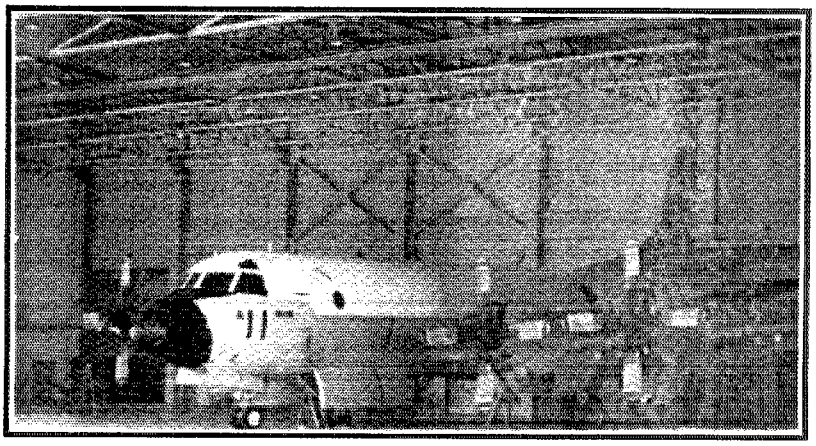
Provides oceanographic support, including aviation weather services, local climatological studies, technical and military training, 24-hour terminal aerodrome forecasts, and severe weather warnings to Commander, Naval Base Philadelphia and various activities at the Naval Air Station. Operates meteorological and communications equipment. Prepares and maintains a local area forecaster's handbook and conducts an active squadron and fleet liaison program.

NAVAL RESALE ACTIVITY

Provides a convenient and reliable source from which authorized patrons may obtain, at lowest practical cost, articles and services required for their well-being and contentment. Generates profits for the welfare and recreation programs in the Navy.

PATROL SQUADRON SIX FOUR (VP-64)
PATROL SQUADRON SIX SIX (VP-66)

Conducts flight and ground training to maintain maximum readiness of antisubmarine warfare mission. Manages assigned resources and personnel; advises, assists and supports participating Selected Reservists in order to provide effective recruiting, training, administration and retention of such personnel. All-weather flight operations for training in accordance with CNO required operational capabilities include: Mobility, Command and Control and Communications, Anti-submarine Warfare, Intelligence, Mine Warfare, Electronic Warfare, Anti-submarine Ship Warfare, Fleet Support Operations, and Non-combat Operations.



NAVY P-3 ORION AIRCRAFT

PERSONNEL SUPPORT ACTIVITY DETACHMENT (PSAD)

Maintains the pay and service records for all active duty and selected reserve personnel assigned to the Station, including but not limited topreparation of active duty/reserve/retired and dependent ID cards; receipt and transfers; ACDUTRA/TEMAC/TAD accounting and documentation processing; educational services; personnel accounting; and travel support to all Navy-sponsored travelers in a designated geographic area. Performs other functions and tasks as directed by higher authority.

RESERVE ANTI-SUBMARINE WARFARE TRAINING CENTER (RESASWTRACEN)

Provides all formal Naval Reserve P-3 Anti-Submarine Warfare Training for Naval Reservists, fleet ,and foreign military personnel in the theoretical and operational phases of aviation anti-submarine warfare; in quality standardization of all crewmembers flying Naval Air Reserve Force P-3 aircraft; and training support in the maintenance and use of airborne ASW equipment and training simulators. Specialized training provided is a portion of a continuation of training leading to qualification of personnel in specific ASW mobilization assignments.

U.S. ARMY RESERVE CENTER UNITS

1. **97th U.S. Army Reserve Command:** Commands all USAR troop program units (except Selective Service Detachments) and attached individuals, reinforcement training units, and mobilization designed detachments within their geographic area of responsibility not assigned or attached to another GOCOM.

2. **305th Military History Detachment:** In support of the Department of the Army Military History Program, collects information in the field to supplement and amplify the factual account of events as recorded by organizations in the course of operations.

3. **153rd & 157th Judge Advocate General Detachment:** Performs operational Judge Advocate functions. Provides augmentation, as required, for variable strength organizations. Effects flexibility of professional personnel commensurate with varying peak workloads within units.

4. **307th Army Band:** Provides music in support of official military ceremonies, formations and activities. Provides music in support of Army recruiting and community relations activities.

5. **4074 Reception Station:** Administers reception processing to enlisted personnel entering the Army from civilian life.

6. **AMSA #23 (Area Maintenance Support Activity):** Provides organizational and selected direct support tasks for assigned group equipment.

7. **Flight Activity #28:** Provides organizational and limited direct support for assigned aircraft.

F. NAVY RESERVE TRAINING UNITS

The Specialized Reserve Units located at Willow Grove are under the established concept of "Project Readiness". The mission of these units is to provide trained personnel for augmentation to specific fleet units during periods of selective or general mobilization.

The following units of mobilization support are:

NAS Willow Grove 1993
NAS Bermuda 0693
NADC Warminster 0193
WEPSYS 0793
WEPSYS 0293
AIRSYSCOM VTU 0493
FIRSTEURLANT 0593
FIRSTEURLANT 0693
NISO 0893
IVTU 0104
DIAHQ 0193
NOCD 1093
PATWING 0593
AVU 0193
COMARSURVRECFORIXTHFLT 0192
VTU 9393
NAVAIRLANT 0293
FASOTRAGRU 0293
VP-1123
VP-2644
GS-1535
4TH MAWMEDHQDET 0104

G. OTHER LAND HOLDERS AT NAS WILLOW GROVE

913th TACTICAL AIRLIFT GROUP (AFRES)

The mission of this group is to provide transportation for airborne forces and their equipment; both long and short movement of personnel, equipment, and supplies including the aeromedical evacuation of patients. The unit also operates and maintains an Air Force installation at Willow Grove Air Reserve Facility to conduct unit and individual training for Air Reserve forces.

The U.S. Air Force property holdings at NAS Willow Grove total 161.76 acres. Navy facilities that are shared with the U.S. Air Force include runways, taxiways, air control, recreation, and personnel support facilities. The 913th is composed of the following units:

913th Consolidated Aircraft Maintenance Squadron
327th Tactical Airlift Squadron
913th Combat Support Squadron
913th TAC Clinic
913th Communications Flight
913th Civil Engineering Squadron
913th Weapons Systems Security Flight
913th Aerial Port Flight
913th Mobility Support Flight

111th TACTICAL AIR SUPPORT GROUP (PAANG)

This group is a tenant of the 913th (AFRES). Their mission involves working directly with, and in support of, ground forces to plan and control attack and defense operations, such as jet fighter strikes, troop carrier operations, reconnaissance, and other similiar tactical operations requiring close air support.

This mission assignment is unusual in that the 111th Group is one of six Air National Guard and three active duty units formed to provide an integral unit, capable of supplying its own needs to accomplish mission goals.

The 111th is composed of the following units:

111th Resource Management Squadron
103rd Tactical Air Support Squadron
111th Combat Support Squadron
111th Consolidated Aircraft Maintenance Squadron
111th Civil Engineering Flight
111th Tactical Clinic
111th Communications Flight

H. BASE LOADING

1. Personnel

The latest personnel loading data available is from the 1989 Shore Facilities Planning System Base Loading Summary dated 06 April 1989. The current and projected 1994 population loadings are shown in Table IV-1. This table shows a very small decrease between the current and projected base loadings.

TABLE IV-1

NAS WILLOW GROVE PERSONNEL LOADINGS [1]

	Permanent Party		Reserves		Students/Trans.			
Year	Officer	Enlisted	Officer	Enlisted	Officer	Enlisted	Civilian	Total
1990	123	1,322	23	185	17	28	568	2,266
1995	136	1,458	24	43	17	28	568	2,274

[1] Includes tenant comands assigned to the Station.

2. Aircraft

There are a total of seventy-three (73) aircraft assigned to the Station or its tenant commands.

TABLE IV-2

NAS WILLOW GROVE AIRCRAFT LOADING [1]

Command	Number of Aircraft	Type of Aircraft
VP-64	11	P-3A/B
VP-66	11	P-3A/B
VR-52	2	DC-9B
HSL-94	8	SH-2A
NAS	2	UC-12B
MAG-49	13	A-4M
MAG-49	7	CH-53A/D
VMA-131	3	TA-4J
79th ARCOM	18	H-1, H-58

[1] Aircraft loading as of September 1990

I. FACILITIES REQUIREMENTS PLAN SUMMARY (FRP)

The Facilities Requirements Plan (FRP) provides a statement of facilities requirements, lists existing assets by condition and displays future plans to utilize, acquire, lease, or dispose of assets. As part of the plan, the Station has included planning information for its tenants and supported units.

Appendix F contains the FRP Summary which provides a concise overview by Category Code Number (CCN) of the Basic Facility Requirement, existing assets, existing deficiencies and surpluses, and any deficiencies which would remain after the implementation of the planning actions associated with the Facility Planning Document (FPD).

V-A. REGIONAL AND COMMUNITY DATA

1. TRANSPORTATION

The areas surrounding NAS Willow Grove are serviced by several State and local highways as well as commuter rail and bus service, air routes, and port facilities. The area is highly dependent upon the highway system for transportation and service. The immediate area surrounding the Station is quickly becoming an economic entity indicated by an increased percentage of the labor force employed locally. However, as development continues, the low densities of residential patterns and dispersed land uses renders public transportation systems prohibitively expensive and operationally inefficient.

Government officials have recognized the transportation energy problems and community development/maintenance costs. In reaction, land use patterns and development intensities are changing which may render public transportation cost-effective and have other environmental and budgetary advantages.

a) Highways

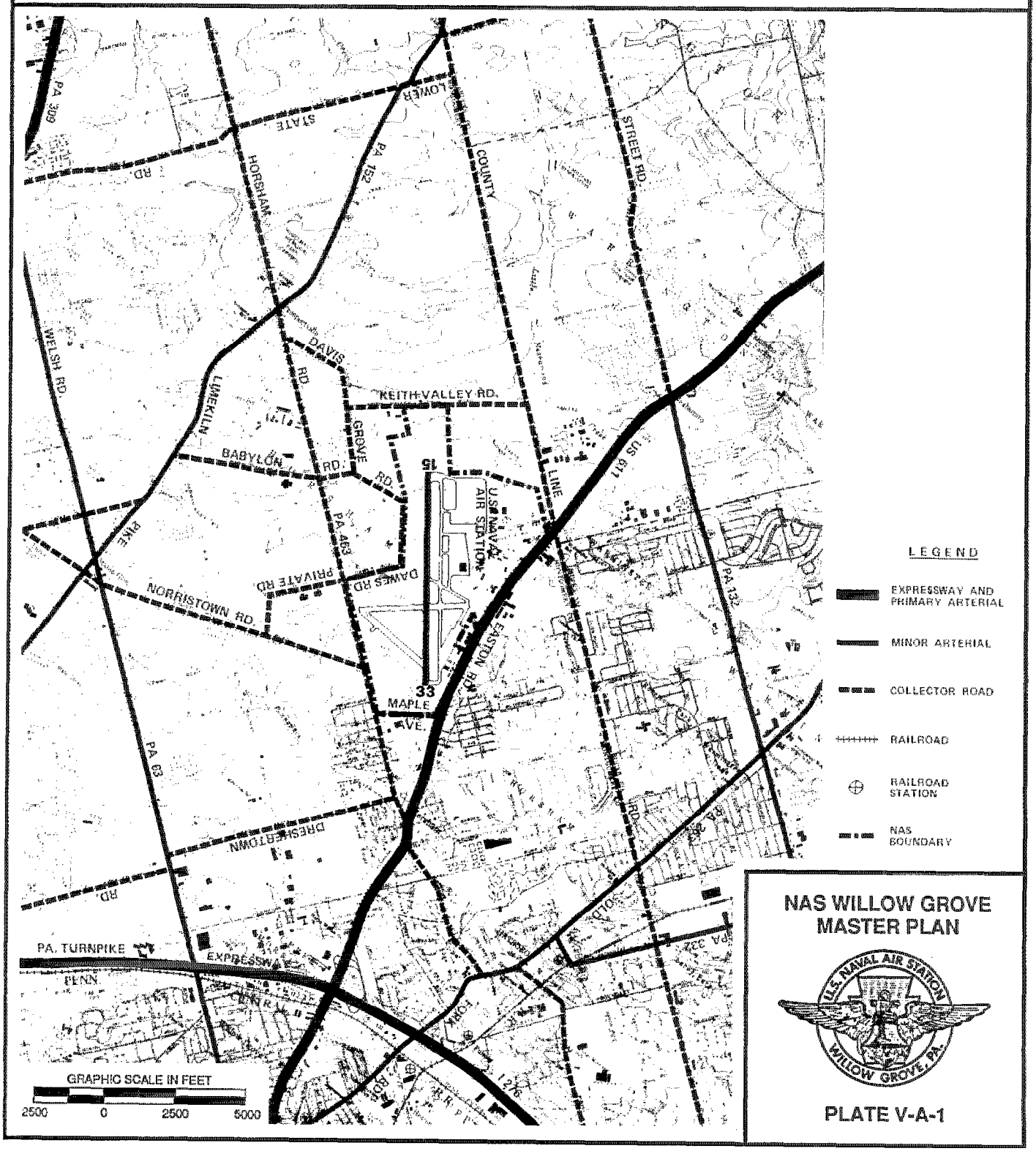
NAS Willow Grove takes primary access from PA State Route 611, Easton Road, a four lane major regional highway. It interchanges three miles south with the Pennsylvania Turnpike (I-276) at Exit #27, Willow Grove. See Plate V-A-1, Area Highways. The Pennsylvania Turnpike provides access to all the major northeast interstate highways and local highways serving the Philadelphia area. A significant amount of commercial, industrial, and residential strip development has occurred along PA 611. The intersection of four collector roads and many local residential streets restrict traffic flows during peak hours.

b) Railroads

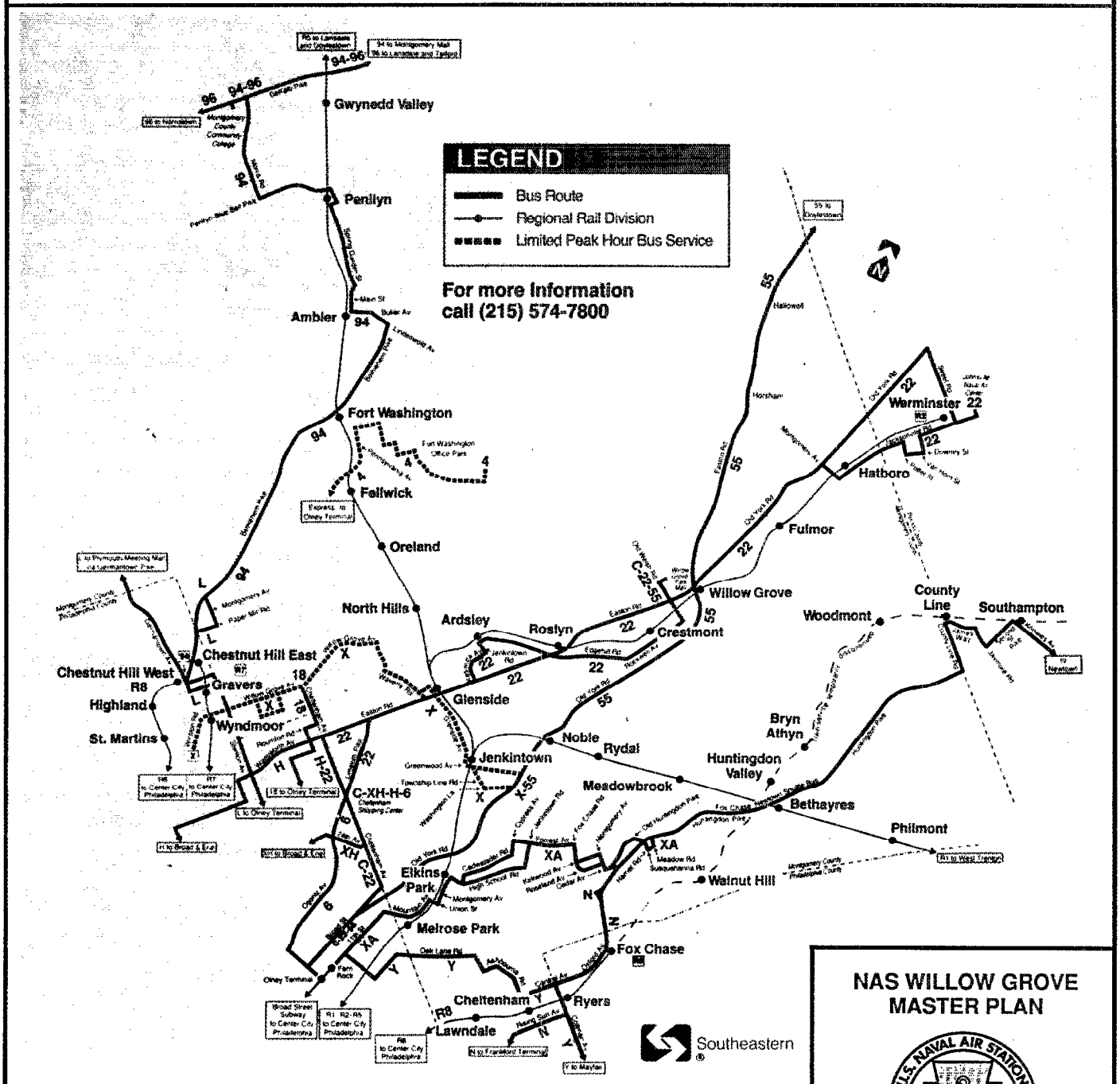
Major Conrail freight lines radiate from the core of Philadelphia northeast and southward through the nearby metropolitan centers. Others radiate northward and westward along river valleys to the more distant cities of Harrisburg, Allentown, Bethlehem, Pottstown, Pittsburgh, and cities beyond.

The passenger station nearest the Naval Air Station is Willow Grove, located approximately four miles south of the Naval Air Station on PA 611. A second passenger station is located approximately four miles east of the Naval Air Station on Park Road, between County Line Road and Street Road in Warminister. Plate V-A-2 illustrates the SEPTA Regional Rail system in eastern Montgomery county.

AREA HIGHWAYS



PUBLIC TRANSPORTATION ROUTES



NAS WILLOW GROVE
MASTER PLAN

PLATE V-A-2

Eastern Montgomery County

c) Bus Service

SEPTA also operates bus service routes in the metropolitan area. One bus route, (#55) follows PA 611 from Broad Street and Olney Avenue in Philadelphia, through Willow Grove past the NAS to Doylestown and then returns. The other route (#22) originates at Broad and Olney and follows Easton Road through Willow Grove to Street and Jacksonville Roads at NADC Warminister. Both routes offer seven day service. Plate V-A-2 illustrates bus service in eastern Montgomery county.

d) Airports

Five major airports with passenger and freight service are situated nearby; Philadelphia International Airport, Northeast Philadelphia Airport, Mercer County (Trenton, NJ) Airport, Allentown-Bethlehem-Easton Airport, and the Greater Wilmington Airport. Numerous other small aviation airports also operate within the area.

e) Port Facilities

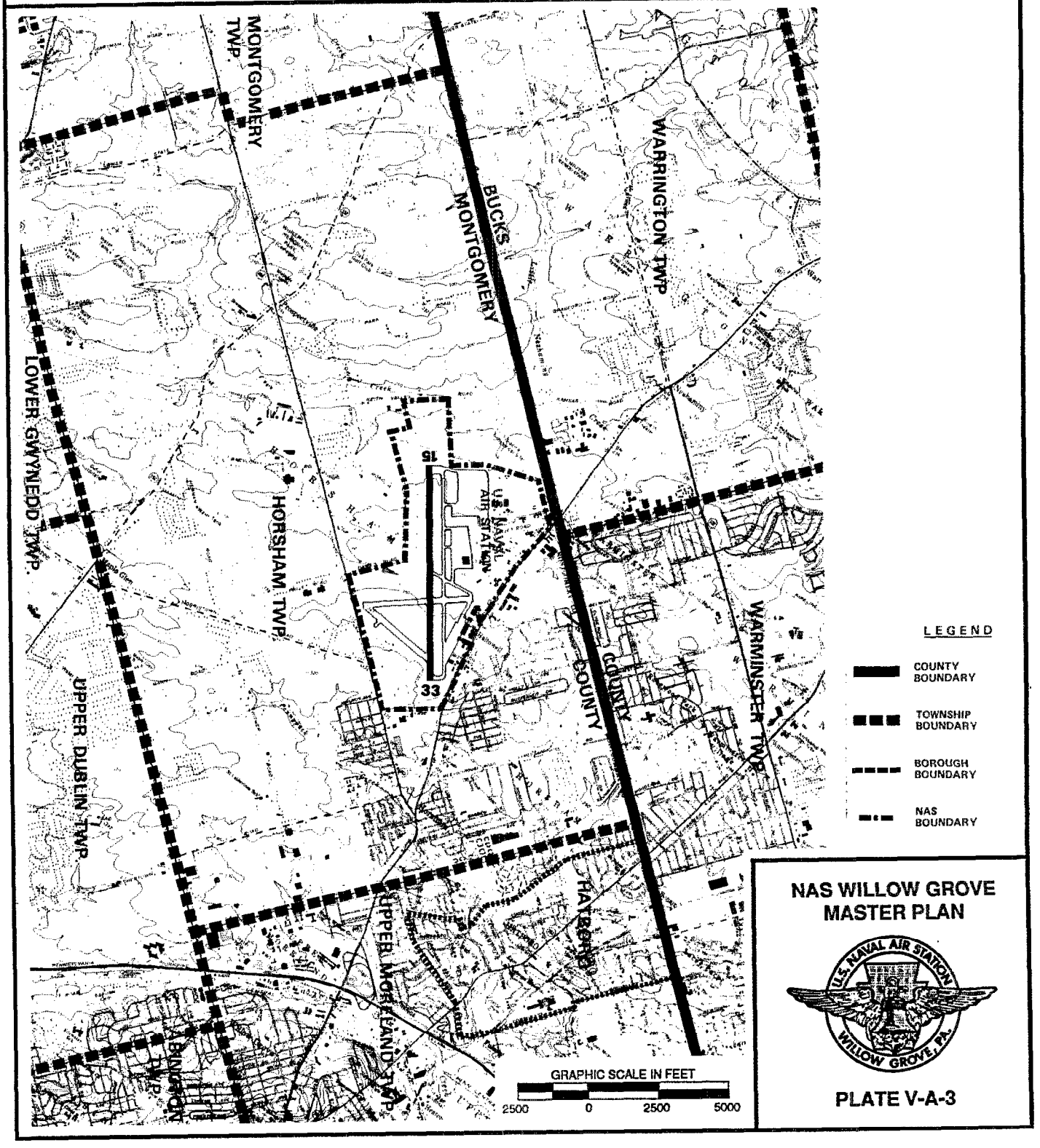
The Station lies approximately twenty-five miles from the port facilities of Philadelphia proper and other major related industries along the Delaware River. In recent years this port has competitively rated between first and third with New York and Baltimore on the east coast for tonnage shipped.

2. JURISDICTION

NAS Willow Grove is located in the central portion of Horsham Township, Montgomery County, but is just south of Warminister and Warrington Townships in Bucks County. Other nearby governmental jurisdictions, all being in Montgomery County are: Hatboro Borough, and the Townships of Upper Moreland, Upper Dublin, Lower Gwynedd, Montgomery, and Abington. See Plate V-A-3, Municipal Boundaries for locations of these townships and boroughs.

To simplify area data, most of the analysis will be restricted to the Townships of Horsham, Upper Moreland, Warrington, and Warminister within which the flight patterns, AICUZ footprint, and other interfaces occur.

MUNICIPAL BOUNDARIES



NAS WILLOW GROVE
MASTER PLAN

PLATE V-A-3

3. POPULATION

Up to 1940, Montgomery and Bucks Counties grew at a slow but steady rate, a natural, progressive expansion of the City of Philadelphia. A number of social and demographic factors influenced the outward growth of the city. The most important has been the desire of many people to leave the highly urbanized city to the more open environment within the commuting distance of work centers in Philadelphia, Allentown, Bethlehem, and Trenton. Extension of the Pennsylvania Turnpike and interstate highway systems with other regional highways supported continued expansion. The provision and extension of utility services further encouraged expanding metropolitan development.

Local population trends for the two counties around the Naval Air Station are generally expected to continue increasing, but at a rather steady rate. See Table V-A-1, Area Populations, for population projections through the year 2000.

4. HOUSING

NAS Willow Grove is geographically located near Philadelphia and hence is socioeconomically related within this region. The area surrounding the NAS is very scenic and desireable for raising families. This desirability accounts for the heavy migration of population from the metropolitan Philadelphia area into northeastern Pennsylvania.

Housing units grew in numbers by 20.1 percent and 35.1 percent in Montgomery and Bucks County respectively between 1970 and 1980. Owner occupied units reflected nearly the same percentage in both counties: 70.5 percent in Montgomery and 74.4 percent in Bucks. New private units authorized by building permits in Montgomery County from 1980 to 1986 numbered 20,297, an increase of 8.7 percent over 1980 housing stock. A similar increase of 19,086 authorized units in Bucks County was an 11.5 percent increase over 1980 housing stock.

5. COMMUNITY SUPPORT FACILITIES

a. School Facilities

Public school systems immediately around the NAS are Hatboro-Horsham, Upper Dublin, Central Bucks, and Centennial School Districts. NAS is located within the Hatboro-Horsham School District, which has a total of nine schools. For 1990, there are about 200 children enrolled as dependents of military personnel. Only about ten of these children actually live on the station; the remainder are spread throughout the community. The overall percentage of children from military personnel in the school system is about six percent, with the highest number of students at the elementary level. All of the schools are within a two-mile radius of the station, with one elementary school located immediately to the east of the station.

TABLE V-A-1

AREA POPULATIONS

Counties and Municipalities	Year 1980	Year 1970	% Change 1970 to 80	Year 2000	% Change 80 to 2000
Bucks County	479,211	416,728	15.5	550,000	15.0
Montgomery County	643,621	624,080	3.1	780,200	21.0
Warrington Twp.	10,704	7,550	41.8	15,900	48.5
Warminster Twp.	35,543	34,900	1.8	40,800	14.8
Horsham Township	15,959	13,888	14.9	21,000	31.6
Hatboro Borough	7,579	8,880	-14.7	10,000	31.9
Abington Township	59,084	63,625	-7.1	67,400	14.1
Lower Gynedd	6,902	6,361	8.5	8,900	28.9
Montgomery Twp.	5,718	3,936	45.3	10,600	85.4
Upper Dublin Twp.	22,348	19,562	14.2	26,100	16.8
Upper Moreland Twp.	25,874	24,866	4.1	29,000	12.1
Twp./Boro. TOTAL	189,711	183,568	3.3	229,700	21.1

Since a number of station personnel live at NADC Warminster, their dependent children attend schools which are in the Centennial School District in Warminster Township. At the start of the school year 1989-1990, this district included 364 students from NADC housing and another 82 students from dependents living off-base. These represented about seven percent of the school district population, with a majority at the elementary level.

The Philadelphia area boasts a large number of colleges, universities, and technical institutes. Within a five-mile radius of the station are Montgomery County Community College, Gwynedd Mercy College, and Temple University/Ambler Campus. Ursinus College is located eight miles away in Collegeville.

b. Religious Facilities

Virtually all of the predominant religious denominations are well represented throughout the local communities.

c. Fire and Rescue Facilities

All of the surrounding communities have these services, many being staffed by well trained volunteer personnel. There are three fire stations within a one-mile radius in Horsham Township, with stations also located in nearby Warrington and Warminster Townships. Due to the proximity to Philadelphia and numerous local suburbs, there is ample fire protection in the community. There is a mutual aid agreement between the NAS and local fire departments.

NAS has an inter-support agreement with the local communities for coordination of rescue units via the county radio network. Rescue services are available from several local fire departments and private ambulance companies.

d. Police and Security Facilities

The nearest local police station is in Horsham Township and is located about one mile west. The nearest police station in Warminster Township is two miles east. The Philadelphia Police Department can supplement the local police forces if necessary.

e. Hospital Facilities

Medical care available in the surrounding vicinity is extensive and of high quality, especially given the proximity of the station to numerous hospitals and medical centers in the Philadelphia area. Within a five-mile radius of the station are the following hospitals: Horsham Hospital, Abington Memorial Hospital, Huntingdon Hospital and Medical Center, North Penn Hospital, and Holy Redeemer Hospital. Among the other outstanding facilities in the Philadelphia area are those affiliated with the University of Pennsylvania and Temple University. Local ambulance service is provided by services in Warminster Township (approximately two and one half miles east) and in Warrington Township (approximately one mile north).

f. Recreation Facilities

In the immediate vicinity there are numerous recreational sites and facilities in this affluent area. There are seven golf clubs within a five-mile radius, as well as several swim clubs and tennis/racquetball clubs. Local township and county parks are close to the station for children's playgrounds, picinics, playing fields, and public tennis courts. Graeme State Park is just north of the station and Fort Washington State Park is situated three miles to the west.

The Philadelphia area is well-known for its historical and sightseeing sites. Valley Forge National Park is eight miles west of the station. Within reasonable distance for day trips are the Pocono Mountains and New Jersey shore points, including Atlantic City.

g. Historic Resources

Both Bucks and Montgomery County are rich in cultural and historic resources.

Using a recent state and local inventories of historic and architectural resources, as well as the National Register of Historic Places, sites of significance have been identified and located. There are three sites in the general region of the Naval Air Station which are listed or are considered eligible for listing in the National Register of Historic Places at this time. These include: Union Library Co., 243 S. York Rd., Hatboro; Loller Academy, 424 S. York Rd., Hatboro; and Graeme Park., Keith Valley Road, Horsham.

h. Other Support Services and Facilities

Many major shopping centers are located within a ten-mile radius of the station. These include the Willow Grove Park Mall (two miles south), Montgomery Mall (three miles west), Cheltenham Shopping Center (four miles south), and the King of Prussia Mall (eight miles west). In addition, the central Philadelphia business district is easily accessible by public transportation. The city of Philadelphia offers a range of cultural activities and is home to several professional sports teams.

6. ECONOMY

The economic foundation of the two counties and local municipalities is based on the traditional manufacturing industries of fabricated metals and machinery products, chemicals and allied products, and electrical equipment. A high, and ever increasing portion of the employed labor force is located in the "white collar" jobs of professional, managerial, sales, and clerical categories.

Current development trends are toward light manufacturing, office parks, and warehousing. Examples are the Prudential Business Campus and the Willow Grove Industrial and Office Center along PA 611 south and west of the Station.

Montgomery County is recorded as having the highest per capita income (PCI) of the five southeastern Pennsylvania counties. It is also higher than the state PCI. However, the municipalities near the NAS, while above average for the area, are mostly lower than Montgomery County. The percent change is greater for these subdivisions indicating the difference is being reduced, if not already reversed.

The local county and municipal government financial status is quite strong. Both counties and the local municipalities located north and west of the Station have considerable land resources and infrastructure systems to support controlled growth and expansion of their tax bases.

7. PLANNING AGENCIES

Four levels of planning exist in the surrounding area.

a. Local Planning

Local community plans and planning commissions focus on the local issues such as zoning, development of specific tracts of land, local land uses, the street system, industrial parks and various types of commercial land uses, sewer and water systems, community parks and recreation areas, pedestrian circulation systems, public services, routes and facilities such as schools, libraries, trash collection, etc.

The local community planning commission consists of active interested residents who are appointed by the elected municipal supervisors/ commissioners. Their occupations can be in any walk of life. They are not necessarily technically trained, and are often dependent upon professional guidance from privately contracted community consultants, and county and regional planning staffs.

b. County Planning

The County Planning Commissions and respective county development plans focus on issues that may span several municipalities such as land use development patterns, primary arterial roads, the spatial distribution of industry, major shopping centers, and water and sewer service areas.

The County Planning Commission reviews and makes recommendations to local municipalities regarding subdivision and land development proposals, comprehensive development plans, zoning ordinances, and other land use/development controls.

c. Delaware Valley Regional Planning Commission (DVRPC)

The Delaware Valley Regional Planning Commission conducts regional planning over several counties and addresses such issues as expressways, transit systems, the regional economy, business centers, and pollution control. Its' statistical base is used for planning of these facilities. It is also the A-95 Regional Clearinghouse.

The DVRPC serves to increase consistency among plans through the A-95 review process and by coordinating development in the region by planning for various aspects of development. It reviews capital improvement projects receiving federal funds.

Proposals inconsistent with regional plans have an impact upon funding potential.

d. State Planning

State Planning agencies provide guidance in coordinating inter-regional facilities such as power resources, air, rail, highway, and port systems, development and exploitation of natural resources and influence the growth and occupational expertise of human resources.

8. ZONING

The municipalities most directly impacted by the Station include: Horsham, Upper Moreland, and Warrington Townships and the Borough of Hatboro. Zoning in these municipalities provides for a range of residential development, several commercial districts, and industrial use districts. The zoning pattern for Horsham Township, which basically encompasses the Station, is illustrated on Plate V-A-4.

The approach pattern to Runway 33 is over portions of Hatboro, Upper Moreland, and Horsham which are densely developed as multiple residential, commercial centers, and small lot single family residential.

In Horsham, high density residential zones and shopping center zones are located under the primary approach-departure flight pattern of Runway 33.

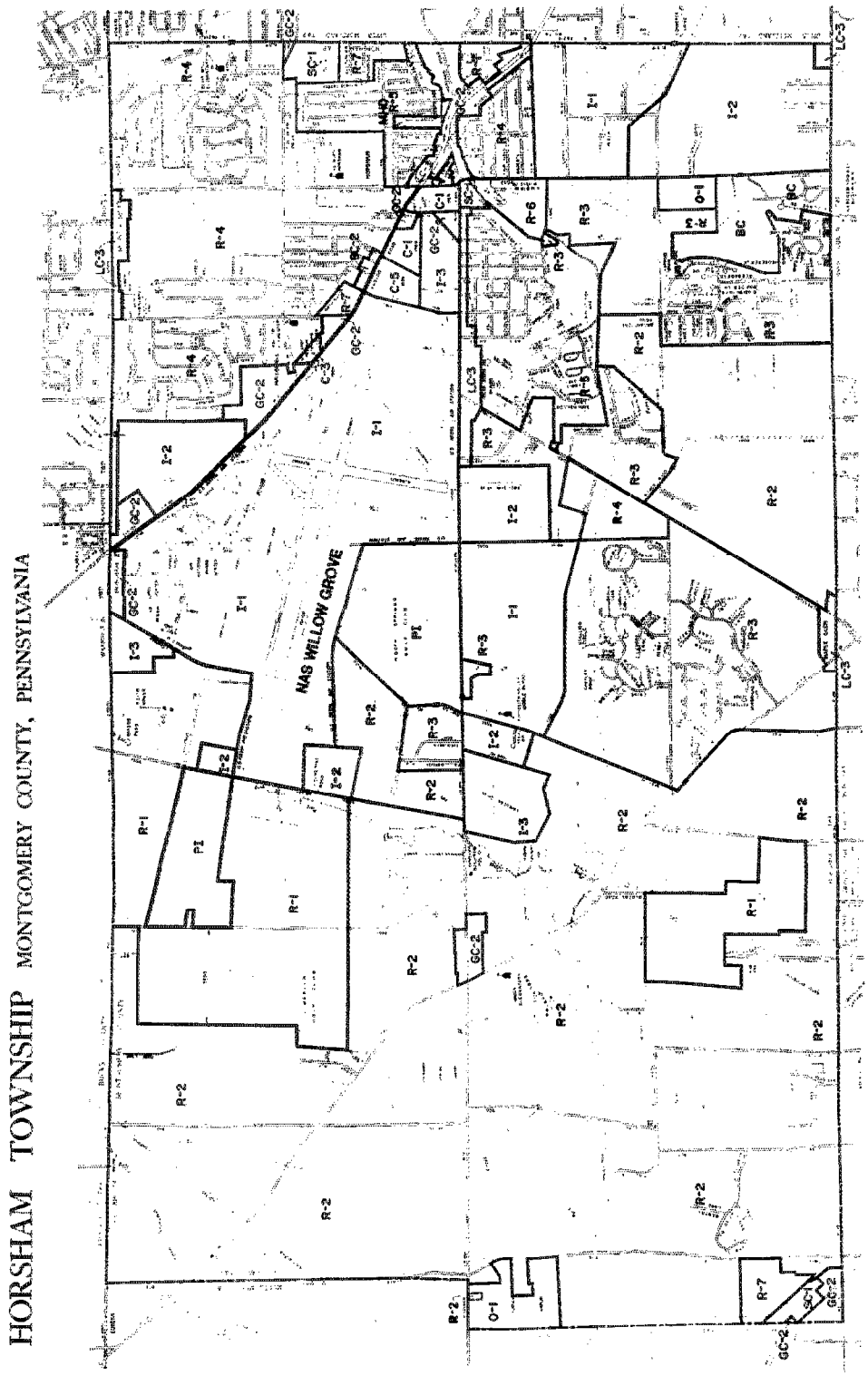
Of particular concern is the C-1 Shopping Center Districts located under the approach pattern. These districts permit restaurants, assembly halls, community buildings, indoor recreational establishments, libraries, child day-care centers, and indoor theaters - land uses which attract high volumes of people and concentrates them in one small space. These types of uses should be discouraged in any area subject to potential crashes and high noise volume. Also, the C-1 zone allows a building height of up to 65 feet. The close proximity of these zones to the Air Station present a severe problem in terms of pilot and citizen safety.

The Government is in process of acquiring much of the lands in the north and south clear zones and additional easements to the north. All of the C-5 and much of the C-1 zone and other areas have been acquired. Acquisition is focusing on precluding additional development while avoiding existing residential areas.

The flight paths from Runway 15 cover R-1 and R-2 residential zones in Horsham Township.

Flight paths also traverse areas of each industrial zoning category (I-1, I-2, and I-3) in Horsham Township.

HORSHAM TOWNSHIP ZONING MAP



ZONING CLASSIFICATION	MIN. LOT AREA	MIN. LOT WIDTH
RESIDENTIAL		
R-1	3 ACRES	250'
R-2	BOTH W & S	150'
R-3	BOTH W & S	125'
R-4	BOTH W & S	100'
R-5	BOTH W & S	80'
R-6	BOTH W & S	60'
R-7	BOTH W & S	60'
R-8	2 ACRES	125'
R-9	(PER D.U.)	5,000 SQ FT	—
R-7	5 ACRES	250'
MHP	BOTH W & S	5,000 SQ FT	50'

NOTES
- LOT WIDTH IS MEASURED AT THE BUILDING LINE
- W & S = SERVED BY PUBLIC WATER & SEWER
- D.U. = DWELLING UNIT

ZONING CLASSIFICATION	MIN. LOT AREA	MIN. LOT WIDTH
COMMERCIAL		
C-1	5 ACRES	500'
C-2	10,000 SQ FT	50'
C-3	20,000 SQ FT	100'
C-4	80,000 SQ FT	150'
C-5	80,000 SQ FT	150'
SC-1	5 ACRES	500'
GC-2	40,000 SQ FT	75'
LC-3	80,000 SQ FT	150'
OFFICE & NON-MFG		
O-1	10 ACRES	500'
O-2	4 ACRES	250'
BC	50 ACRES	500'
LIGHT MANUFACTURING		
I-1	25 ACRES	750'
I-2	4 ACRES	250'
I-3	2 ACRES	200'
P1	2.75 ACRES	200'

GRAPHIC SCALE IN FEET

2000 0 2000 4000

NAS WILLOW GROVE MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE V-A-4

In Warrington Township, the flight paths for Runway 15 cover small areas of zones RA-2, R-2, and PI-2.

Warminister Township is not involved in the AICUZ footprint. The various zones are summarized in Chapter IX, Appendix I - Zoning Classifications.

9. SURROUNDING LAND USE

Land use surrounding NAS Willow Grove can be characterized as suburban residential intermixed with commercial and light industrial uses and scattered vacant parcels. To the north, residential uses are mixed with large areas of open space, including a golf course. To the east, land uses are predominantly commercial along PA 611 with some vacant lots toward the northeast. To the southeast, the U.S. Army Reserve Training Center is located on PA 611 across from NAS. To the south, land uses aremostly residential with commercial and some light manufacturing. To the west, land remains mostly open, including a large golf course, with scattered residential and light industrial.

Warrington and Horsham Townships are expected to experience substantial growth in the years ahead. Horsham's population growth will be in the western part of the township where open land is available and sanitary services are planned. Areas to the north of the Station are mostly large vacant tracts of land, zoned low density residential. This pattern is expected to continue due to the County and Township land use plans, lack of utility services and the environmental sensitivity of the watershed. One parcel to the north was rezoned for light industry having a proposed development pattern with building and improvement restrictions and flight clearance/visibility considerations. The golf course bordering the northwest side of the Station is also zoned industrial.

10. POTENTIAL GROWTH

A number of factors are important to aid in identifying future development trends within a community or region. Some factors are easily defined since they are based on objective criteria that allow certain types of development in accordance with the suitability of a given land area. Other factors, such as economic climate, community attitudes, and development regulations are less easily identified since they are part of a dynamic, continuing process within the various communities.

Horsham Township's position is highly influenced by the Philadelphia Metropolitan area, which has grown outward to Horsham. The metropolitan development pattern has enveloped Horsham between the Philadelphia arterial corridors of State Routes 309 and 611. Suburbanization is already evident in the surrounding communities of Upper Dublin, Upper Moreland, Hatboro, Warminster, and Warrington.

Horsham's open, rural charm and character, in contrast to much of its surroundings, is more of a liability than an asset in that it provides a very attractive environment for future redisential development. This is aided and abetted by its proximity to mass transportation in Hatboro, and access to regional arterial highways and the Pennsylvania Turnpike.

Horsham is at its developmental turning point, and its rate of growth will largely depend on the regional growth pressures, the natural capability of its land, sewer and water resources, and the tenacity of the Township in its efforts to wisely steward future growth in Horsham.

11. WATER SUPPLY

The only source of water in Horsham Township is groundwater. The Township water authority maintains that geological studies indicate that there are groundwater resources that could supply five to seven million gallons per day.

12. ENCROACHMENT

NAVFACINST 11010.63C defines encroachment as "any non-Navy action planned or executed in the vicinity of a Navy/Marine Corps activity or normal area of operation which inhibits, curtails, or has the potential to impede the performance of operations." The scope of encroachment can be wide and varied and often extend well beyond the installation boundaries.

a. Community Development

When the NAS was first established, the local communities were mostly farm land with development concentrated along some of the major roads, and in the boroughs and villages located at the major road intersections. Development increased rapidly in the 1950s, through the late 1970s. It has subsequently tapered off due to economic conditions, a reduction in available lands, increasing awareness of environmental impacts, and limitations to utility services.

The Navy has consistently responded to Horsham Township regarding the constraining impact various development proposals often have against the Station. The local officials have been less than enthusiastic towards the AICUZ concept and creating compatible development through adoption of appropriate land use controls and development regulations. The reasons are many and varied including but not limited to: impact on the tax base, impact on the school system, physical separation of the community, the relative land area it occupies (10% of Horsham Township), traffic impact, noise impact and ensuing complaints, accident history, and others.

Most of the land to the north, encompassed by the AICUZ footprint is undeveloped. Much of the area is zoned for large lot single family development which is considered incompatible. One of the large parcels was rezoned for planned industrial with consideration given toward a development pattern, building requirements, site improvements, and other conditions which are favorable toward air operations. Certain agreement conditions between the developer and Navy have failed to materialize. The Government is now acquiring clear zone land areas and flight clearance easements or restrictive easements in this northerly area, where necessary.

The south clear zone is more developed and is zoned for commercial and industrial uses with some fringe areas having residential development. Acquisition has concentrated in the industrial and commercial areas which were largely undeveloped and generally more central to the clear zone. An elementary school, considered excess to the school system, was also acquired. This acquisition allows for the extension of the runway approach lighting in addition to added safety to local residents and aircrew.

At this point in time, development potential has been substantially reduced and the viability of the Station has been enhanced. Some incompatible zoning and land development plans do exist under the downwind leg of the approach pattern having a classification of Accident Potential Zone I. Other portions are being developed as office parks and light industrial areas. Still others are in ownerships that have minimal likelihood of being developed.

The Station should continue to monitor development policies, trends and community plans, and maintain a dialogue with the local officials, citizens, special interest groups, and planners to ward off further incompatible development. For instance, an increase in zoning amendments can be an indicator of the upcoming increase in land development activity which in turn could increase encroachment pressure.

b. Airspace Environment and Air Traffic Control

The airspace between 4,000 and 7,000 feet above NAS Willow Grove is contained within the Philadelphia Terminal Control Area and is utilized for arrivals and departures to Philadelphia International Airport. The NAS aircraft must obtain authorization to operate within this area regardless of weather conditions.

The Naval Air Development Center (NADC) Warminster lies approximately three miles east of NAS Willow Grove. The extended runway centerline of the NADC passes over NAS Willow Grove. Entry to the NADC traffic pattern is normally from the northwest, rotating clockwise through the southeast approach end of the runway. Traffic below 3,000 feet must receive NAS Willow Grove clearance. The NAS has control of the airspace for a distance of five miles.

Local private airports in the immediate area are Warrington, Turner, and Wings which respectively lie four miles north, three miles west, and nine miles southwest of NAS Willow Grove. Doylestown, a county airport, lies nine miles north of the Station.

The private airports do not have air traffic controllers (ATC). Although transient aircraft must receive clearance to pass through the NAS airspace, those civil aircraft can arrive and depart from the local airports without contacting the NAS air traffic control tower. Consequently, an aircraft can suddenly appear in the airspace with no warning to the high performance military aircraft crewmen or the ATCs. This seriously increases the potential of a mid-air collision.

c. Regional Airport System Plan

In 1980, the Federal Aviation Administration (FAA) granted the Delaware Valley Regional Planning Commission funds to develop a Delaware Valley Regional Airport System Plan. The study area includes parts of Delaware, Maryland, Pennsylvania, and New Jersey. It identified ninety-eight airport facilities, eight of which were publicly owned and three were military, one being NAS Willow Grove. A previous study "The Pennsylvania Statewide Airport System Plan Summary Report" also identified the NAS as a potential joint military/civilian use facility.

The study recommended: (1) which private airports should be acquired by public entities or assisted by other means in order to insure their continued operation as airport facilities and, (2) which public and private airports need facility improvements to meet the future demands of the Delaware Valley Region.

As the study evolved, representatives of the Navy attended meetings and appropriately provided inputs and review comments. The committee and planning consultants have been consistently advised that the Naval Air Station, Willow Grove is unavailable for joint use and that the study should develop a realistic plan which identifies an alternate facility that could be established or improved to provide service to this area of the region. The Township of Horsham has also opposed the joint-use concept of the study.

Reasons for opposition to joint-use of the Naval Air Station are manifold. The NAS, in response to the Pennsylvania Statewide Airport System Plan, requested the Chief of Naval Operations to comment on the position the Navy would take if a formal proposal was submitted for joint-use of the facility.

The Navy, as stated by CNO, has taken a position that it cannot support a proposal to introduce general aviation aircraft into Naval Air Station Willow Grove, based on the following principal objections:

1) Adverse impact on operational capability and flexibility.

2) Increased air traffic and resulting adverse safety impact.

3) Limited space aboard the Air Station to absorb general aviation or to provide for future expansion of military facilities as may be required.

4) Security considerations.

5) Increased noise and accident potential and the resulting adverse impact on the Station's Air Installation Compatible Use Zone (AICUZ) efforts.

6) Local community opposition to the plan.

Additionally, the NAS serves not only the Navy but also the Air Force, the Army, and the Pennsylvania Air National Guard. Furthermore, NAS Willow Grove is one of only six remaining Reserve Naval Air Stations in continental United States. They are situated to serve major metropolitan areas. NAS Willow Grove has the highest level of flight operations of the system and is a primary training facility for other Reserve Stations and their ASW long-range patrol squadrons.

In the future, the Navy should monitor the State and Regional Airport Plans and continue to state their opposition to joint-use of the Willow Grove Naval Air Station for the reasons stated in the CNO letter 05R/730468 of 20 October 1978 and any other more current reasons that may apply.

In March 1990, the Delaware Regional Planning Commission (DVRPC) published a report titled "Airspace Conflicts Analysis of Philadelphia Metro Area Airports". This report was a preliminary analysis of airspace conflicts covering the Philadelphia International Airport and twelve satellite airports. Unfortunately, this study did not recognize the impacts of the area military airports (NAS Willow Grove, NADC Warminister, NAEC Lakehurst, and McGuire AFB) on airspace conflicts. Recommendations have been made to DVRPC to prepare a second phase study to address these military airports.

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V-B. ACTIVITY DATA

1. HISTORICAL PERSPECTIVE

In 1919, an airfield was established when, under private auspices, land was purchased from four Horsham families for the creation of an airport. In the 1920's Harold Pitcairn, a U. S. pioneer in the european autogyro (forerunner of today's helicopter) began experimental operations on the site. The structure now housing Tinius Olsen Testing Company was built as part of this early operation.

In 1942, with the outbreak of World War II, the Navy acquired and expanded the 516 acre Pitcairn field to provide a separate facility for its expanding air operations. The major Runway, 15-33, remained in use; however, Runways 06-24 and 10-28 were closed to operations due to inadequate length for larger aircraft and because of surrounding community encroachment. These runways are now used as taxiways and helicopter landing pads. A large portion of today's existing facilities were constructed during the World War II era.

Formal commissioning occurred in January 1943, when the Installation was designated Naval Air Station, Horsham. Seven months later, the name was changed to Naval Air Station, Willow Grove.

In the 1950's, land acquisitions made possible the necessary end-zone clearance at the south end of the major runway. Today, it runs in a northwest/southeast direction and is 8,000 feet long. This clearance took the form of removing structures and relocating Maple Avenue.

Additional property was acquired during the 1950's until the Station expanded to over 1,000 acres. Included in that property was 161.73 acres deeded over to the U.S. Air Force on a host-tenant agreement. The Air Force maintains its own facilities and aircraft, but uses the airfield and all support facilities on a joint user basis; while the Navy controls all aircraft and furnishes fire, crash, and rescue services. An additional host-tenant agreement was signed in 1976 with the 79th Headquarters, U.S. Army Reserve Command, which has a helicopter unit located on the west end of former Runway 06-24.

During the 1970's, upon the introduction of the P-3 Orion aircraft to the Station, a major investment was made for organizational and intermediate maintenance facilities, as well as additional parking aprons. Technical training facilities were also expanded so that squadron personnel in the Reserve Program could be trained, making them technically and operationally ready to function as a unit in the event of mobilization.

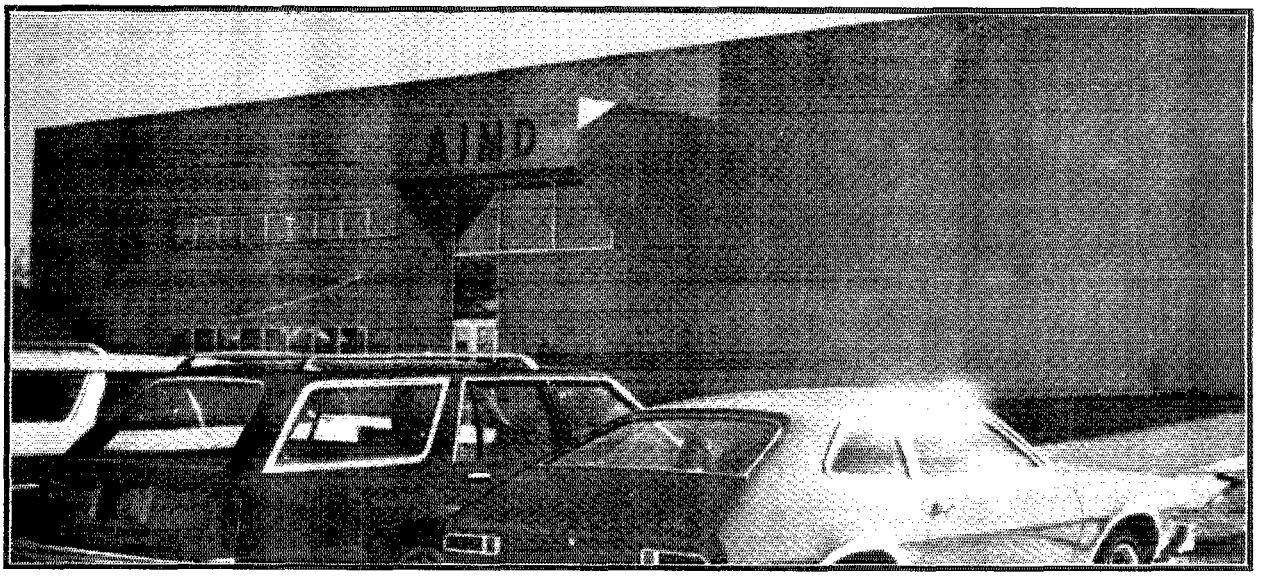
2. BUILDING AGE AND CONDITION

Upon formal commissioning of the Naval Air Station in 1943, there were some twenty (20) various structures on the Station. During the first year of operation, twenty-seven (27) new facilities were added, all of which still remain. These facilities include: Building #1, the main administration building; Building #5, BOQ; Buildings #9, #10, and #12, BEQ's; the majority of buildings south of Tinius Olsen; and Buildings #2 and #3. Buildings #9, #10, and #12 are all over forty (40) years old and are wood frame structures in generally poor condition. They have various plumbing, floor slab, and space criteria deficiencies. It should be noted that Building #12 is scheduled for demolition sometime in FY-91. A large portion of the Station's existing facilities were constructed during World War II. Prior to 1950, eighteen (18) additional buildings were completed.

During the 1950's, Runway 15-33 was lengthened to its present size of 8,000 feet, necessitating the relocation of Maple Avenue. Large aircraft parking areas, Public Works Building #78, and Hangar 80 were constructed during this period as were some thirteen (13) other facilities.

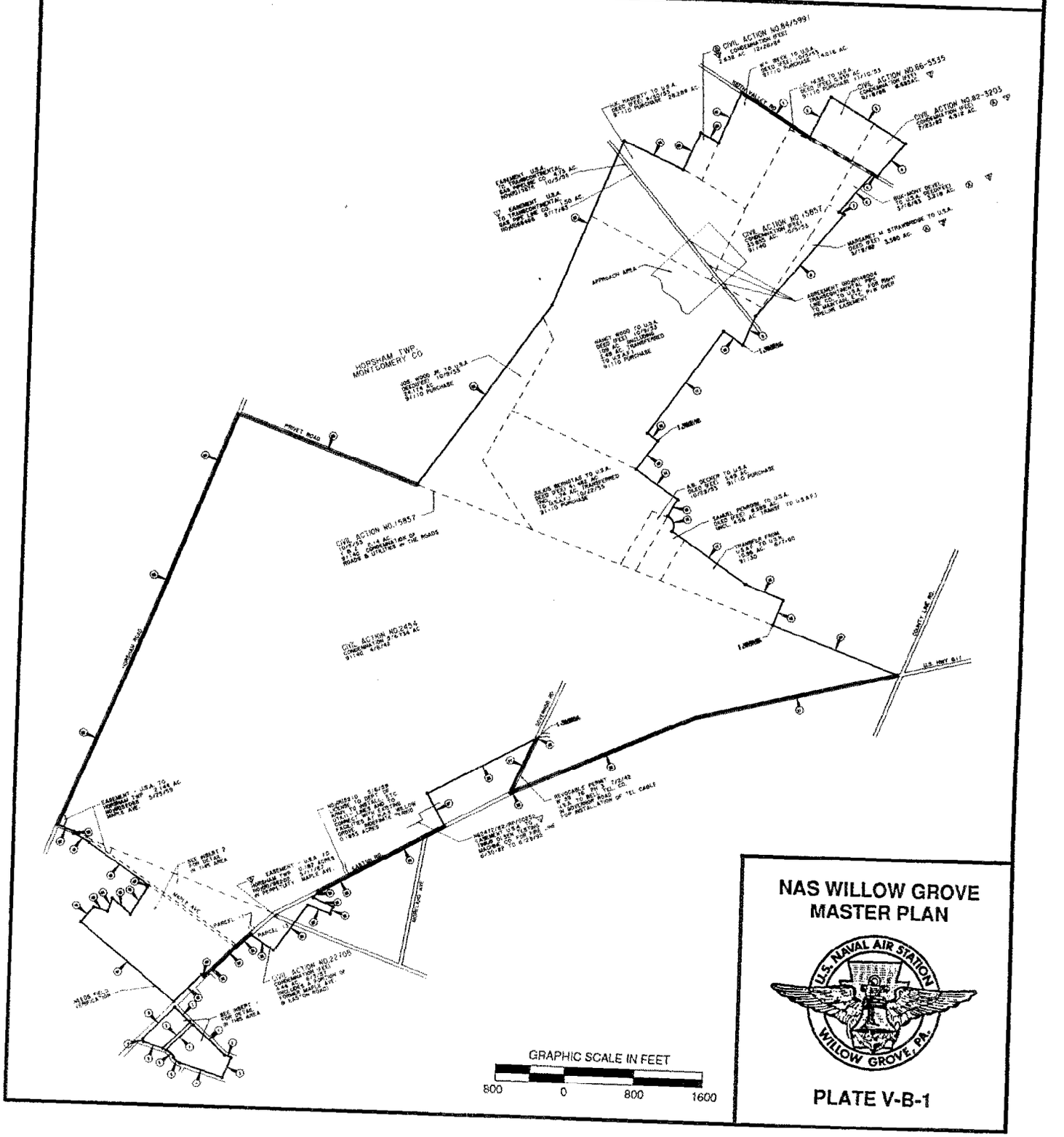
In the 1960's, there was additional construction of twenty-two (22) buildings. Today, almost all these buildings are used exclusively by the U.S. Air Force.

In the 1970's, Hangar 175, Aircraft Intermediate Maintenance Building #180, and the large aircraft parking area surrounding the two buildings and extending south were completed. Building #171, the main supply facility; Building #172, the BEQ; and the Enlisted Mens Club were constructed, along with twenty-three (23) other facilities.



AVIONICS/ENGINE SHOP, BUILDING #180

REAL ESTATE MAP



NAS WILLOW GROVE MASTER PLAN

PLATE V-B-1

The decade of the 1980's has seen the construction of several new facilities on the Station. The Bowling Alley, Building #192, was constructed along Privet Road in 1981. In 1982, a new Applied Instruction Facility was built near the Reserve ASW Training Building. The Navy Exchange, Building #605; and the Marine Warehouse, Building #606 were constructed in 1983 and 1984, respectively. Building #608, a new Firehouse was constructed adjacent to the flight line near Hangar 175 in 1987. Construction in 1988 included a new Galley, Building #609; and Bachelor Enlisted Quarters, Building #626. These facilities are located adjacent to one another near the Base Chapel.

The 1990's have already started off with the new construction. A Marine Aircraft Maintenance Hangar was completed in mid 1990 and is located adjacent to Hangar 80.

3. REAL ESTATE

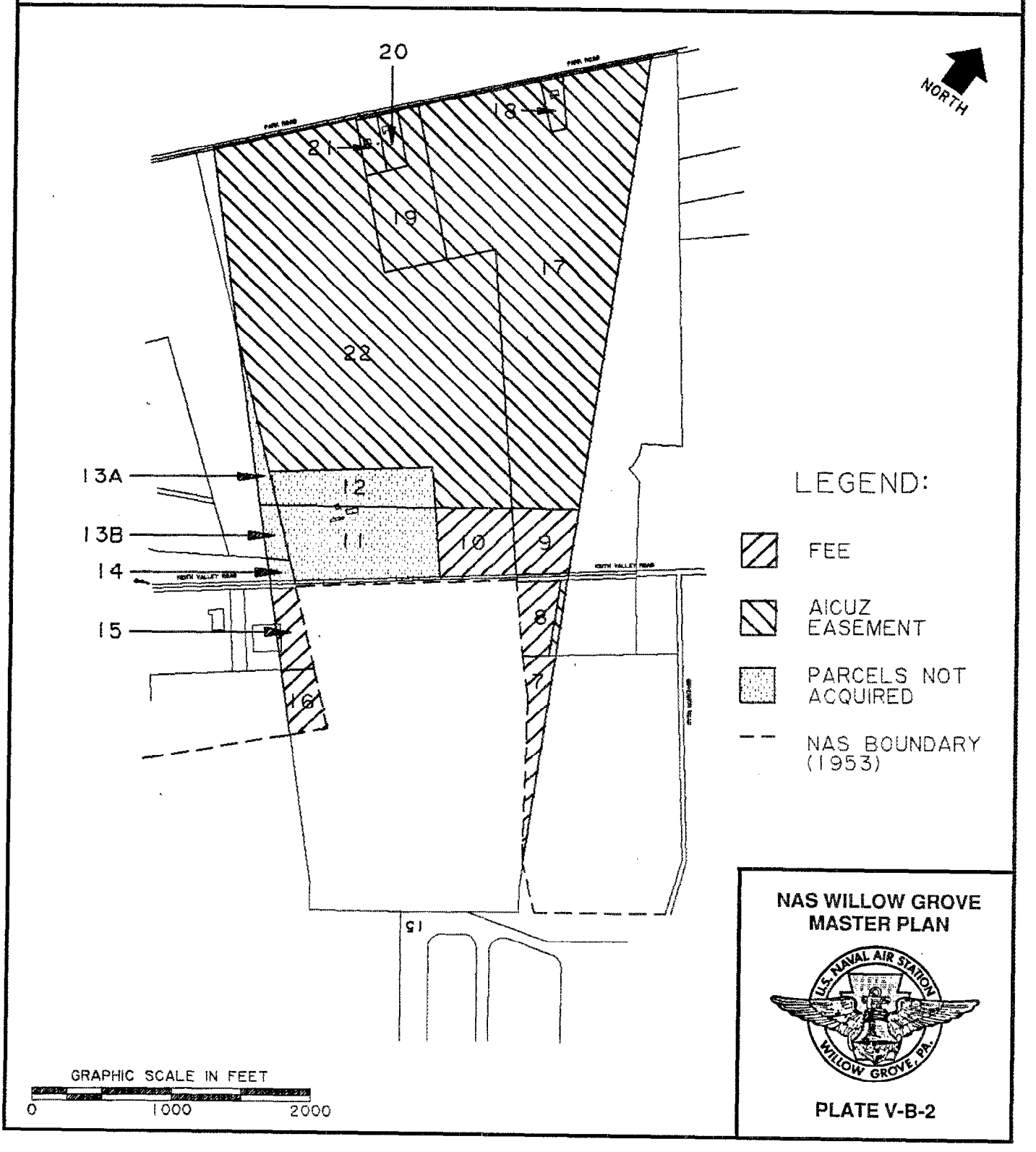
The Navy's Class I Real Property at NAS Willow Grove consists of approximately 911 acres acquired by fee or condemnation; and approximately 177.22 acres restricted by real estate agreements, easements, and other public rights held by outside organizations. Therefore, the total acreage of the Installation is approximately 1088.61 acres.

The Station was essentially acquired in four separate time periods. See Plate V-B-1. The original portion, bounded by Horsham, Privet, and Easton (SR 611) Roads was acquired in 1942. The northerly portion between Privet and Keith Valley Road was obtained in 1953 for the runway extension. In 1957, the small irregular shaped area was acquired to allow for the placement of fill material and proper grading for part of the clear zone at the south end of the runway. The action included removal of some buildings and relocation of Maple Avenue. The fourth period is presently ongoing and includes acquisition of both clear zones and easements over certain properties to the north. See Plates V-B-2 and V-B-3, Real Estate Maps - North and South Clear Zones.

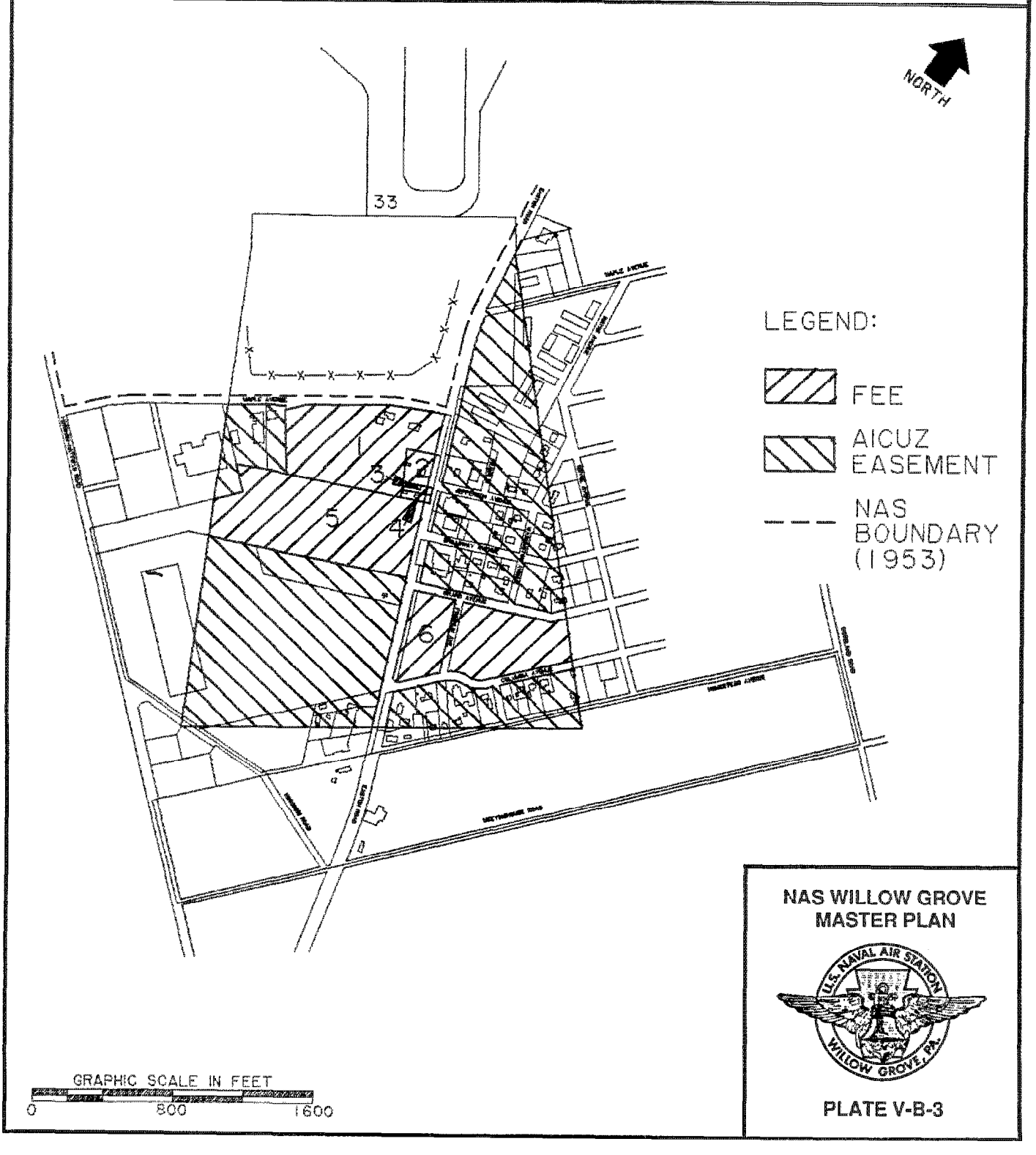
Currently, the U.S. Air Force holds 161.76 acres.

Existing easements include bordering road right-of-ways with the Transcontintental Gas Pipe Line Company, and easements with Horsham Township for use of two sections of Maple Avenue at the southeast corner of the Base. For additional information regarding easements, see Chapter V-D.

REAL ESTATE MAP - NORTH CLEAR ZONE



REAL ESTATE MAP - SOUTH CLEAR ZONE



NAS WILLOW GROVE
MASTER PLAN

PLATE V-B-3

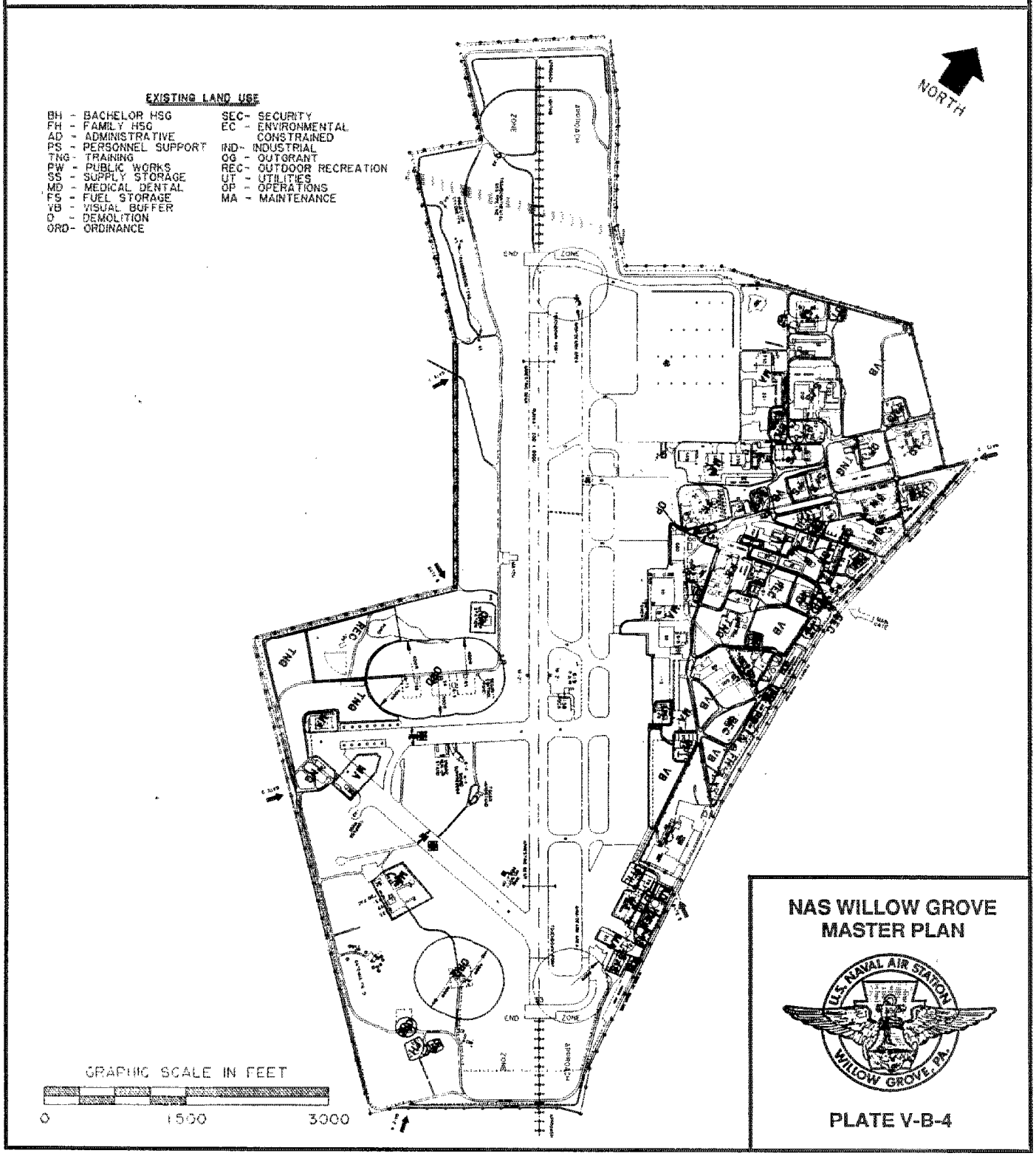
4. EXISTING LAND USE

As is normal with a Naval Air Station, the greatest portion of the land area at NAS Willow Grove is devoted to airfield operational surfaces, airfield safety and flight clearance zones, and separation spaces necessary between and around various facilities. Air traffic control, navigational aid, and electronic systems also require unobstructed line-of-sight "quiet" and interference free separation distances. Because the Station provides a Reserve Training Mission only a small area is encumbered by Ordnance Explosive Safety Quantity Distance (ESQD) Arcs in comparison to major fleet air stations. Plates V-B-4 and V-B-5 illustrates the existing land uses for the Station and developed area, respectively.

It may be useful to point out at this time that the development sequence at NAS Willow Grove has not been ideal. With a combination of operational facilities gradually intruding into the singular purpose of personnel support area that once comprised the entire northern part of the Station and the Station boundaries, most notably State Route 611, limiting growth and expansion in that direction, the normal separation between personnel support and operations is not possible. Therefore, that best that can be made of the situation is to use the fill in/demolition process, whereby the planning process attempts to place or replace required facilities as near as possible to the ideal location while acknowledging the realities of the constricted site.

CONTROL TOWER/HANGAR BLDG. 80

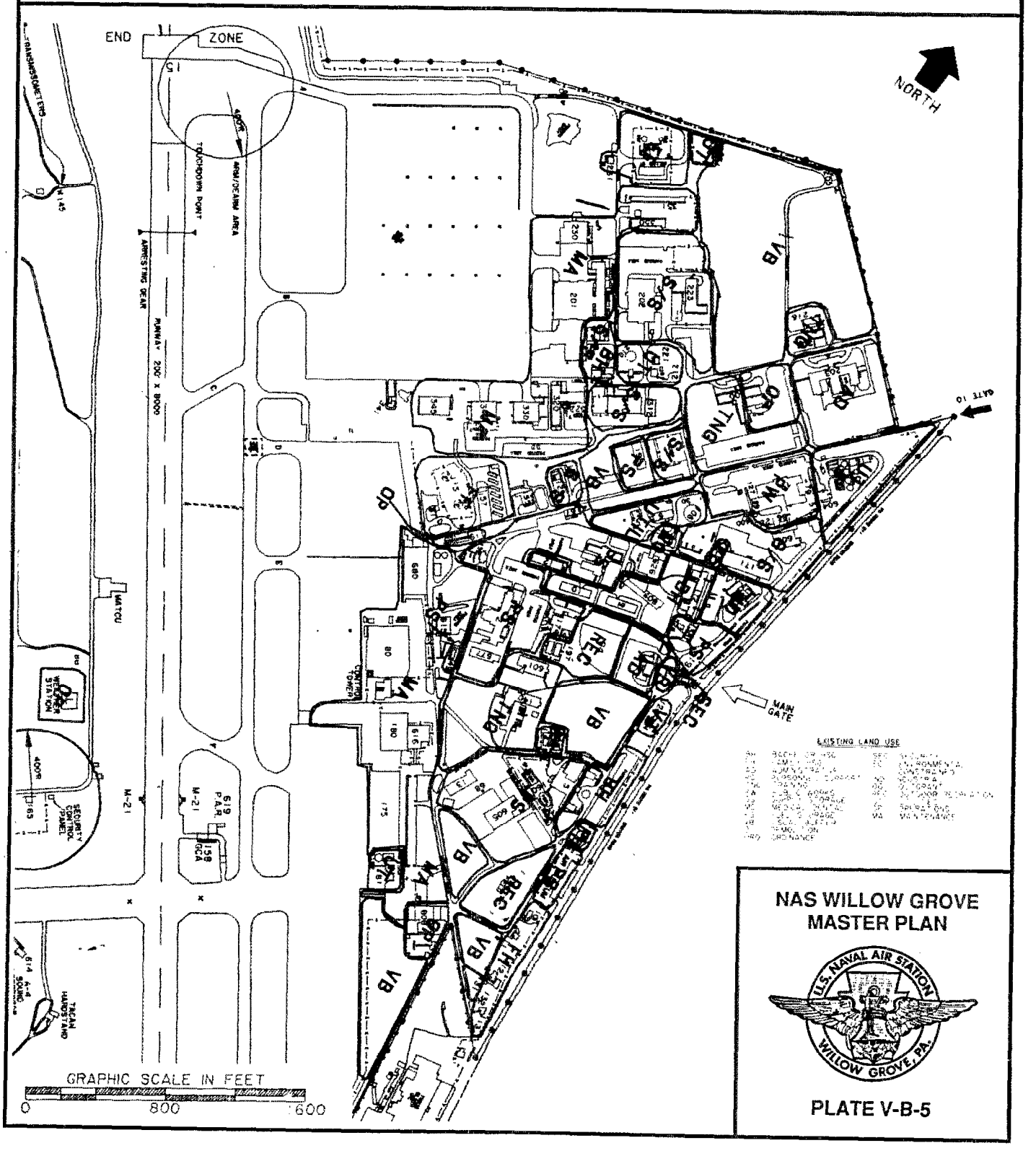
EXISTING LAND USE



NAS WILLOW GROVE
MASTER PLAN

PLATE V-B-4

EXISTING LAND USE (DEVELOPED AREA)

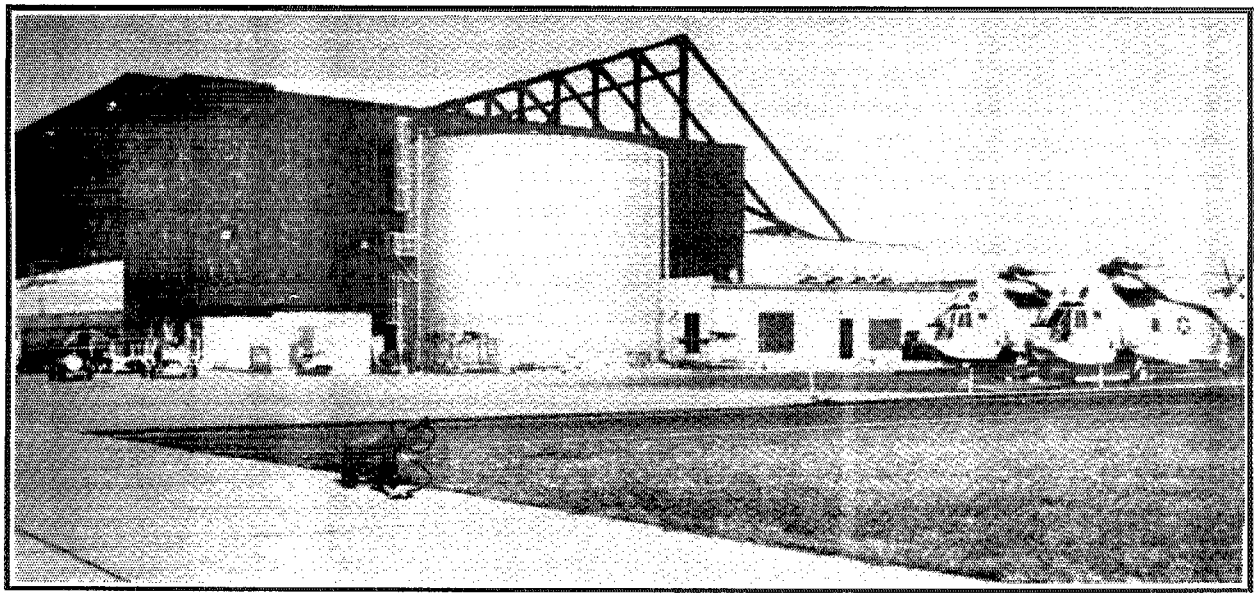


5. EMPLOYMENT CENTERS

Being a Reserve Air Station, NAS Willow Grove has a population density, employment force, and operational peaks which differ from Fleet Air Stations. Flying activity and personnel loading is greatest on weekends when the Reserve Activities fulfill their monthly drill requirements. The active duty personnel are normally on-Station Wednesday thru Sunday and with Monday and Tuesday off. Thus, most of the Station department are either closed or operate with a minimum staff on Mondays and Tuesdays. See Plate V-B-6 for weekday employment centers.

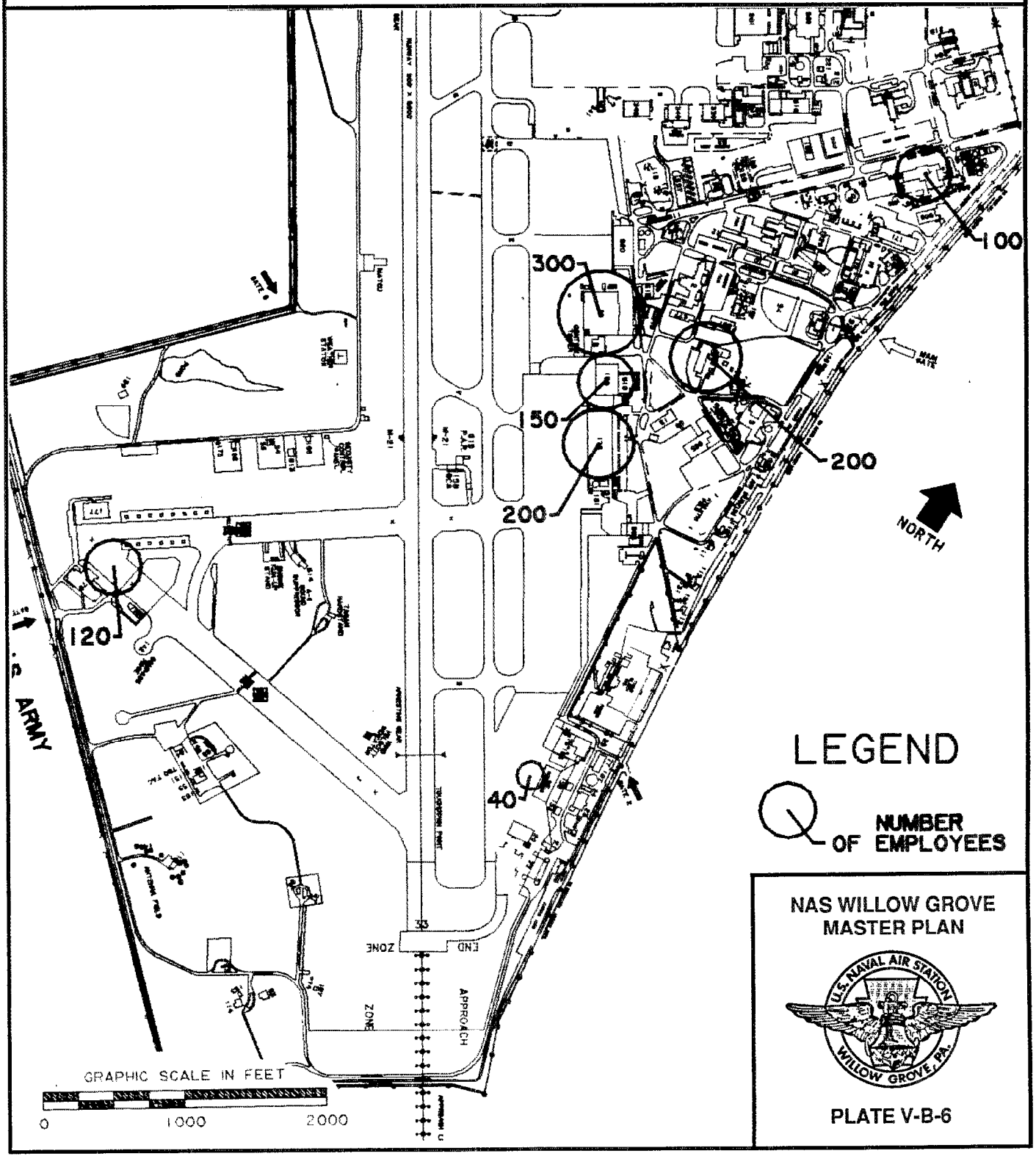
The active duty employment force is greatest in the area surrounding Hangars 175 and 80 with a population density of approximately 400 and 350, respectively. Hangar 175's employment force consists of VP-64 and VP-66 Squadrons and Reserve Training. Hangar 80's employment force consists of VR-52, HSL-94, MAG-49, various AIMD Departments, Air Operations, Reserve Training, and other various activities and functions. The next largest employment center is the Aircraft Intermediate Maintenance Department, Building #180, having approximately 250 persons. Public Works, Building #78, has a work force of approximately 100 persons. Smaller numbers of employees are scattered throughout the Base at various locations.

Due to reserve personnel, the weekend concentrations of personnel are substantially higher than those during the week. The largest increase occurs in the operational hangars. Plate V-B-7 illustrates the weekend employment centers.

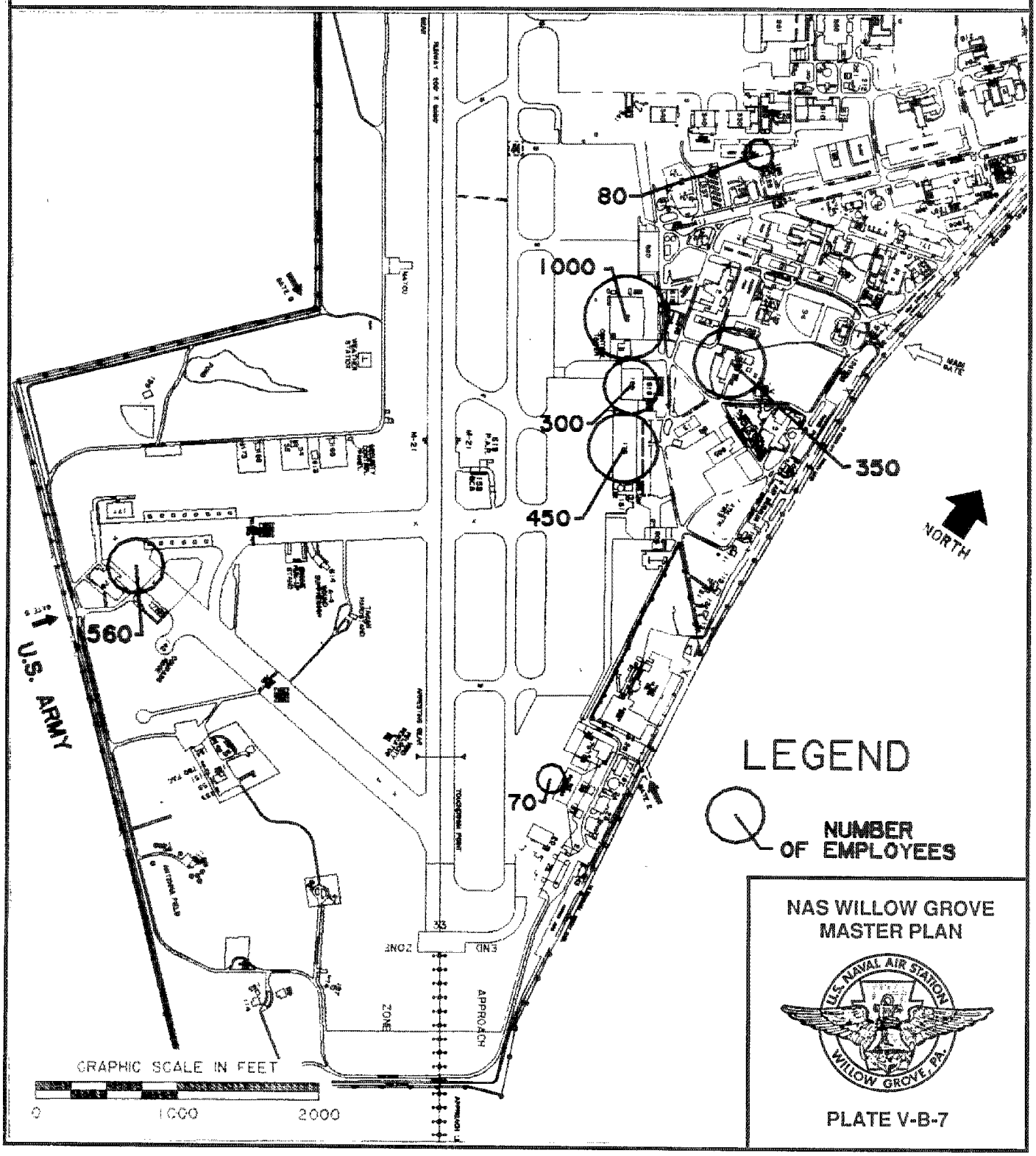


MAINTENANCE HANGAR BLDG. 175

EMPLOYMENT CENTERS (WEEKDAY)



EMPLOYMENT CENTERS (WEEKEND)



With the exception of Ground Support Equipment (GSE), the employment force is fairly stable during the day. This exception is due to the remoteness of GSE's present location, at the southeast end of the Base, with relation to the operational hangars.

Lunchtime causes a temporary interruption in the stability of the employment force. At this time, there is a mass migration of the employees to one of five (5) dining facilities located on the Station, the largest number occurring at the Enlisted Dining Facility, which also serves approximately 90% of the Air Force personnel in addition to Navy personnel.

The military population will move between their work spaces, dining facilities, Navy Exchange, and living quarters during the day. In the evening, these population centers shift to the on and off-Station housing facilities and recreation facilities.

The civilian employment force moves entirely off-Station to their domiciles, except for those employees working overtime, dependents of the military, and maintenance/watch personnel.

6. STATION ACCESS

There are four access gates to the Station: the Main, Air Force, South, and Army Reserve Center gates. These gates provide easy direct access to the public works, medical/dental, personnel support, and work areas. However, during Reserve weekends, there is a large back-up of traffic entering and leaving the Station both on Easton Road and the area surrounding theMain Gate inside the Station. On a typical weekday, observations revealed little back-up, but a queue of 14-15 turning vehicles did tax the capacity of the gate on one or two signal cycles.

The Air Force Gate is accessed from the intersection of Easton and County Line Roads and is only open from 6:45 AM to 7:45 AM, 11:30 AM to 12:30 PM, and 4:00 PM to 5:00 PM. This gate presents the greatest operational difficulties since it creates a five-legged intersection at County Line and Easton Road.

The Army Reserve Center Gate is off Horsham Road (State Route 463) and is only open on reserve weekends.

The South Gate access is on Maple Avenue and offers rush hour access only from 7:00 AM to 8:15 AM and 4:00 PM to 5:15 PM.

7. CIRCULATION AND PARKING

Circulation and parking at NAS Willow Grove are both very closely related to the location of various employment centers. Plate V-B-8 shows the existing vehicular access routes. The two basic modes of surface transportation are pedestrian and vehicular.

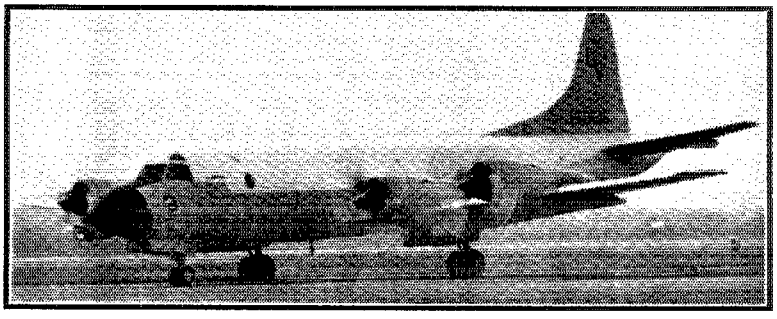
A 1983 Military Traffic Management Command Study concluded that congestion was a problem, especially around the Main Gate area. This in part is due to the proximity of the personnel support facilities, as well as the increased traffic during reserve duty weekends.

On reserve duty weekends, there is a significant back-up of traffic entering and leaving the Station at the Main Gate. These weekends also bring congestion in the areas surrounding Hangars 80 and 175, and the AIMD, where all available official and unofficial parking is often occupied.

Redesign of the Main Gate has helped to alleviate the problem of congestion. The storage capacity between the gate and Route 611 has doubled for inbound traffic and decreased the congestion for outbound traffic. A parking lot for visitors needing passes is located outside of the Main Gate. Improved traffic signs and markings have also been placed in this area.

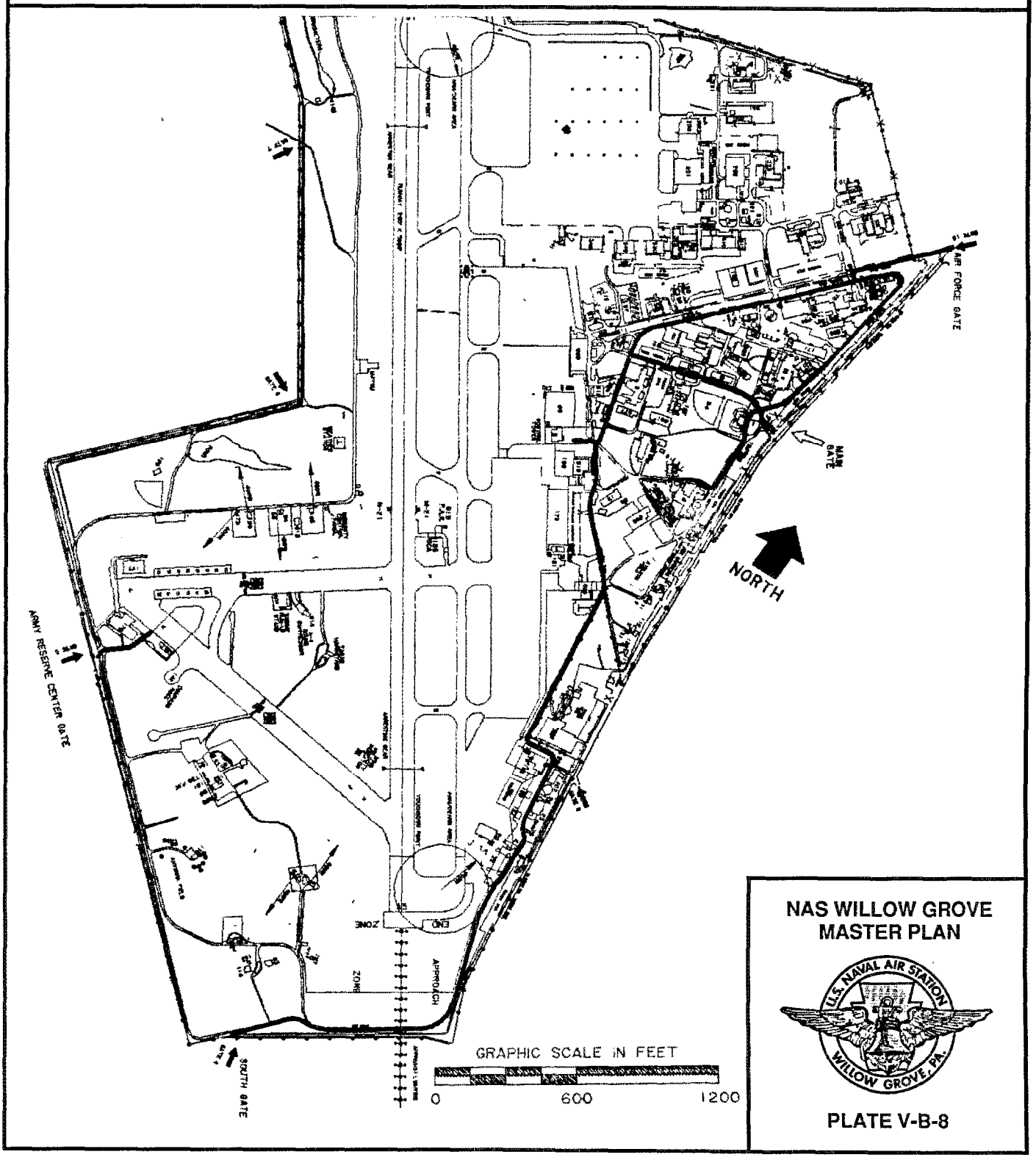
To alleviate the deficiency of parking around the bachelor enlisted quarters, enlisted dining facility, and the operational hangars, Project P-164 proposes to construct two (2) new parking lots. Plate V-B-9 illustrates the current and proposed parking capacity at the Station.

Ideally, vehicular and pedestrian traffic should occupy separate corridors and crossover conflict should be non-existent. However, this is not the case at NAS Willow Grove. Station boundaries limit the potential for Base expansion; thereby, limiting the circulation and parking possibilities. The most feasible solution to problems of congestion in circulation and parking is to optimize the use of the existing available land. Another alternative solution is to provide a remote parking area for drilling reservists and provide shuttle service to the developed core area.



NAVY P-3 ORION AIRCRAFT

VEHICULAR ACCESS ROUTES

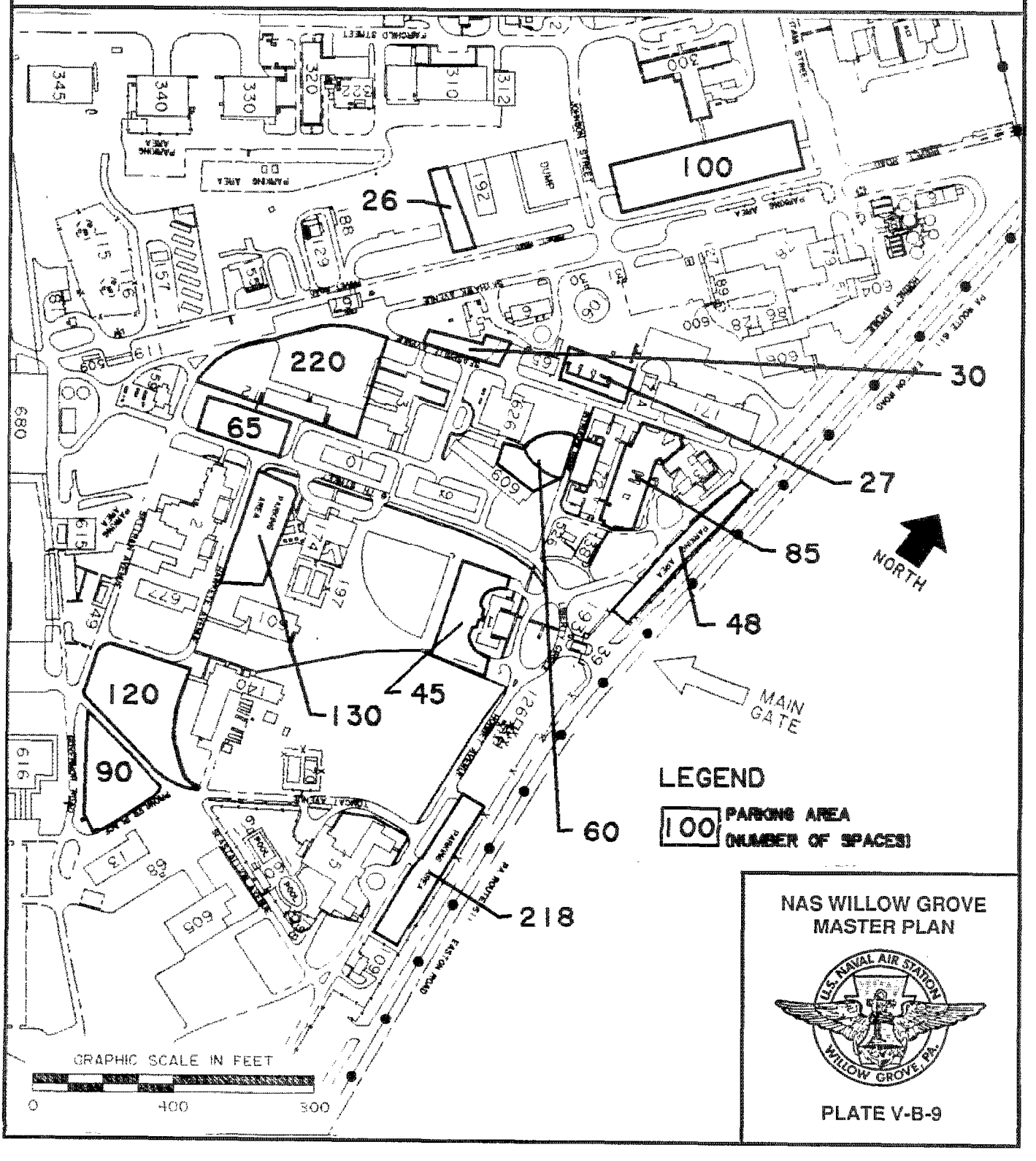


NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE V-B-8

PARKING AREAS



NAS WILLOW GROVE
MASTER PLAN

PLATE V-B-9

8. FACILITIES ANALYSIS

a. Airfield Operational Surfaces

1) History of Construction

Original construction of Runways 15-33 and 06-24 was extended with an asphalt section and a 500 foot portland cement concrete section at the north (15) end. In 1960, a portland cement concrete section was placed at the south (33) end.

The principal Runway 15-33 runs in a southeast-northwest direction and is 8,000 feet long and 200 feet wide. It is capable of landing all types of aircraft presently in operation. The cross runway 06-24 which runs in a northeast-southwesterly direction is inactive and used mainly for engine runups, taxiing, and helicopter practice operations.

Runway 06-24 and taxiway 10-28 received bituminous paving in 1980. Runway 15-33 was overlaid in 1981.

A complete history of construction and recorded maintenance is provided in Appendix J, Construction History of Airfield Operational Surfaces.

2) Airfield Pavement Survey

A survey to determine the Pavement Condition Index (PCI) was conducted on all the airfield pavements at NAS Willow Grove in June of 1988. The objectives for the condition survey were to: 1) determine present condition of the pavement in terms of apparent structural integrity and operational surface condition, 2) provide a common index for comparing the condition and performance of pavements at all air stations and also provide a rational basis for justification of pavement repair projects, and 3) to provide feedback on pavement performance of validation and improvement of current pavement design, evaluation, and maintenance procedures.

The results yielded a very good rating for the asphaltic concrete (AC) portion of Runway 15-33, and a good to very good for the Portland cement concrete (PCC) portions. In general, the other PCC areas, mostly aircraft parking, ranged from fair to excellent. PlateV-B-10 illustrates the composition of airfield types at NAS Willow Grove.

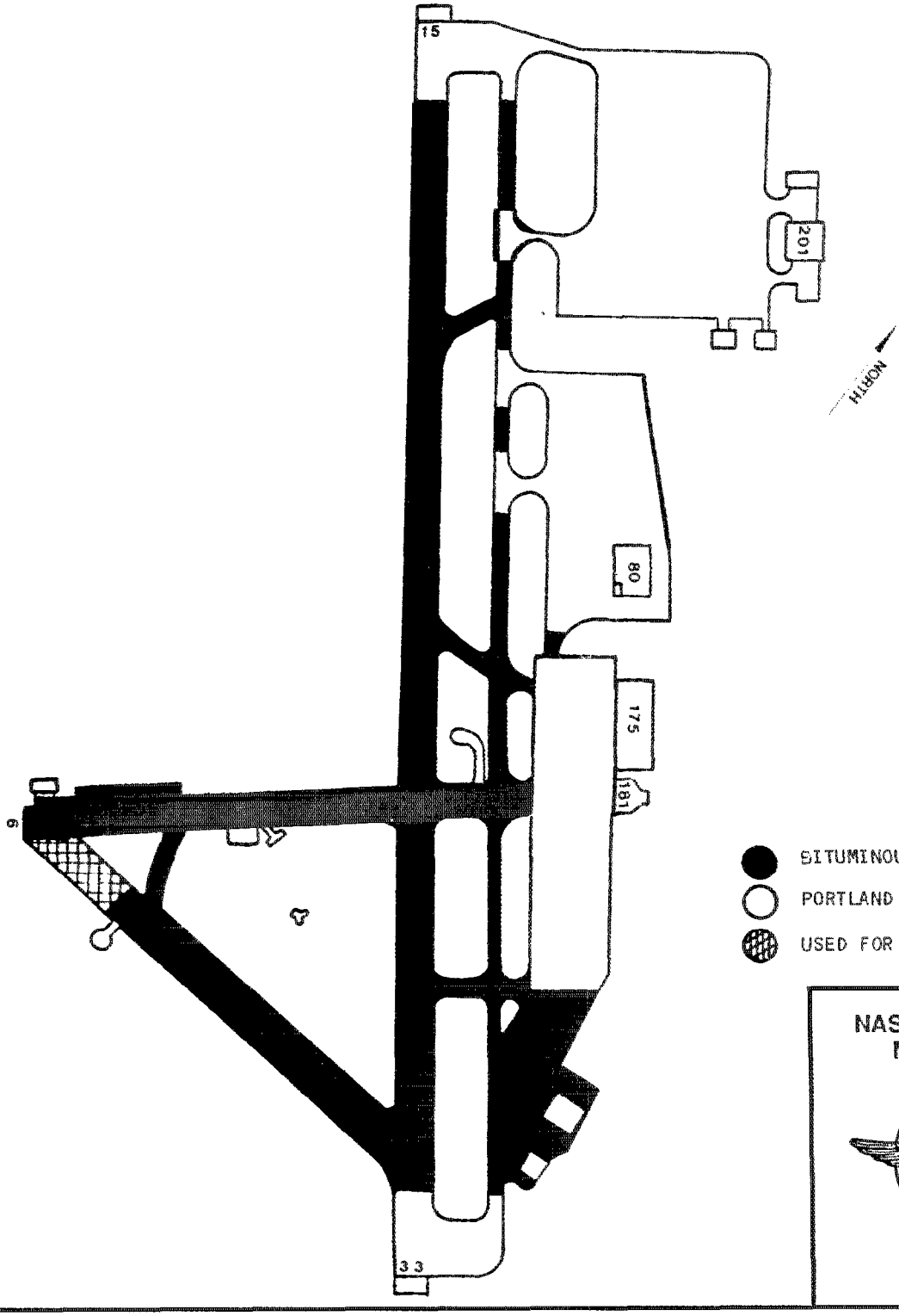
Wheel loading capacities for the airfield pavements at NAS Willow Grove are included in Appendix G, Airfield Pavement Evaluation.

3) Airfield Pavements

a) Runways

Runway 15-33 is complete and in good condition.

AIRFIELD PAVEMENT - TYPES



BITUMINOUS CONC. SURFACE

PORTLAND CEMENT CONC.

USED FOR OTHER PURPOSES

NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION
WILLOW GROVE, PA.

PLATE V-B-10

b) Taxiways

The taxiway systems are complete and in good condition.

c) Parking Aprons

The main problem with the aircraft parking aprons is lack of adequate area free of violations. The area that does exist is in reasonably good condition. The lack of adequate parking has resulted from a main runway that is basically unmoveable, a man-made boundary (State Route 611) which restricts Station expansion, and the need to place too many facilities between these two "boundaries". Consequently, the majority of the P-3 aircraft are forced to park in violation of the 7:1 transitional slope plane. Given existing constraints, there does not seem to be a feasible alternative available to alleviate this condition.

d) Helicopter Landing Pads

There are three main areas used for helicopter operations at NAS Willow Grove. The first area is located west of Hangar 80 on Taxiway 15-33. HSL-94 and HMH-772 use this area during the day and shift to the Runway 15-33 for night operations due to the availability of lighting.

The 79th ARCOM uses the one designated landing pad to the west of Runway 15-33 located on Taxiway 10-28. Also, the grass area directly between the two abandoned runways are used for skid mounted operations. Additionally, Runway 15-33 is used on an infrequent basis and during IFR conditions.

b. Aircraft Support

1) Aircraft Washrack

An aircraft washrack is located southeast of Hangar 175. It is conveniently close to the P-3 apron and taxiways.

2) Aircraft Rinse Facility

An aircraft rinse facility does not exist at NAS Willow Grove.

3) Aircraft Compass Calibration Pad

The aircraft compass calibration pad is located approximately 400 feet east of Building #176 and is in adequate condition.

4) Airfield Lighting Systems

The main runway is equipped with variable high intensity runway lights, green threshold lights, and runway end identifier lights. A problem with the runway end identifier lighting is that they cannot be controlled from the control tower and present an unavoidable distraction/glare for taxiing aircraft under certain situations.

Wave-off lights are highly desirable but presently do not exist. If the situation arose whereby a landing aircraft was in final approach and a problem arose with the UHF communication, there would be no way for the control tower to ward off the aircraft should there be an obstruction on the runway. Due to varying runway elevations, aircraft on final approach do not have a complete view of the runway.

A rotating beacon light is located on top of the water tower near Tinius Olsen.

c. Operational Hangars

Hangar 20 is located in the group of buildings south of the Tinius Olsen area. The hangar provides 01 and O/H spaces along with operational storage and PW storage. The open bay area and administrative spaces are all considered substandard due to a badly leaking roof and overall poor building condition. This hangar will be demolished in FY-92 under Special Project R20-90.

Hangar 80 is jointly occupied by VR-52, HSL-94, and AIMD. All use hangar bay, administrative, and shop spaces. Other functions housed in Hangar 80 include Air Operations Department, the photographic office, reserve administration, and the Naval Oceanography Command Detachment. All are considered adequate spaces.

Hangar 175 houses the crew, equipment, and administrative spaces for the Squadrons VP-64 and VP-66, and it is considered an adequate facility.

Hangar 680, which was completed in Aug 1990, is used exclusively by MAG-49. The location is directly north of Hangar 80.

d. Aircraft Intermediate Maintenance

A relatively new facility, Building #180, is occupied by AIMD. It is centrally located between Hangars 80 and 175. The Ordnance Shop remains in Building #29 as does the Ground Support Equipment (GSE) Shop, and the GSE holding and parking area. Building #21, in the same general area as Building #29, houses the remainder of the GSE shop spaces. Both Buildings #21 and #29 are in the building complex south of Tinius Olsen and area considered substandard due to heating, OSHA, roof, and power deficiencies. It is also located some distance from the VP and HS squadrons which rely heavily on the GSE equipment.

Hangar 20, near Building #29, houses the parachute and survival equipment shop and a small engine maintenance shop in addition to the main engine maintenance shop in Building #180. These spaces in Hangar 20 are also considered substandard due to a generally poor building condition and its location in the south clear zone.

Hangar 80 houses the airframes shop and a small avionics shop, both adequate facilities. An aviation armament shop does not exist although one is required.

e. Air Operations

Aircraft operations, weather service, and photographic spaces are located in Hangar 80.

The control tower, also located in Hangar 80, is an adequate facility with the exception of limited visibility to the area immediately south of Hangar 175.

A new air operations/air passenger terminal is under construction south of Hangar 80. It will provide adequate spaces for an air passenger and operation terminal with waiting and receiving areas, flight operations support, communications, weather, and administration.

f. Combined Structural/Aircraft Fire/Rescue Station

Recently completed Building #608 houses the structural/aircraft Fire-Rescue Station. Location of this facility is directly south of Hangar 175 and provides direct access to the operational hangars, flight line, and other Station facilities.

g. Ordnance Facilities

The ordnance operation is located in Building #29 and is considered substandard due to OSHA and roof deficiencies.

There are two main magazine areas: one is approximately 800 feet west of Runway 33 end and the other approximately 1,000 feet northeast of Hangar Building 177. The eight magazines are all adequate facilities and properly sited. See Table V-B-1. Plate V-D-8 in Section V-D illustrates the ordnance facilities on base with their corresponding ESQD arc.

For the explosive capacity of each magazine, see Appendix K, Magazine Data Report.

h. Aircraft Fuel Dispensing Facilities

The aircraft fuel dispensing facilities are located approximately 300 feet north of Hangar 680 and have direct access to the aircraft parking area. The aircraft fuel farm contains two 210,000 gallon storage tanks, #115 and #116, which are used to store JP-5.

The Navy supplies fuel for the Marine and Army aircraft, but the Air Force is independent except for emergency courtesy service.

Although the storage capacity is adequate for present and future needs, the fuel farm is currently undergoing extensive repairs. The repairs will include new fuel storage tanks, operations building, an additional truck fill stand, and reconfiguration of the fuel farm layout to provide more efficient and safer operations.

i. Liquid Oxygen Facilities

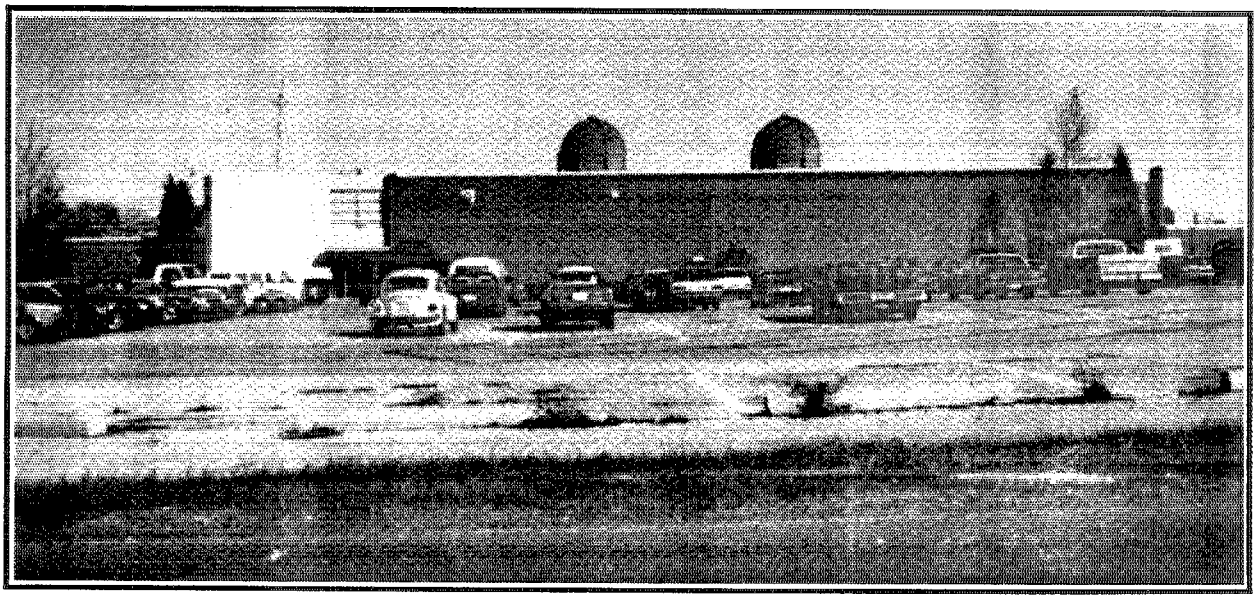
The LOX Farm is located approximately 750 feet northeast of the aircraft fuel farm and is considered adequate.

j. Training Facilities

Virtually all of the operations oriented buildings fulfill a training function when the weekend Reserves are drilling. Certain spaces however, are specifically devoted to training category codes.

The main Navy Reserve Training is located in Building #140A, with smaller areas in Hangar 80 and Building #2. The Applied Instruction Building and Operational Trainer Facility are located in Buildings #140 and #140B, respectively.

A recently completed Applied Instruction Building, #601, accommodates the Naval Air Maintenance Training Group Detachment 1010. NAMTGD 1010's mission is to train the reserve community on the P-3A/B avionics systems.



RESASWTRACEN BLDG. 140

TABLE V-B-1

ORDNANCE STORAGE FACILITIES

Bldg. No.	Ord. No.	Loc.	Size	Year Constr.	Cl/Div	Amt. Cu Ft.	Arc[1] Feet	Remarks
87	1Y2B	H 25	6x8x8	1956	1.3	288	400	Pyro/Fuses VP-66
	1Y2A				1.4	288	100	Small Arms EOD
88	1Y1A	H 25	6x8x8	1956	1.4	288	100	Small Arms PA ANG
	1Y1B	H 25			1.3	288	400	Pyro/Fuses PA ANG
25	1YC1A	H 27	12x4x7	1942	1.4	252	100	Small Arms
	1YC1B	H 27	18x12x7		1.4	1,134	100	Small Arms MAG 49
173	2HC4	N 18	10x10x8	1974	1.3	525	400	Chemical (grenades) Designation - Fuse and Det. Mag.
166	1NC2	N 19	25x50x10	1968	1.3	125 K HE	400	Semi Fixed Projectiles Rocket Motors
54	2YC3A	M 19	49x14x8	1944	1.4	4,116	100	Small Arms
55	2YC3B	M 19	49x14x8	1944	1.3	4,116	400	Pyro
165	INC1	L 18	25x50x10	1968	1.3	7,500	400	HE/Inert Material

(1) ESQD Arcs reflect designated mobilization loading, not necessarily present day use.

k. Maintenance Facilities - Automotive Vehicle and Public Works

The Public Works compound contains the majority of the Public Works facilities and is located in the northern triangular area of the Station. Building #78 is the primary Public Works shop.

A fuel storage tank, #130, has a capacity of 10,000 gallons and is located near the Public Works compound.

l. Supply and Storage

Virtually all of NAS Willow Grove's departments, tenant activities, and assigned squadrons are supported in some capacity by the Supply Department. Supply facilities, spaces, and areas occur throughout the Station, some being on the plant account of the Supply Department, while others are the responsibility of the receiving activity/department. Those facilities/areas used by the Supply Department are addressed in this section. Those activities/departments having self-contained supply deficiencies are addressed in that respective section.

Building #171/171A accommodates the supply/comptroller administrative functions and the general warehouse space. It is an adequate facility.

Buildings #119 and #600 house the Hazardous/Flammable storage, both adequate facilities.

m. Medical and Dental Facilities

The Medical and Dental Clinics are located in Building #137. It is well sited but lacks a fire protection system, has a very poor interior layout, and has heating deficiencies. It is in general a cramped, substandard facility.

DISPENSARY BLDG. 137

n. Administrative

The Command Headquarters for NAS Willow Grove is located in Building #1, an adequate facility.

The Pass and Personnel Support System (PASS) Detachment office, occupies recently constructed Building #677. This facility provides space for the following mission related PASS functions: (1) Administration, (2) Educational services, (3) Source Data System (SDS) CRT terminal area, and (4) a customer service counter. The PASS office maintains the pay and personnel records, disbursing, and travel and transportation services.

Other administrative spaces occur about the Station in direct support of various functions and departments.

o. Housing Facilities

Housing assets include family housing quarters, bachelor officer quarters (BOQ), and bachelor enlisted quarters (BEQ).

1) Family Housing Assets

The Naval Air Station, Willow Grove is included with NADC Warminister and ASO Philadelphia in the area Navy Family Housing Complex. Assets throughout the North Philadelphia Complex area are combined and are available for use by the three activities. These include Station housing (on-base) and non-military controlled (private) housing.

NAS Willow Grove has six units, all officer quarters, located on Station. NADC Warminister has the largest portion of on-base housing, 207 units of which 199 are for enlisted personnel.

At present, the Navy has not established any housing leases in the local community.

2) Bachelor Officer Quarters (BOQ)

This function is located in Building #5. The W-1/O-2 and O-3 and above are considered inadequate due to roof and air conditioning/environmental control system deficiencies. The Commissioned Officer Mess, Open, which is also located in Building #5, is considered adequate.

3) Bachelor Enlisted Quarters (BEQ)

A summation of Station BEQ assets are as follows:

Bldg. #	CCN	BEQ	#MN	Condition
9	721-11	E-1/E-4	88	I
10	721-11	E-1/E-4	72	I
12	721-12	E-5/E-6	155	I
12	721-13	E-7/E-9	20	I
172	721-11	E-1/E-4	100	A
172	721-12	E-5/E-6	34	A
172	721-13	E-7/E-9	5	A
609	721-11	E-1/E-4	124	A
609	721-12	E-5/E-6	53	A
609	721-13	E-7/E-9	19	A

These facilities are well grouped and properly located in relation to the dining facility, Building #626, enlisted club, employment centers, and most other supportive facilities.

Buildings 9, 10, and 12 are all over 40 years old and WWII wood frame structures in generally poor condition. They have plumbing, floor slab, and space criteria deficiencies. Building #172 is fuly adequate as well as recently constructed Building #609.

p. Community Personnel Support Facilities

This section addresses the authorized Peronnel Support Services (CCN 730 series) and Morale, Welfare, and Recreation (interior and exterior) Facilities (CCN 740 and 750 series) except in the following instances:

1) Fire Station - see Fire and Rescue Station in Air Operations and Facilities.

2) Exchange Cafeteria - see Food Services/Club Facilities.

3) 740-63, Enlisted Men's Club - see Food Service Club Facilities.

Any item not addressed was not listed as a Basic Facility Requirement. A brief analysis follows for each of existing adequate and deficient items:

CCN 730-20, Police Station - Located in Buildings #1, near the main gate, the Police Station is operating out of the second floor which is considered inadequate due to functional deficiencies.

CCN 730-25, Gate/Sentry House - Located in Building #39, it is adequate and properly located.

CCN 730-66, Personnel Weather Shelters - Located in Building #193, it is adequate and satisfies all requirements.

CCN 730-77, Personnel Support Storage - Currently located in Building #19, it does not satisfy the entire requirement.

CCN 730-83, Chapel - Located in Building #38, the Chapel is totally adequate and convenient for use by both on and off-base personnel.

CCN 730-84, Religious Education Building - This required facility does not currently exist.

CCN 730-85, Post Office - Currently located in Building #2, it is an adequate but undersized facility.

CCN 740-01, Exchange Retail Store - Located in Building #605, this recently constructed facility is adequate.

CCN 740-03, Exchange Central Administration - Currently located in Building #2, it is inadequate due to functional and design criteria deficiencies.

CCN 740-09, Exchange Service Outlets - Previously in Building #2, these outlets were recently relocated to the new Exchange, Building #605. The only other outlet, a minimart, is in Building #167 and is totally adequate. The package/liquor store is located in Building #2.

CCN 740-16, Exchange Maintenance Shop - This required facility currently does not exist.

CCN 740-19, Credit Union - Located in Building #2, the Credit Union occupies adequate space which satisfies the requirement.

CCN 740-25, Family Services Center - This function is located in Building #2, occupying adequate space.

CCN 740-29, Area/Regional Exchange Administration Building - This function is located in adequate spaces of Building #2.

CCN 740-30, Exchange Auto Repair Station - This function currently operates out of Building #159. It is located behind the new Marine Aircraft Hangar.

CCN 740-32, Exchange Self Serve Car Wash - The car wash is located outside of Building #13. The existing area needed indoors to store equipment and supplies is adequate.

CCN 740-34, Thrift Shop - This facility is currently located in Building #2 and is considered adequate.

CCN 740-36, Hobby Shop, Arts/Crafts - Building #13 houses this function in an adequate area.

CCN 740-37, Special Services Issue Office - This function is currently split between Buildings #2 and #5. Building #2 is adequate while Building #5 is badly located and considered inadequate. Building #75 is a storage facility for boat rentals and considered adequate for its functional use.

CCN 740-38, Automobile Hobby Shop - Prevoiusly located in Building #23, this function has been relocated to Building #13, the former Fire House. It is an adequate facility.

CCN 740-40, Bowling Alley - Building #192 which was recently completed, fully satisfies this requirement.

CCN 740-43, Gymnasium - Building #2 houses the main gymnasium and is considered substandard due to plumbing and piping deficiencies.

CCN 740-55, Youth Center - This facility is currently in adequate space of Building #3.

CCN 740-56, Theater - This required facility does not, at present, exist. The Air Force auditorium is jointly used for this function.

CCN 740-74, Child Care Center - This function is currently located in Building #3 and the space is adequate for all child care needs.

CCN 740-76, Library - Located in Building #2, it is considered adequate.

CCN 740-78, Recreation Pavillion - Located on the east side of the Base adjacent to the playing field, Building #199 provides an adequate, covered area for recreation and picinics.

CCN 740-84, Indoor Playing Courts - Two indoor playing courts are scheduled to be constructed between the two wings of Building #2.

CCN 740-85, Exchange Central Warehouse - Located in Building #22, this adequate space satisfies all requirements.

CCN 740-86, Exchange Installation Warehouse - Located in Building #605, this recently constructed facility is adequate and satisfies all requirements.

CCN 740-89, Bathhouse - This adequate but undersized facility (Bldg. #160) is properly located beside the outdoor swimming pool.

CCN 750-10, Playing Courts - The Station has four outdoor tennis courts; two located behind the Pitcairn Club (facilities #197) and two near the BOQ (facilities #170).

CCN 750-20, Playing Field - There are currently three playing areas; one baseball field located behind Building #1, a combination baseball/football field east of Building #110, and a baseball field located on the east side of the Base by the recreation pavillion.

CCN 750-30, Outdoor Swimming Pool - There are two outdoor pools on the Station (#90 and #161), both located behind Building #5. Facility #90 (30 meters) is considered substandard with totally deteriorated plumbing. Facility #161 is considered adequate although it has a stabilization problem.

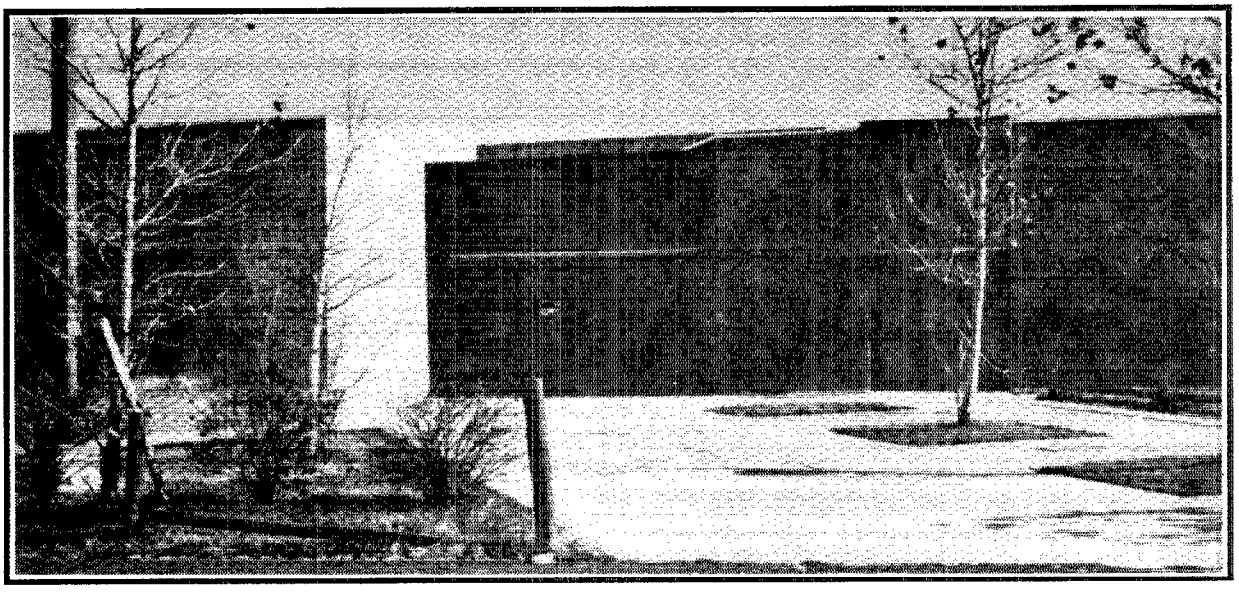
CCN 750-34, Wading Pool - This adequate facility (#198) is located adjacent to the swimming pools.

q. Food Services/Club Facilities

This section is an analysis of the combined food services and club facility system on the Installation.

CCN 722-10, Enlisted Dining Facility - This function is located in recently constructed Building #626. The facility is properly located adjacent to the enlisted barracks and satisfies all requirements.

CCN 740-04, Exchange Cafeteria - Although numerically required, it is not considered to be justifiable.



ENLISTED CLUB BLDG. 174

CCN 740-05, Exchange Snack Stand - There are three snack stands located on Base. Buildings #49, #605, and #625 are all adequate.

CCN 740-60, Commissioned Mess, Open - Located in Building #5, it is considered adequate.

CCN 740-63, Enlisted Men's Club - This function is located in Building #174, the Pitcairn Club, which was recently built and is fully adequate. It serves grades E-1/E-9.

9. UTILITIES

a. Electric Power and Distribution Systems

A single 34.5 KV primary service connection from Philadelphia Electric Company with a capacity of 10,000 KVA supplies the NAS Willow Grove's main 5000 KVA, 34.5 KV/2400-4,160 Volt wye, 55 C OISC continuous rated transformer. The primary supply coming in to the main gate substation is considered reliable and in good condition. See Plates V-B-11a and V-B-11b for the location of the primary electrical distribution system at NAS Willow Grove.

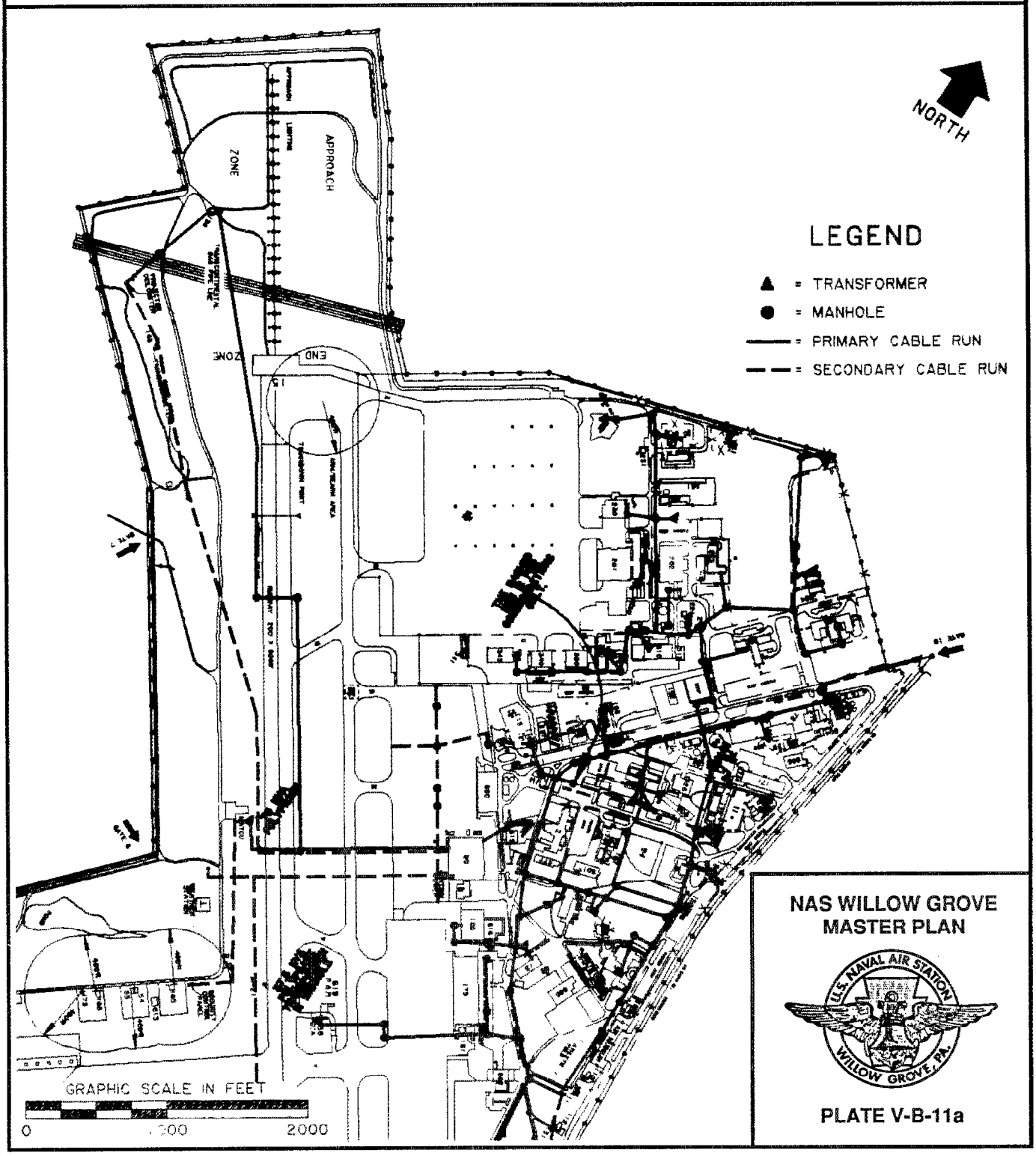
A second connection from the Horsham Road supplies 4,160 Volt power from the Philadelphia Electric Company to the MATCS-48 site and the transmitter/receiver Building #118. A 225 KVA transformer steps down the 4,160 volts to 120/208 volts. The condition and capacity of this installation are good and adequate.

A third Philadelphia Electric Company connection from the Horsham Road supplies electric power to the Army Reserve Center. The 13.8 KV overhead feeder supplies a 1000/1150 KVA - 1120/1288 KVA at 55 C - 65 C, 13.2 KV/480-277 Volt Westinghouse Inerteen Transformer serving buildings 176-177-178. Its condition and capacity are adequate, but it contains PCB fluid.

Various other Philadelphia Electric Residential Services at 120/240 Volts serve the south gatehouse, the Officers Quarters, the Marines, and the base sign. These minor loads are metered directly by the utility company. The Air Force Facility is fed from the main substation as a tenant of the Navy.

The electric power distribution system is considered to be in fair condition. Some improvements are required to improve the quality and reliability of the equipment. Eight radial feeders, which are regularly upgraded in size and replaced as required, distribute power at 2400 volts from the main substation to various load centers.

PRIMARY ELECTRICAL DISTRIBUTION SYSTEM - NORTH

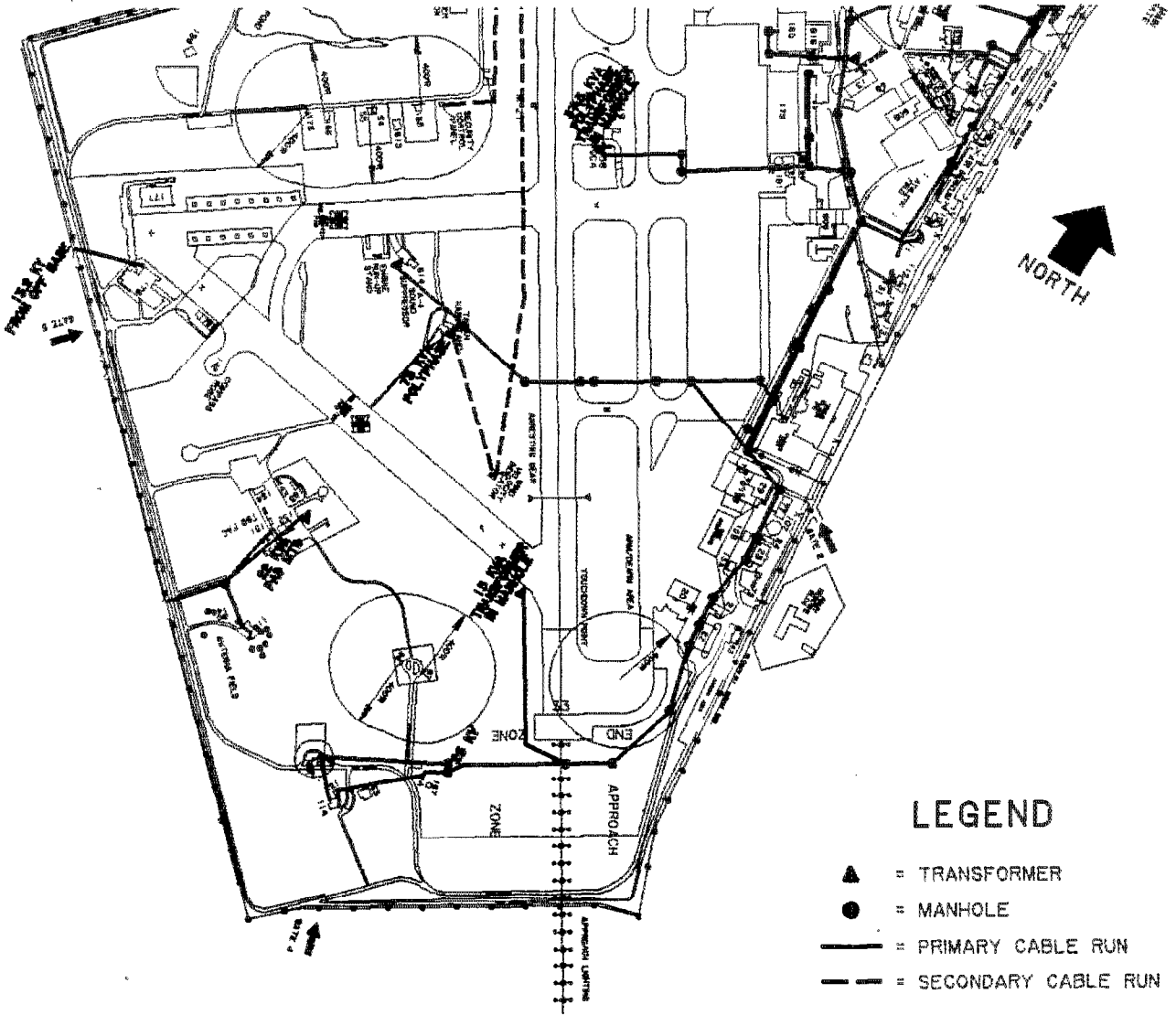


NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE V-B-11a

PRIMARY ELECTRICAL DISTRIBUTION SYSTEM - SOUTH



GRAPHIC SCALE IN FEET

0 1000 2000

NAS WILLOW GROVE MASTER PLAN

PLATE V-B-11b

b. Steam Production and Distribution

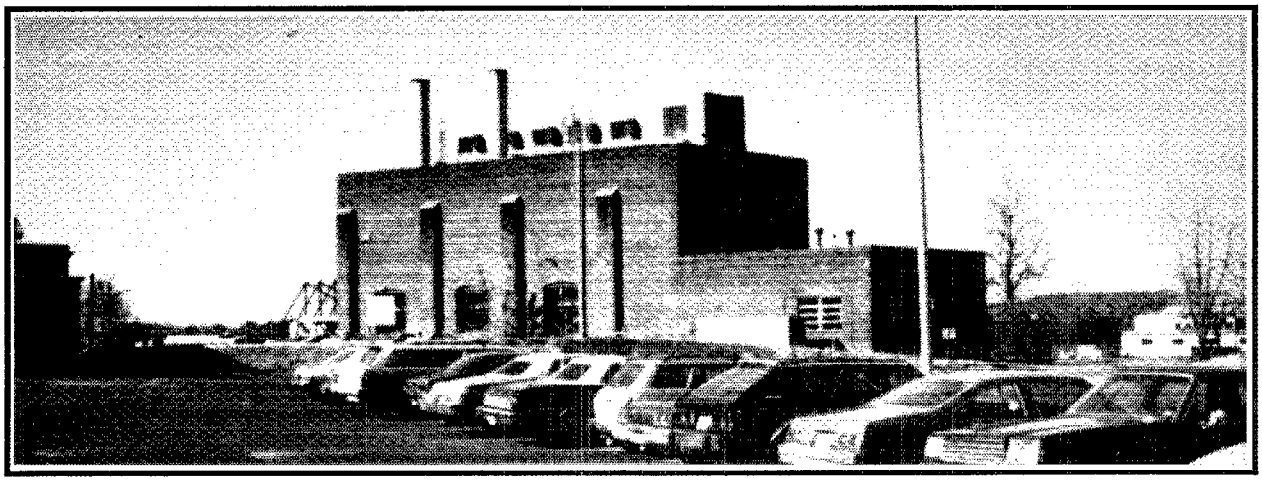
The main steam plant, Building #6, contains two Keeler water tube boilers each with rated capacity of 35,000 lbs/hr. These boilers operate at 15 psig and burn natural gas when the outdoor temperature is above 32 degrees Fahrenheit and #2 fuel oil when the outdoor temperature is below 32 degrees Fahrenheit. Both boilers were installed in 1970 and are in good condition.

The condition of the main steam plant distribution and condensate return system is good. The majority of the piping was replaced approximately eight years ago and the condensate receiving stations have either been recently replaced or are being replaced as funds become available. Condensate return to the main steam plant has increased from approximately 40% to 70% in the past several years. The capacity of the main steam plant distribution and condensate return system is adequate for the present and foreseeable future needs of the Station.

The south end steam plant, Bldg. #15A, contains one Sellers boiler and one Clayton boiler (used as standby) each with a rated capacity of 6,900 lbs/hr. These boilers operate at 50 psig and burn #2 fuel oil. The Sellers boiler was installed in 1982 and is in good condition. The Clayton boiler, installed in 1977, is in poor condition and is scheduled to be replaced.

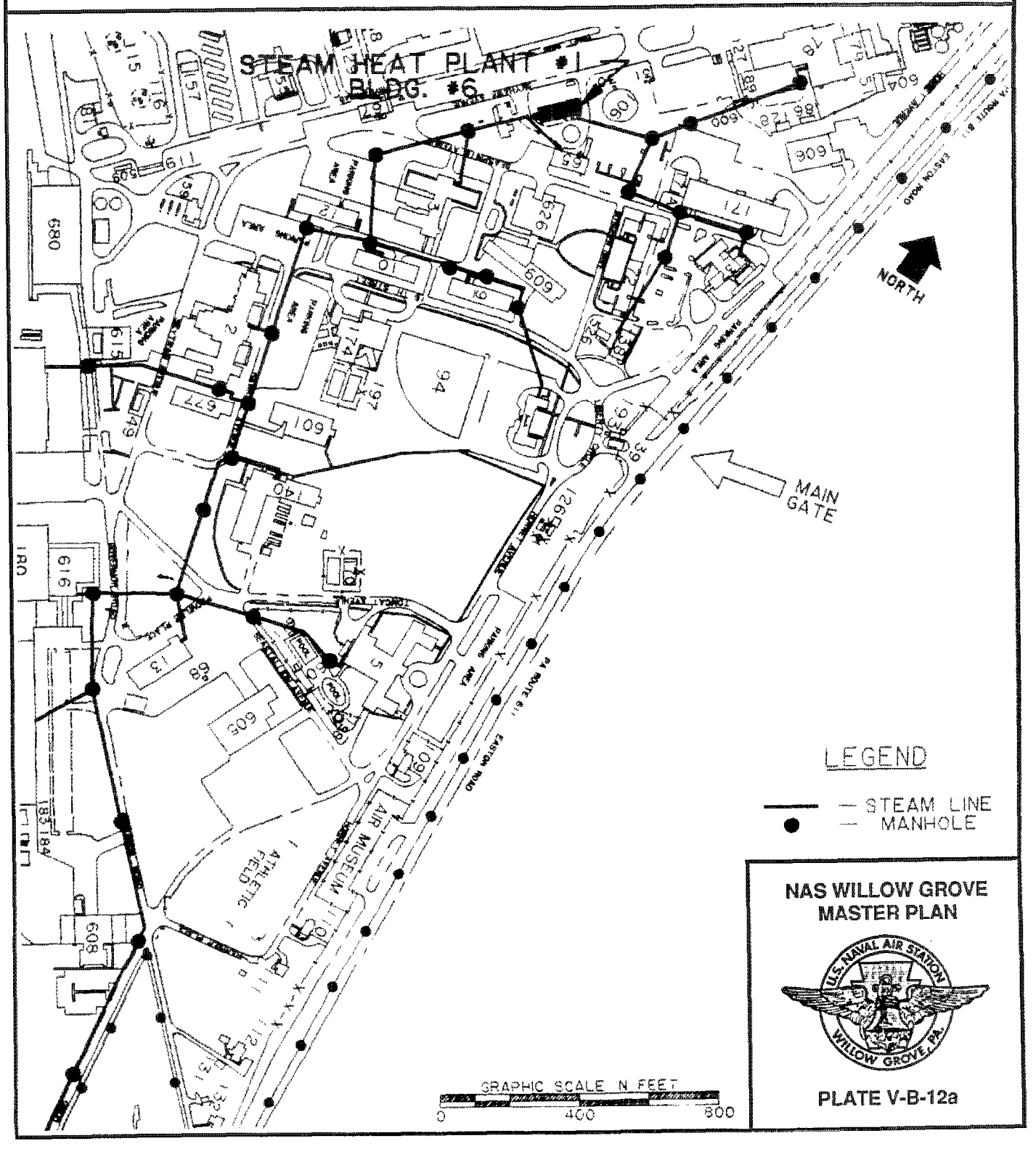
The majority of the south end steam plant distribution and condensate return system is 40 years old, in poor condition, and scheduled to be repaired/replaced. The capacity of the south end steam distribution and condensate return system is adequate for the present and foreseeable needs of the Station.

Plates V-B-12a and V-B-12b illustrate the steam distribution system at the northern and southern portions of the Installation, respectively.

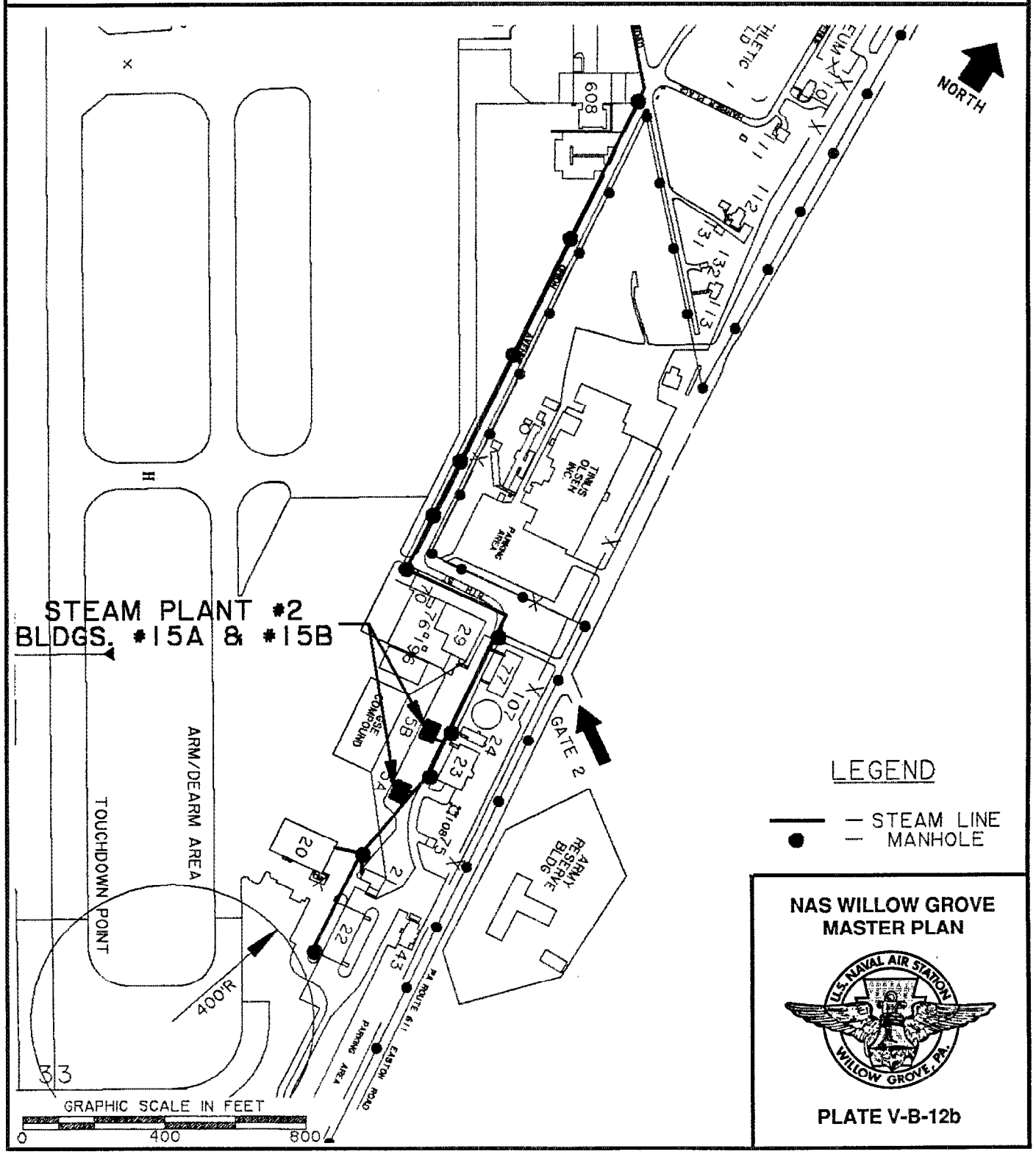


BOILER HOUSE 1

STEAM DISTRIBUTION AND RETURN SYSTEM - NORTH



STEAM DISTRIBUTION AND RETURN SYSTEM - SOUTH



NAS WILLOW GROVE MASTER PLAN

PLATE V-B-12b

c. Potable Water System

The water supply system is considered reliable and adequate to meet the present and future demands of the Station. NAS Willow Grove supplies its own water from two wells. Well #1 is 398 feet deep and is rated at 260 GPM. Well #2 is 352 feet deep and is rated at 225 GPM. See Plates V-B-13a and V-B-13b. An additional well is maintained by the Air Force. This well is 350 feet deep and is rated at 225 GPM. There are two 500,000 gallon ground level reservoirs for storage of potable water. The maximum amount of water pumped from the wells for any one day during the past five years has been a combined one million gallons (720,000 Navy + 280,000 Air Force). Treatment of the potable water consists of chlorination only.

d. Water for Fire Protection

The condition of the non-potable water system at NAS Willow Grove is good. Non-potable water for fire protection is supplied by the same wells and water mains as the potable water. There is one 500,000 gallon and one 450,000 gallon ground-level reservoirs for storage of fire protection water. In an emergency, water is supplied from two pump houses.

One pump house has four domestic pumps with a total capacity of 1,200 gpm and three fire pumps with a capacity of 4,000 gpm which take suction from one of the 500,000 gallon reservoirs.

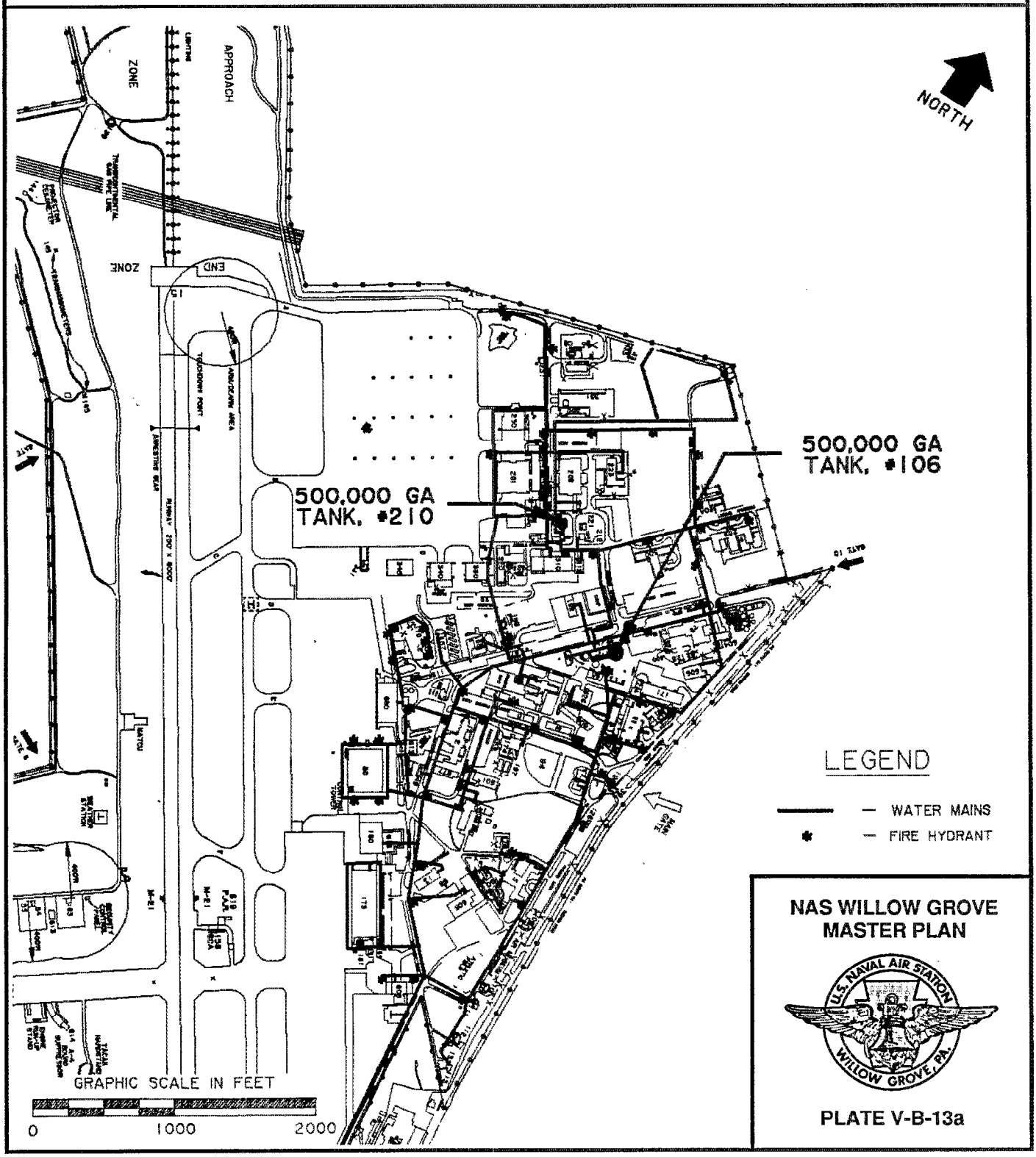
The second pump house has three domestic pumps with a capacity of 2,500 gpm, all of which draw suction from the second 500,000 gallon reservoir. There are no deficiencies in the non-potable water supply.

e. Sanitary Sewage System

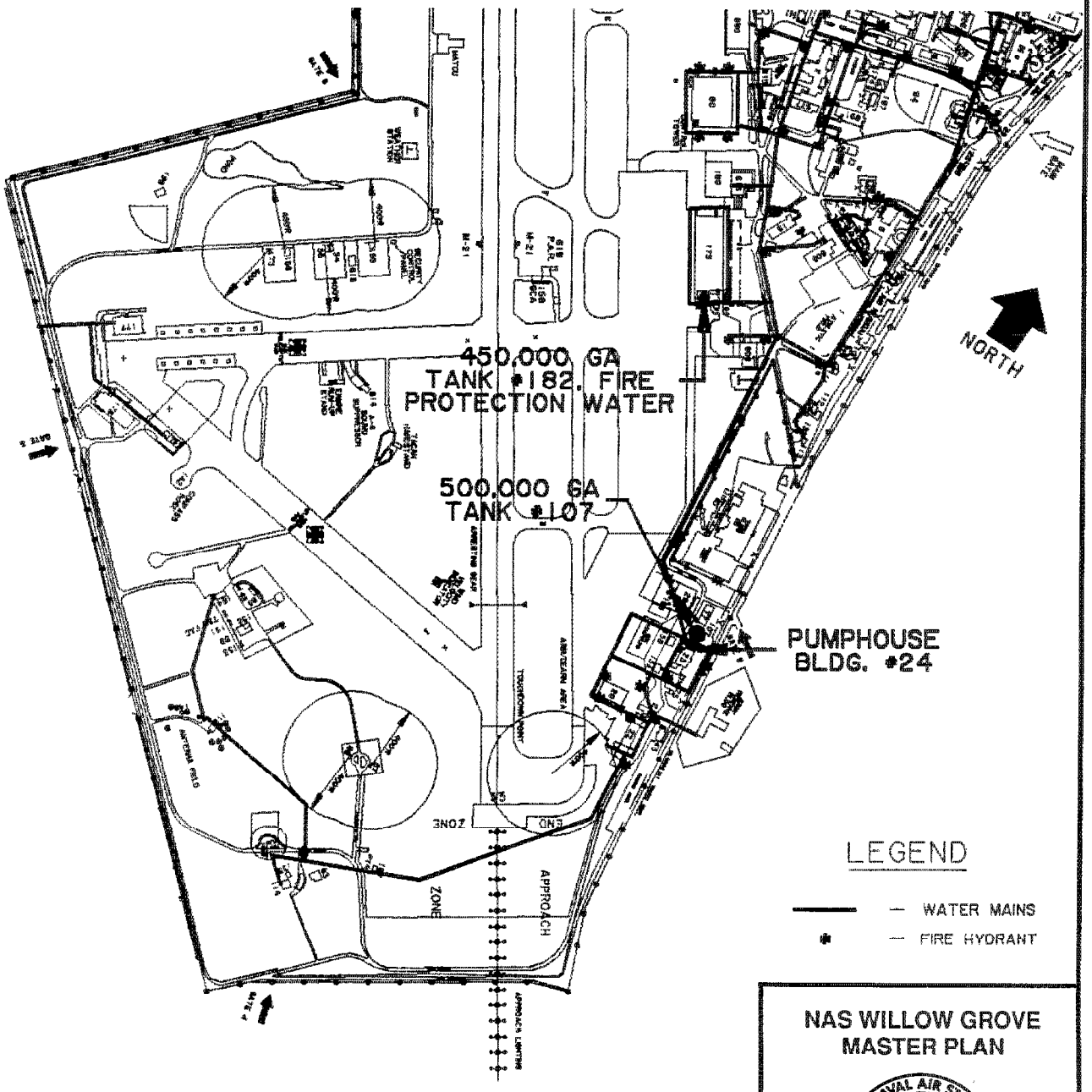
The sewage collection and treatment systems generally were found to be in good condition. Structural repairs were recently completed on the tank walls for the primary and secondary filters to the rotating arm of the trickling filter. Effluent parameter requirements of the National Pollution Discharge Elimination System (NPDES) Permit have been consistently met.

NAS Willow Grove has a combined sanitary-storm sewer collection system which has a capacity adequate for the facilities it serves. See Plates V-B-14a and V-B-14b for the sanitary sewage distribution system for NAS Willow Grove. The Navy and Air Force sides of the Station each has its own collection system both of which discharge into the Navy owned trickling filter 1mgd sewage treatment plant. The sludge produced as a treatment residue passes to an on-site anaerobic digestor where the methane gas is created and used to produce steam for the plant.

POTABLE WATER DISTRIBUTION SYSTEM - NORTH



POTABLE WATER DISTRIBUTION SYSTEM - SOUTH



LEGEND

— WATER MAINS

— FIRE HYDRANT

GRAPHIC SCALE IN FEET

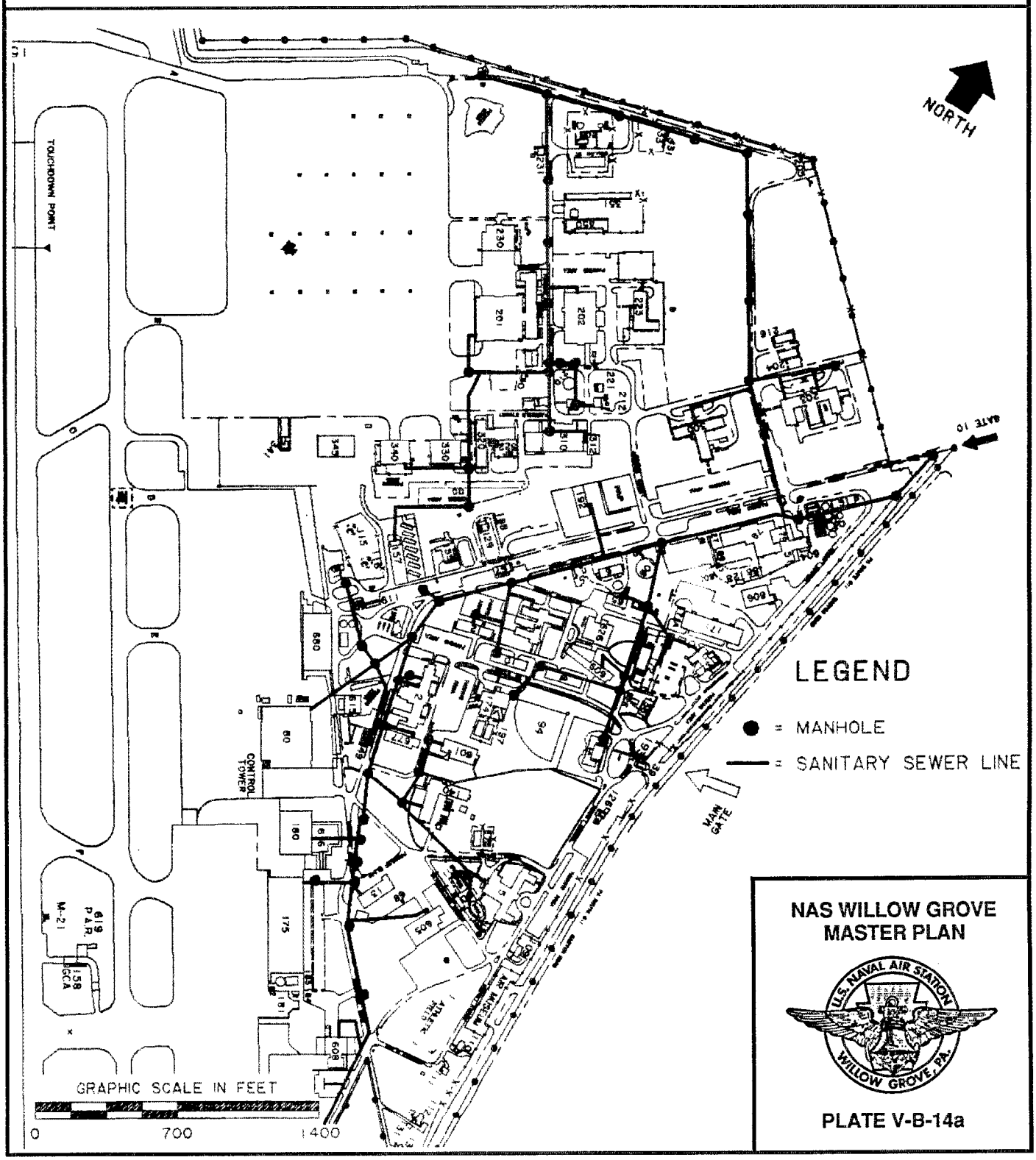
0 1000 2000

NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE V-B-13b

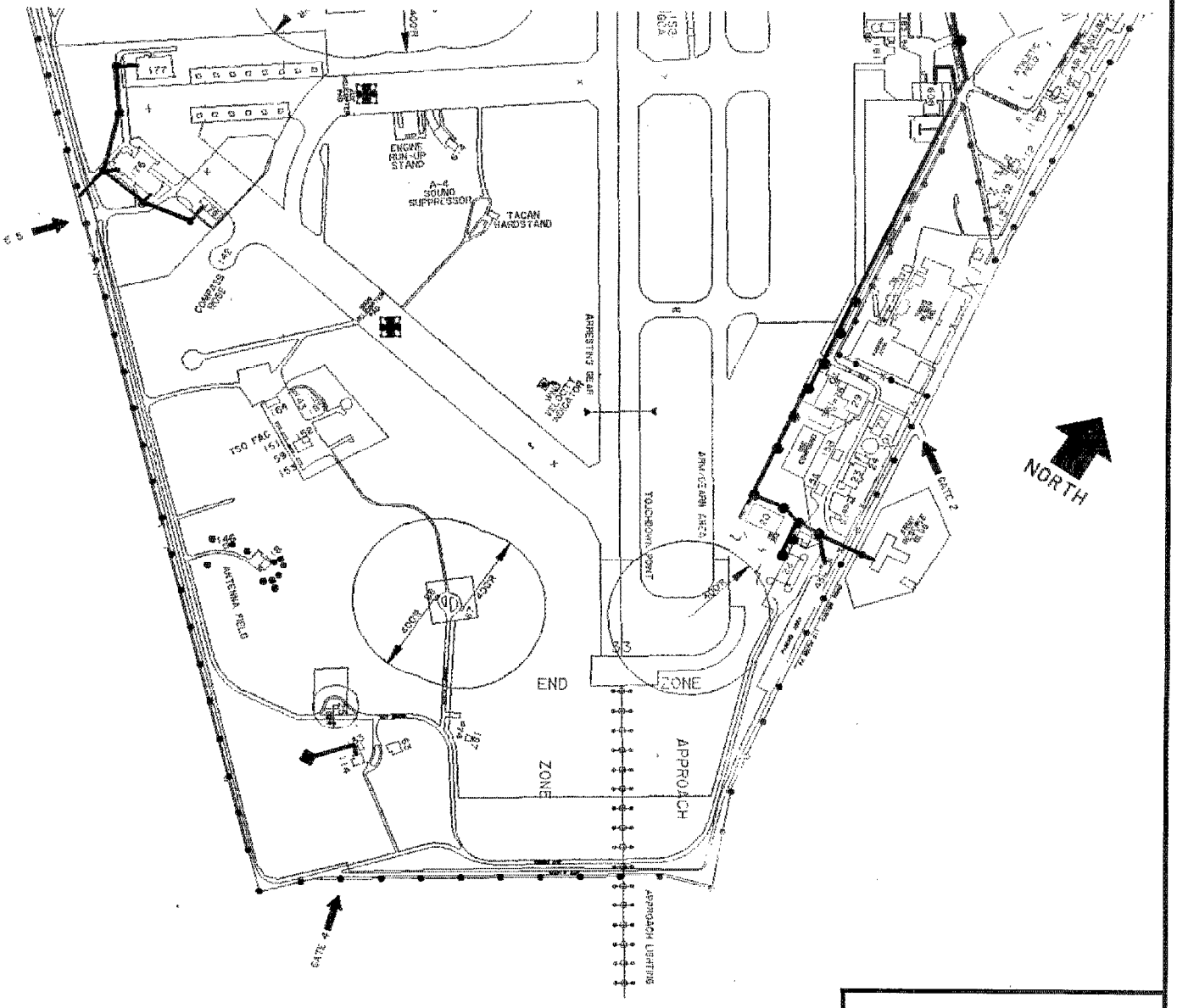
SANITARY SEWAGE DISTRIBUTION SYSTEM - NORTH



NAS WILLOW GROVE
MASTER PLAN

PLATE V-B-14a

SANITARY SEWAGE DISTRIBUTION SYSTEM - SOUTH



GRAPHIC SCALE IN FEET

0 800 1600

NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE V-B-14b

f. Storm Drainage System

The central Storm Water drainage system is illustrated on Plates V-B-15a and V-B-15b. Runoff collects in various Station low areas or along roadside drainage ditches.

g. Natural Gas Distribution System

The overall condition of the natural gas distribution system at NAS Willow Grove is good. Natural gas is supplied and maintained by the Philadelphia Electric Company (PECO). PECO also holds itself responsible for periodic inspections. Plate V-B-16 illustrates the natural gas distribution system in the main area of the Base.

This interruptible natural gas system has its meter located in the main steam plant (Bldg. #6) which is in the northwest section of the Station. PECO has installed an impressed current system for corrosion protection of its natural gas piping. PECO is also responsible for maintaining this existing cathodic protection system.

h. Telecommunications System

NAS Willow Grove is served by a Dimension 2000 switch that is leased from and maintained by AT&T. This switch was installed in January of 1980 and has a capacity of over 4,000 stations. Presently, there are 103 trunks and 1800 working stations off of this machine. Interviews with principal personnel at the Station indicate that barring a full scale defense mobilization, no growth is projected. The distribution cables and inside wiring are owned by Bell of Pennsylvania and occupy the Navy carrying plant and generally have sufficient capacity for any projected requirements.

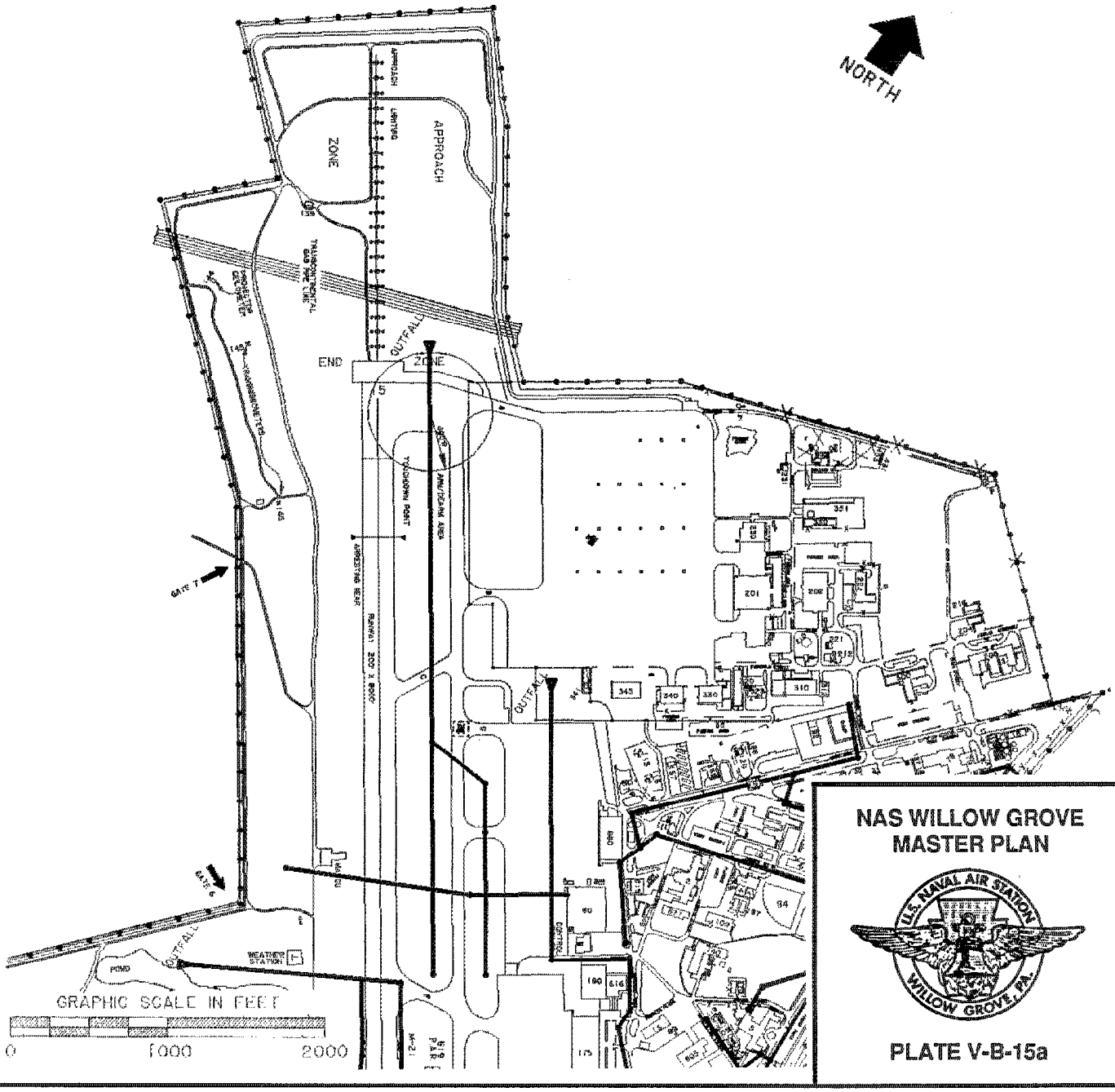
i. Compressed Air Production and Distribution

The air compressors and air receivers throughout the Station are in good condition. There is no compressed air distribution system at NAS Willow Grove. A service contract is issued for testing unfired pressure vessels (air receivers) every 3 years.

Compressed air is used for oil atomization in Central Plant, Bldg. #6, control air in heating and air conditioning systems, and pneumatic tools and automatic sprinkler systems in Hangar 80.

The capacities of the air compressors are considered adequate for the existing and future demand.

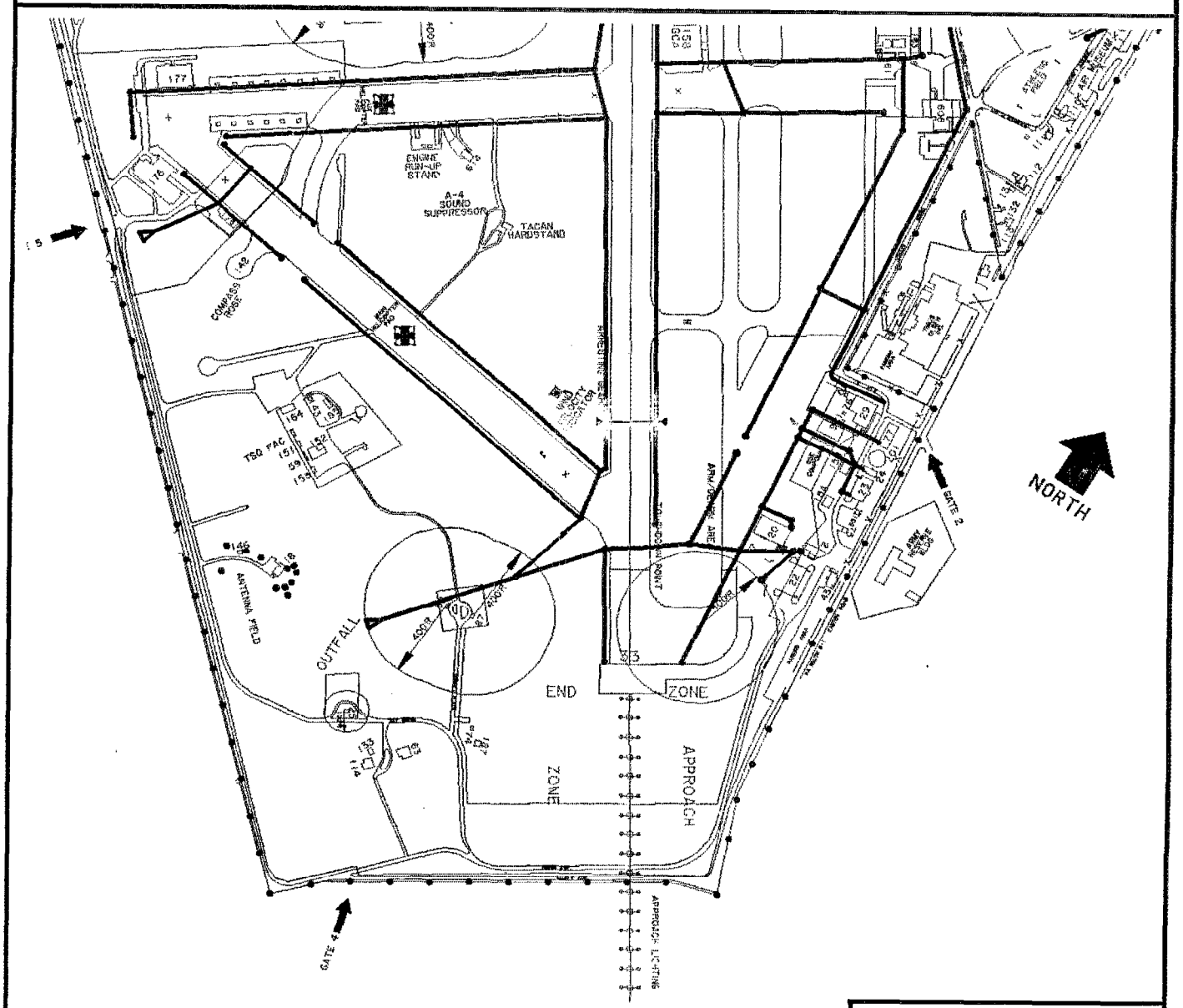
STORM WATER DRAINAGE SYSTEM - NORTH



NAS WILLOW GROVE
MASTER PLAN

PLATE V-B-15a

STORM WATER DRAINAGE SYSTEM - SOUTH



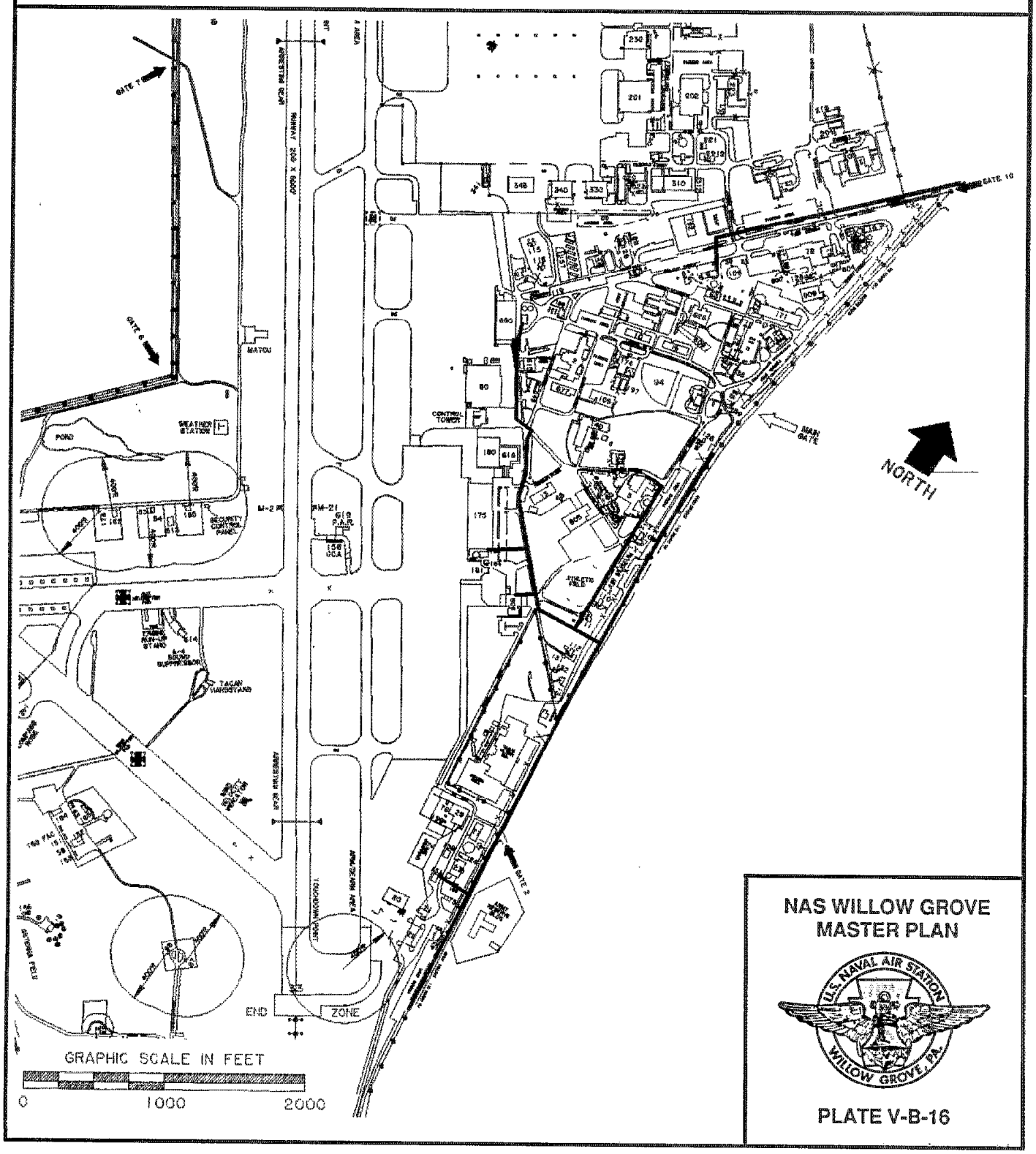
GRAPHIC SCALE IN FEET

0 800 1600

NAS WILLOW GROVE MASTER PLAN

PLATE V-B-15b

NATURAL GAS DISTRIBUTION



NAS WILLOW GROVE
MASTER PLAN

PLATE V-B-16

j. Aviation Fuel Storage System

The aircraft fuel farm contains three 210,000 gallon storage tanks. Two of the tanks are owned by the Navy and are designated as #115 and #116. One is owned by the Air Force and is designated No. 207. The Navy supplies the Marine and Army aircraft, but the Air Force is independent except for emergency courteous service.

Although the storage capacity is adequate for present and foreseeable future needs of the Station, the condition of the aviation fuel storage system is currently under repairs for modernization.

k. Fire Alarm System

A new Honeywell D.G.P. Fire Alarm System was installed in 1978 by Special Project R8-74. It satisfactorily replaced the thirty year old Gamewell system.

The Data Gathering Panel has dual local alarms. It has been expanded to include the U.S. Army building which was a new requirement since originally designed. The master control panel is located in the new firehouse, Building #608.

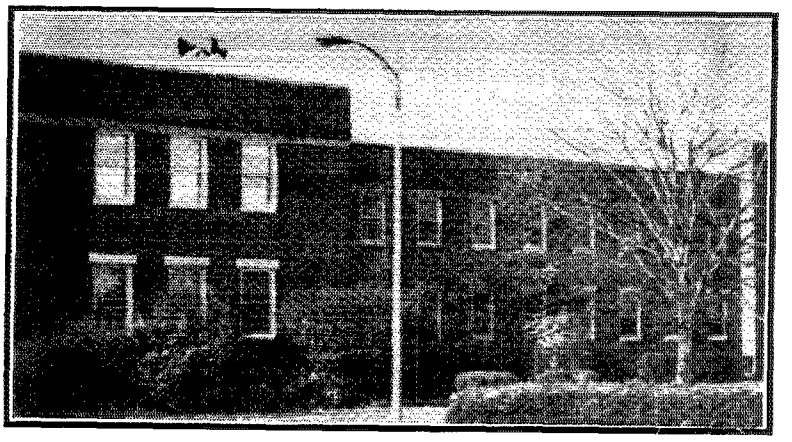
l. Refuse Disposal

The solid waste disposal system is adequate to meet the needs of the Air Station. Solid waste is collected by a government-owned 24 cubic yard compactor truck. All domestic refuse is taken by government vehicles to Montgomery County Solid Waste in Abington, Pennsylvania, approximately six miles from NAS Willow Grove.

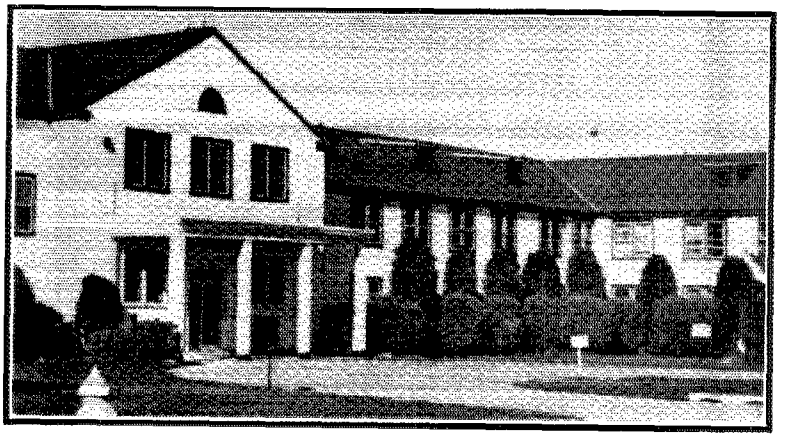
The Naval Air Station also has a small transfer site which it utilizes which it utilizes for disposal of wood and metal. This small area is fenced off to prevent the spread of litter. The metal and wood at this transfer site are disposed by private contract. It is estimated that approximately 60 cubic yards of this type of waste is generatedat the activity per week. The private contractor empties the full container on an "as needed" basis. There are no deficiencies in the solid waste disposal system.

m. Air Conditioning Systems

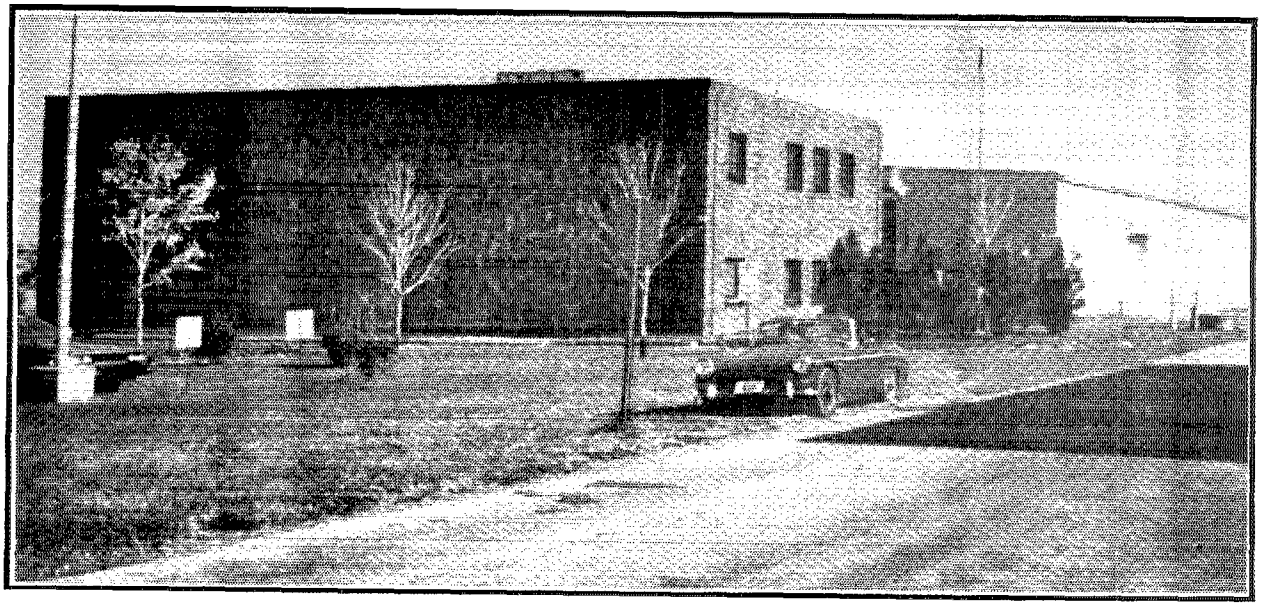
The air conditioning systems throughout the Station are well maintained and in generally good condition, however, some of the units are in poor condition and beyond economic repair. The capacities are adequate to meet the needs of the Station.



ADMINISTRATION BLDG. 1



BOQ BLDG. 5



SUPPLY DEPT./COMPTROLLER BLDG. 171A

V-C. NATURAL ENVIRONMENT

1. CLIMATE

Willow Grove is within the temperate latitudes, with a prevailing west to east flow of atmospheric systems. This produces a diverse, and at times, rapidly changing array of weather elements.

The location and orientation of the mountain chain to the west and north has significant effects on eastward moving frontal systems. The nearest coastal section of the Atlantic Ocean is about 70 miles east of the Station. The industrial area of Philadelphia produces haze and smoke conditions that persist when southwest to southeast winds prevail.

The Station has a moderate climate. Periods of very high or very low temperatures seldom last more than several days as conditions change fairly rapidly. See Table V-C-1, Climatic Conditions.

Flying conditions are excellent. The field visibility is above Visual Flight Rules (VFR) minimums 90% of the time. Heavy fog, causing marginal flying conditions, is most prevalent during the autumn and winter months.

Precipitation is fairly evenly distributed throughout the year with maximum amounts during the late summer months. The average annual rainfall is 44.36 inches. Much of the summer rainfall is in connection with local thunderstorms. The average annual snowfall is 21.5 inches. Single storms of 10 inches or more occur about every 5 years.

The prevailing wind direction for the summer months is from the southwest, while northwesterly winds prevail during the winter. Destructive winds are comparatively rare and occur in gustiness during summer thunderstorms.

2. GEOLOGY

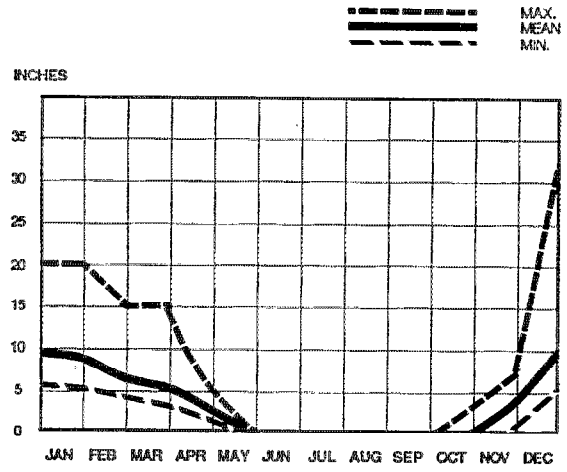
The Station is located in the Triassic Lowlands of the Piedmont Physiographic Province. Three sedimentary formations make up the bedrock in the vicinity of the Station. These include the Stockton, Brunswick, and Lockatong Formations.

Structurally, these formations form a monoclinal dip 10 to 14 degrees to the northwest. Superimposed on the local structure is the Warrington anticline, bounded on the north by a fault. The bedrock is joined parallel to the bedding planes, though there is some vertical jointing as well.

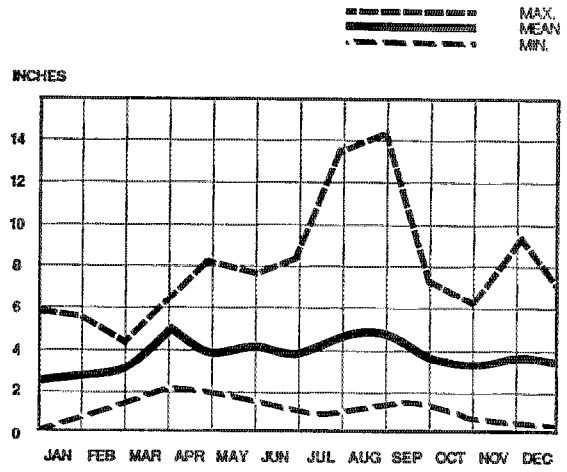
TABLE V-C-1

CLIMATIC CONDITIONS

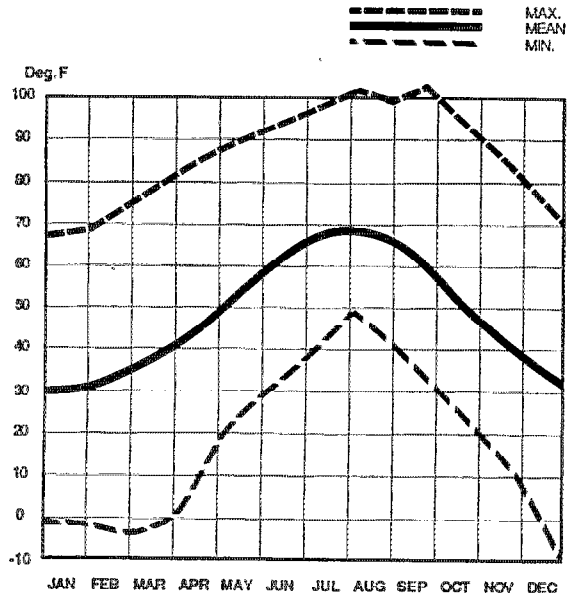
SNOWFALL



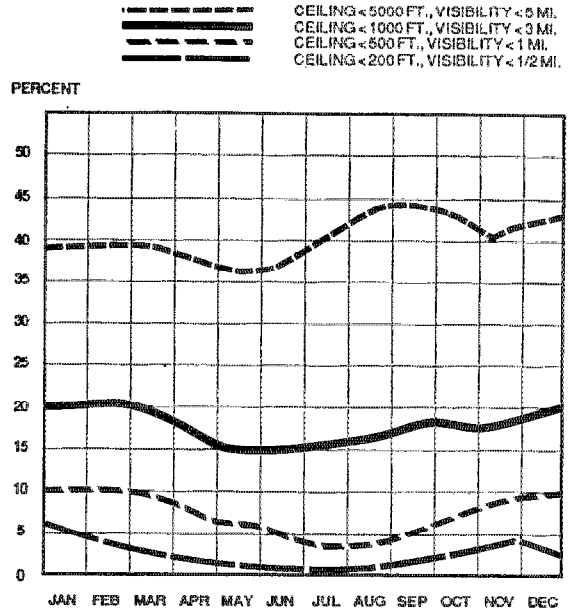
PRECIPITATION



TEMPERATURE



MONTHLY FLIGHT CEILING VISIBILITY



3. SOILS

Approximately fifteen soil types occur on the Station and they are illustrated on Plate V-C-1. The principal soils found on Station which have remained undisturbed by construction are Lawrenceville silt loam. Readington silt loam, and Lansdale loam.

Lawrenceville silt loam and Readington silt loam are deep, moderately drained and exhibit a depth to seasonal high water table of approximately 1 to 2 feet deep. These soils usually exist on relatively flat areas of the Station. They have moderate limitations for use in development. This limitation is based on slow permeability, seasonal high water table, and poor surface drainage. In addition, if these soils are disturbed on steeper slopes, they present a definite erosion hazard which can result in a considerable loss of topsoil and siltation of nearby streams.

On flatter areas where the erosion hazard is minimal, these soils can be readily drained and become more suitable for development. Lawrenceville and Readington silt loams are extensive within the drainage swale running parallel along the west side of Runway 15-33. This area exhibits moderate slopes, thereby requiring extensive land management and protective measures to curtail existing erosion problems. Development in this area is precluded due to runway centerline clearance criteria.

Lansdale soils are moderately deep, well drained, and exhibit a depth to seasonal high water table greater than 3 feet. These soils have moderate permeability and available moisture capacity for vegetation is high. Surface runoff is medium up to slopes of 8%, and erosion hazard is moderate with good construction practices. Limitations are slight to moderate for use in development.

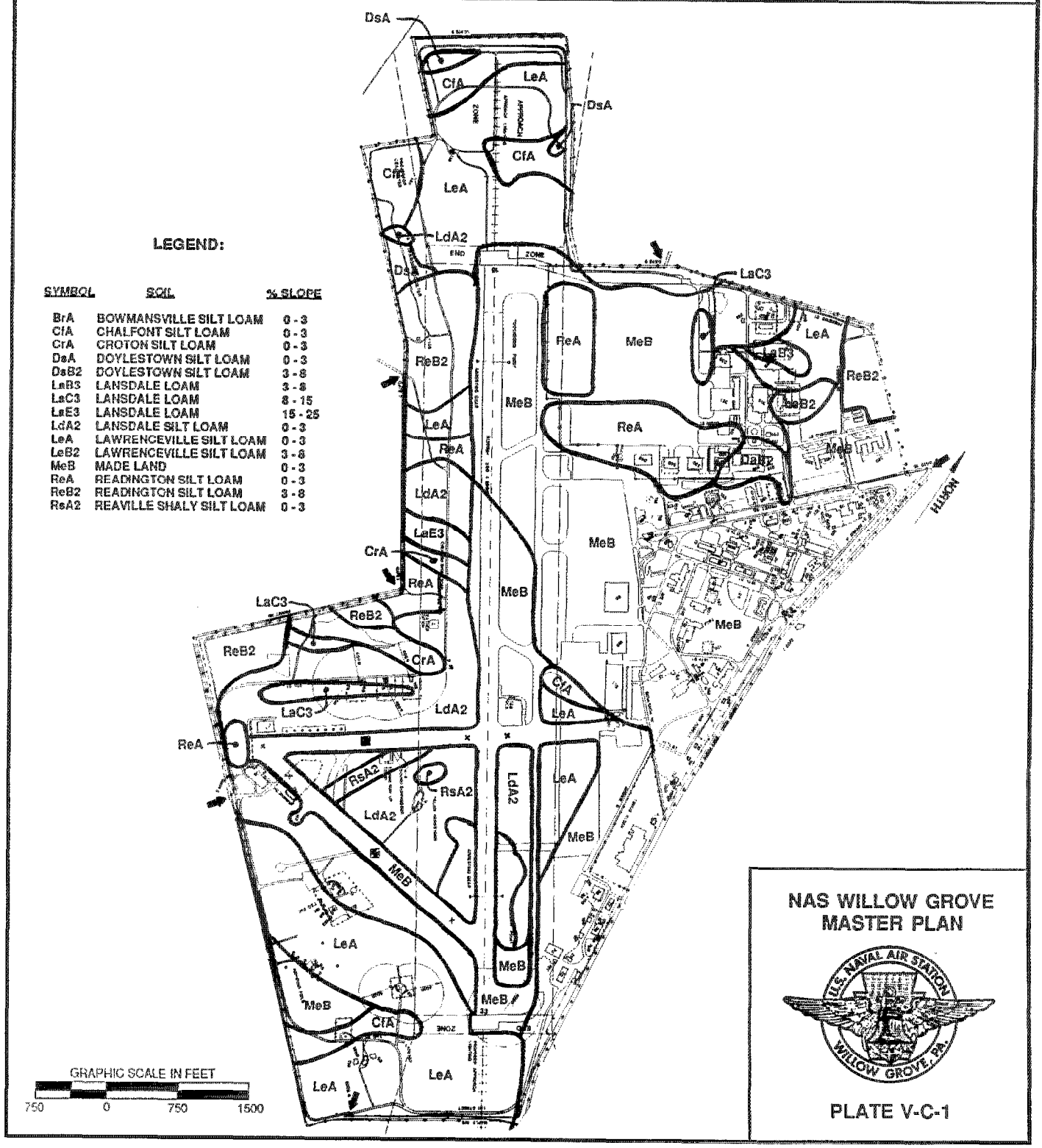
The man-made land (those soils which have been altered from their original state) immediately adjacent to the runways and taxiways and in the built-up areas are primarily Triassic shale and sandstone or silty materials underlain by shale and sandstone. These soils vary widely in depth and drainage condition, but all range from very good to moderately good with a minimum of protective measures indicated.

4. HYDROLOGY

a) Groundwater

With the exception of the Stockton Formation, consolidated sediments in the area are poor sources of groundwater. Having a low ratio of pore space to rock volume, groundwater in these formations must be tapped from the joint structures to provide a useful yield. The lower and middle arkosic members of the formation are the best sources of water. The upper member is shale which acts as a confining bed. Jointing and fracturing is found primarily in the weathered zone in the first 500 +/- feet of the formation. Average yield in the formation is 106 gallons per minute.

SOIL CONDITIONS



LEGEND:

SYMBOL	SOIL	% SLOPE
BrA	BOWMANSVILLE SILT LOAM	0 - 3
CfA	CHALFONT SILT LOAM	0 - 3
CrA	CROTON SILT LOAM	0 - 3
DsA	DOYLESTOWN SILT LOAM	0 - 3
DsB2	DOYLESTOWN SILT LOAM	3 - 8
LaB3	LANSDALE LOAM	3 - 8
LaC3	LANSDALE LOAM	8 - 15
LaE3	LANSDALE LOAM	15 - 25
LdA2	LANSDALE SILT LOAM	0 - 3
LeA	LAWRENCEVILLE SILT LOAM	0 - 3
LeB2	LAWRENCEVILLE SILT LOAM	3 - 8
MeB	MADE LAND	0 - 3
ReA	READINGTON SILT LOAM	0 - 3
ReB2	READINGTON SILT LOAM	3 - 8
RsA2	REAVILLE SHALY SILT LOAM	0 - 3

NAS WILLOW GROVE MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE V-C-1

Groundwater supplies all of the public demand in the area, and all of the wells producing public water tap the various members of the Stockton Formation. Per capita consumption ranges from 204 to 247 liters per day (54 to 68 gallons per day).

b) Surficial Hydrology

Surface water in the region of NAS Willow Grove can be characterized as a relatively well-organized trellis drainage system, flowing generally eastward into the Delaware River. The Station has two subdrainage areas, Little Neshimany Creek to the north, and Pennypack Creek to the south. Small ponds and lakes are scattered evenly throughout the area. Wetlands are limited to the areas where the water table is perched, the soils are of poor permeability, and the watercourses regularly inundate. Numerous intermittent and first order streams cross the landscape. See Plate V-C-2, Hydrology.

5. FLOOD PRONE AREAS

There are no flowing streams on the Station that have defined floodplains. Park Creek lies just north of the Station boundary. The floodplain for that stream is generally delineated by the alluvial soils mapped in the Montgomery County Soils Survey.

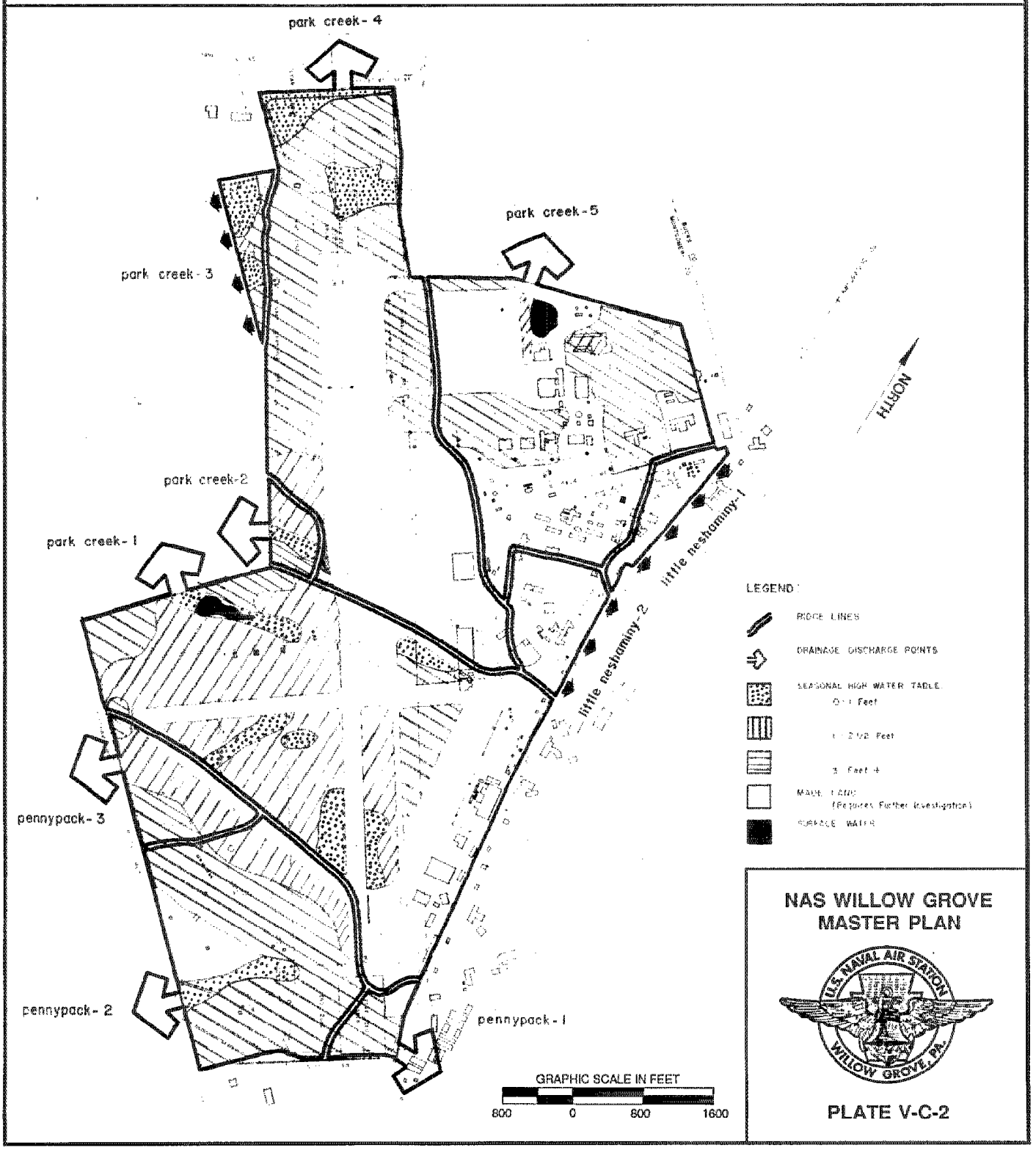
During heavy rainfalls very local flood conditions are associated with the various swells and man-made drainage ditches that exist on the Station. These flood areas can only be established through on-site observation or an extensive engineering analysis.

Two large storm water detention basin areas have been constructed on the Installation. One is actually a double basin located in the northerly clear zone. See Plate V-C-3, Flood Prone Areas. It impounds much of the runoff from the airfield operational surfaces. A second basin exists on the northerly boundary of the Air Force property. It impounds and slowly releases runoff that accumulates over nearly the entire site area.

6. WETLANDS

The National Wetlands Inventory (NWI) map indicates the presence of Palustrine open water in the north central portion of the NAS, along the southern boundary, and on the western boundary along Dawes Road. A Palustrine Scrub-Scrub/Emergent wetland is mapped along the western boundary directly south of one of the Palustrine Open Waters. NWI maps, due to their margin of error, do not show all wetlands and are not intended to define the limits of federal, state, or local jurisdiction.

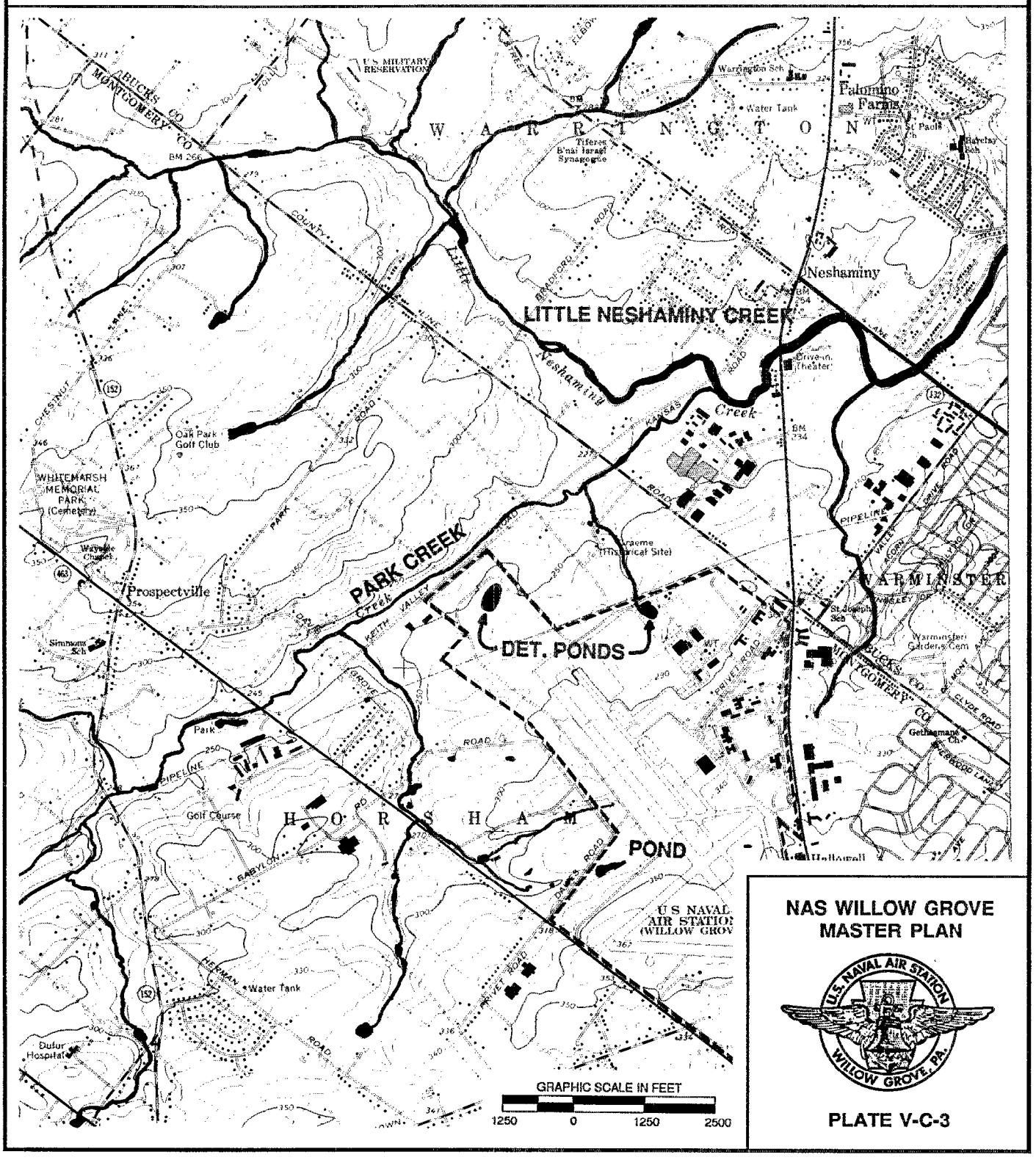
HYDROLOGY



NAS WILLOW GROVE
MASTER PLAN

PLATE V-C-2

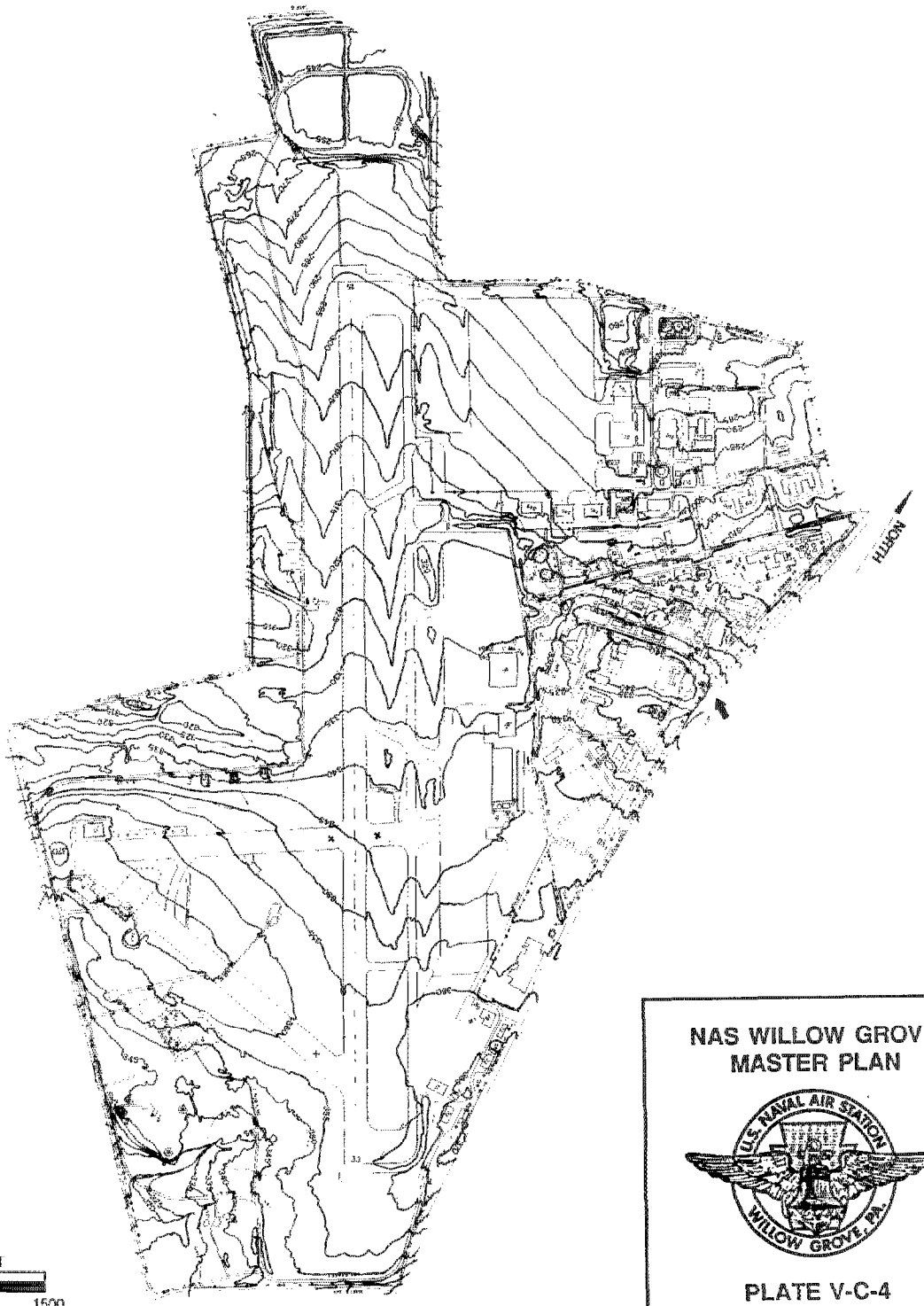
FLOOD PRONE AREAS



NAS WILLOW GROVE
MASTER PLAN

PLATE V-C-3

TOPOGRAPHY



GRAPHIC SCALE IN FEET

750 0 750 1500

NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION
WILLOW GROVE, PA.

PLATE V-C-4

7. TOPOGRAPHY AND SLOPES

Available information indicates a change in elevation of approximately one hundred twenty-five feet across the Station. The north boundary, along Keith Valley Road, is about 240 feet above sea level. From the northerly boundary, the land rises gradually at approximately one and one-half percent slope to 360 feet above sea level at the south end of Runway 15-33. The land then descends at a gentle slope to the south boundary. See Plate V-C-4, Topographical Map.

The community support area consists of relatively flat land gently descending from southeast and east to the northwest. Terrain over most of the Station varies between one to five percent. Isolated areas vary between five and ten percent along water courses, on the western and northern borders of the Station and other man-made locations.

The development of the Station has necessitated the removal of all trees and large shrubs in accordance with airfield criteria constraints. The only area of significant vegetation on Base is along the northerly property lines, the community support area, and the area adjoining family housing Building #114. Care has been taken to preserve the existing trees in these areas; however, the potential of large scale development of vegetation in the community support area is worthy of consideration.

8. WILDLIFE

The variety, distribution, and abundance of wildlife in the local area is determined primarily by habitat, food availability, and proximity to man. As hunting is very limited in the area, man's major role in determining which species are present is through his utilization of the land. The habitat found in the local area supports a relatively high diversity of mammals. This diversity is due to the edge habitat created by the intermingling of cultivated fields, woodlands, wetlands, old fields, streams, and ponds and is especially unique in light of the close proximity of these habitats to the City of Philadelphia and surrounding suburban development. Appendix B in this Master Plan provides a complete listing for species of mammals, reptiles, amphibians, and birds found in the Willow Grove area.

9. ENDANGERED SPECIES

A compilation of state-listed endangered species and federally-listed endangered plants and aminals within the Commonwealth of Pennsylvania is in Appendix B.

With the exception of the peregrine falcon, there are no species of wildlife which are recorded as being present within the local area and recognized as endangered or threatened under the Federal Endangered Species Act of 1973. The peregrine falcon is a rare transient in this area during the period of March through November.

10. SEISMIC ZONE

A seismic risk map of the United States shows southwestern Pennsylvania in Zone 2 (relatively minor damage potential over the long term).

V-D. DEVELOPMENT CONSTRAINTS

Constraints to Station development have been categorized as Natural Constraints and Operational/Man-Made Constraints. Many of these constraints overlap common areas.

1. NATURAL CONSTRAINTS

a) Threatened/Endangered Species

The Endangered Species Act of 1973 requires all Federal agencies to carry out programs for the conservation of endangered and threatened wildlife species, and to insure that actions taken by the agencies do not jeopardize the existence of such species.

With the exception of the Peregrine Falcon, there are no species of wildlife which are recorded as being present within the local area and recognized as endangered or threatened under the Federal Endangered Species Act of 1973. The Peregrine Falcon is a rare transient in the area during the period of March through November.

b) Historic Sites

No historical or archeological survey has been conducted at NAS Willow Grove, according to the Pennsylvania Bureau of Historic Preservation, and there are no known sites or buildings on the station that have been listed or determined eligible for listing in the National Register of Historic Places.

c) Flood Prone Areas

The most prominent floodplain borders Park Creek when that stream overflows its banks. A small area of the Station becomes inundated in the 100 and 500 year frequency identified by the U.S. Department of Housing and Urban Development National Flood Insurance Program. Other more local undefined flood plains exist along the natural drainage courses.

Man-made flood plains exist around the ponds and in the storm water detention basins.

Most of the flood prone areas constrain development. The Park Creek flood plain and northerly detention basins are in the runway clear zone. The other local flood plains are mostly in areas lacking utility services and have no planned development.

d) Wetlands

The National Wetlands Inventory (NWI) map indicates the presence of Palustrine open water in the north central portion of the NAS, along the southern boundary, and on the western boundary along Dawes Road. A Palustrine Scrub-Shrub/Emergent wetland is mapped along the western boundary directly south of one of the Palustrine Open Waters. NWI maps, due to their margin of error, do not show all wetlands and are not intended to define the limits of federal, state, or local jurisdiction.

e) Soils

The various soils on the Station have properties which in most instances present few problems for development as long as sanitary sewer services are available. Bearing capacities are adequate to preclude unusual and costly foundation designs in most structural designs.

f) Steep Slopes

Steep slopes are very localized and in most instances are man-made to comply with criteria for various facilities and to provide proper drainage characteristics.

2. MAN-MADE CONSTRAINTS

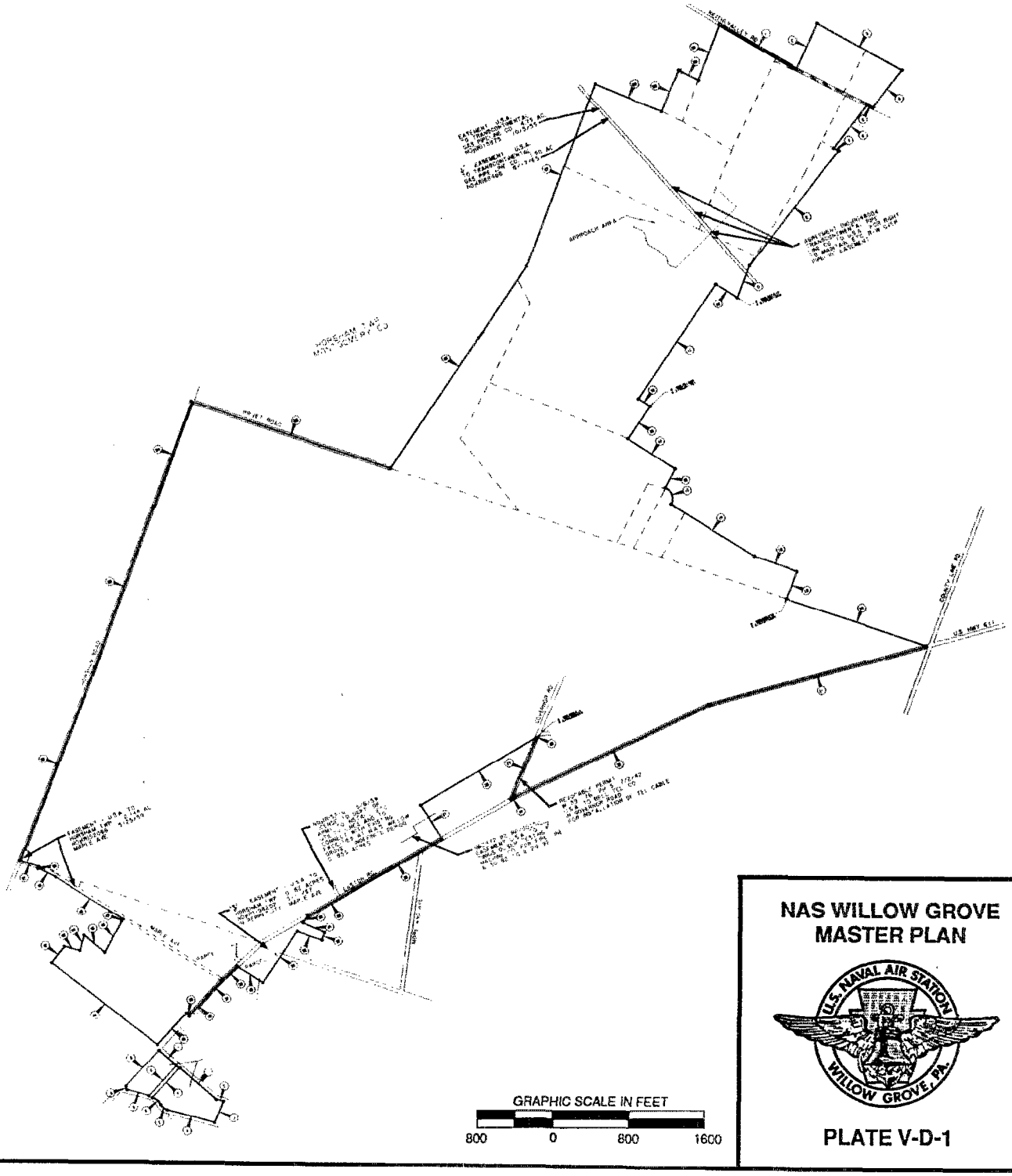
Many constraints are levied upon the Station land area by airfield safety criteria, contaminated areas, operations requirements, ordnance explosive safety quantity distance (ESQD) arcs, electromagnetic conditions, aircraft noise emissions, existing development, and legal constraints.

a) Legal Constraints

Seven legal constraints exist at NAS Willow Grove. Two easements have been granted to the Transcontinental Gas Pipe Company for the right to operate and maintain a gas transmission line across the north end of Runway 15. An agreement between Transcontinental and the U.S.A. also exists allowing the USA to maintain a right of way over the easement. The Township of Horsham is the recipient of two (2) easements for the use of two sections of Maple Avenue at the southeast corner of the Station. An easement was granted to the Tinius Olsen Testing Machine Company to install and maintain a fire protection line which is dependent upon the U.S. Navy storage system. A license was issued to the Department of the Army to install and maintain utility lines and to connect with existing facilities at NAS Willow Grove for an indefinite period.

Plate V-D-1 illustrates those legal easements identified in Table V-D-1.

LEGAL EASEMENTS



NAS WILLOW GROVE MASTER PLAN

PLATE V-D-1

TABLE V-D-1

LEGAL CONSTRAINTS

Type of Easement	Description
Revocable Permit	U.S.A. to Bell Telephone Company, Governor Road for installation of telephone cable.
Easement	U.S.A. to Transcontinental Gas Pipe Company, gas pipe right of way.
Easement	U.S.A. to Horsham Township, use of Maple Avenue at southeast corner of Base
Easement	U.S.A. to Tinius Olsen Testing Machine Company, for fire line.
Easement	U.S.A. to Transcontinental Gas Pipe Company, gas pipe right of way.
Easement	U.S.A. to Horsham Township, use of Maple Avenue on the east side of Route 611.
Agreement	Transcontinental Gas Pipe Company to U.S.A., for right to maintain, etc., Runway over pipeline easement.
License	To U.S. Army Reserve, to install and maintain utility lines.

b) Existing Development

Existing development planned for retention occupies land area that cannot be used for other purposes; additionally, those existing land uses have established a pattern of development that requires compatibility from other new functions that may be constructed upon available sites within the existing developed sector.

c) Airfield Imaginary Surfaces

1) Clear Zones

Clear zones are the areas extending immediately off the end of the runways. These areas are required for aircraft overrun and unrestricted visibility of approach lighting. Clear zone dimensions for Class B runway are 750' laterally from the centerline of the runway to either side, extended 200' from the runway end at which point it extends at an angle of approximately 8 degrees to a distance of 3000' from the runway end. The clear zone is divided into three distinct areas, Type I, II, and III. See Plate V-D-2.

Clear Zone - Type I. This zone is immediately adjacent to the end of the runway. It should be cleared, graded, and free of above ground objects with the exception of airfield lighting, and is to receive special ground treatment or pavement in the area designated as the runway overrun. This type clear zone is required at both ends of the runway.

Clear Zone - Type II. This zone is used only for Class B runways and is an extension of the Type I clear zone except that the width is reduced. The Type II clear zone shall be graded and cleared of all above ground objects except airfield lighting.

Clear Zone - Type III. This zone is laterally adjacent to the Type II clear zone for Class B runways and is used in lieu of the Type II clear zone at Class A runways and basic training OLFs used by T-34 aircraft. Objects in this zone shall not penetrate the approach-departure clearance surface. Buildings for human habitation are prohibited. The land in this type clear zone is best utilized for agriculture or permanent open space exclusive of agricultural uses which would attract birds or waterfowl. Land uses which would include human activity for extended periods should be avoided. Traverse ways such as roads, railroads, canals, etc. are permitted, provided they would not penetrate airfield imaginary surfaces.

2) Accident Potential Zones

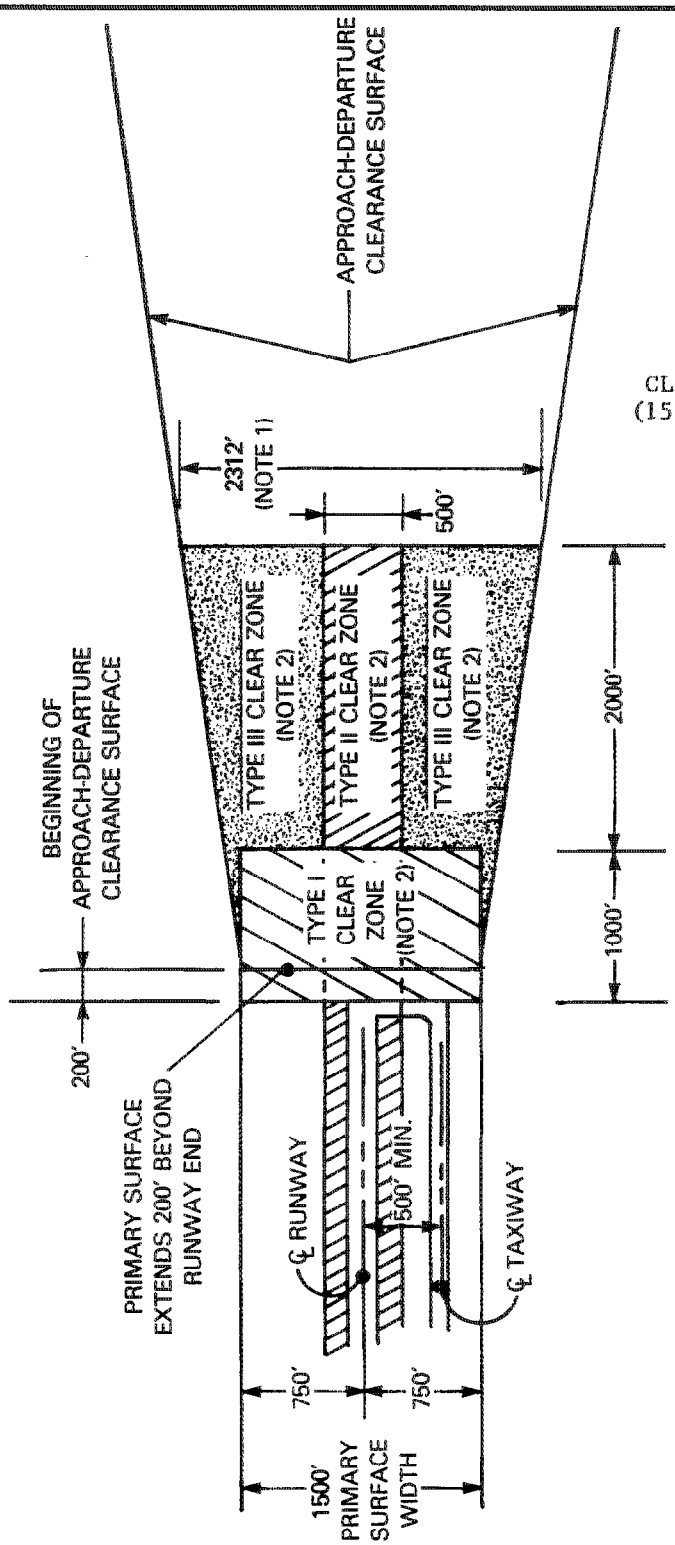
Accident Potential Zones (APZs) have been developed to identify areas having sufficient exposure to aircraft accidents. Refer to the Accident Potential Zones narrative in Section VI, AICUZ Update for preferred compatible land uses.

3) Imaginary Surfaces

The imaginary surfaces are illustrated on Plate V-D-3. These are restrictions which limit the height of objects in the vicinity of the runways. The following imaginary surfaces affecting Station facilities are:

Primary Surface. A rectangle, at ground level, extending 750 feet from the centerline of the runway and 200 feet beyond the ends. Only navigational and operational aids are allowed above ground level within this area.

CLEAR ZONES



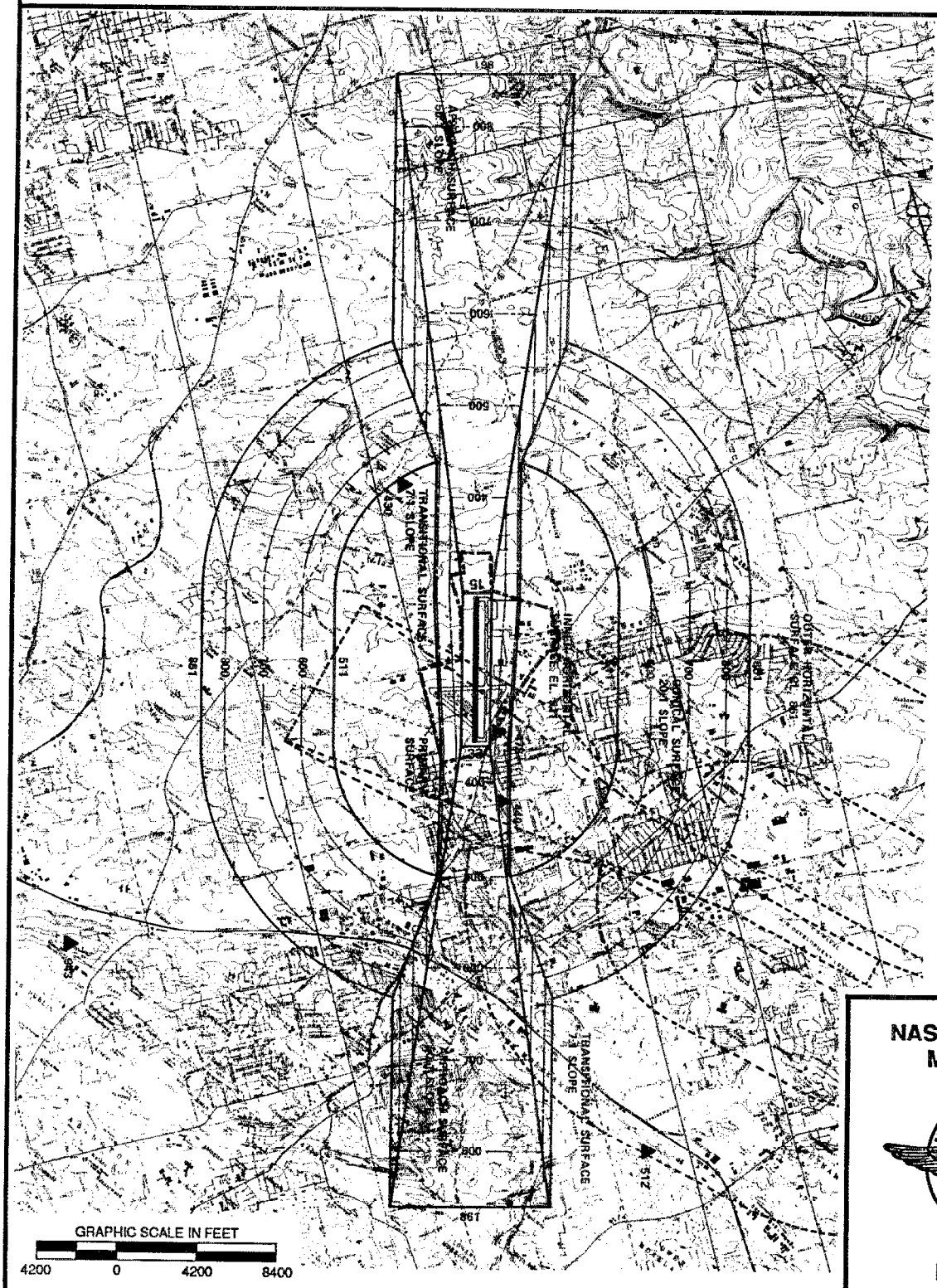
CLASS B RUNWAY - CLEAR ZONE
(1500 WIDE PRIMARY SURFACE)

PLAN
NOT TO SCALE

NAS WILLOW GROVE
MASTER PLAN

PLATE V-D-2

IMAGINARY SURFACES



NAS WILLOW GROVE MASTER PLAN

PLATE V-D-3

Approach-Departure Clearance Surface. A combination of inclined and horizontal plane, symmetrical about the runway centerline extended. The inclined plane flares outward and upward from the primary surface, beginning with the same width as the primary surface and starting with the centerline elevation at the runway end. The slope of the surface is 50:1 until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning. The outer width is 16,000 feet.

Transitional Surface. Inclined planes which connect the primary surface and the approach-departure clearance surface to the inner horizontal surface, conical surface, and other transitional surfaces. The slope is 7:1 outward and upward from the primary and approach-departure clearance surfaces at right angles to the runway centerline extended.

Inner Horizontal Surface. This surface is an oval shaped plane at a height 150 feet above the established airfield elevation. It is constructed by scribing an arc with a radius of 7,500 feet about the centerline at each end of the runway and interconnecting these arcs with tangents.

Conical Surface. An inclined plane that extends from the periphery of the inner horizontal surface outward and upward at a 20:1 slope. For Class A and B runways it extends for horizontal distance of 7,000 feet and to a height of 500 feet above the established airfield elevation.

Outer Horizontal Surface. A plane located 500 feet above the established airfield elevation, extending outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.

4) Flight Obstructions

Flight obstructions are classified as any facility, terrain, or vegetation that penetrates the imaginary surfaces or is located within any of the airfield primary surfaces, excluding those airfield facilities exempted by NAVFAC P-80. See Plate V-D-4.

Off-Station obstruction in private ownership cannot be easily eliminated without condemnation and demolition. They can be precluded from occurring by applicable review procedures by Municipal, State, and Federal agencies. On-Station obstructions can be eliminated in many instances through the facility construction/replacement process. Some correction measures are prohibitively expensive. Plate V-D-4 illustrates those obstructions and hazards listed in Table V-D-2.

OBSTRUCTIONS AND HAZARDS

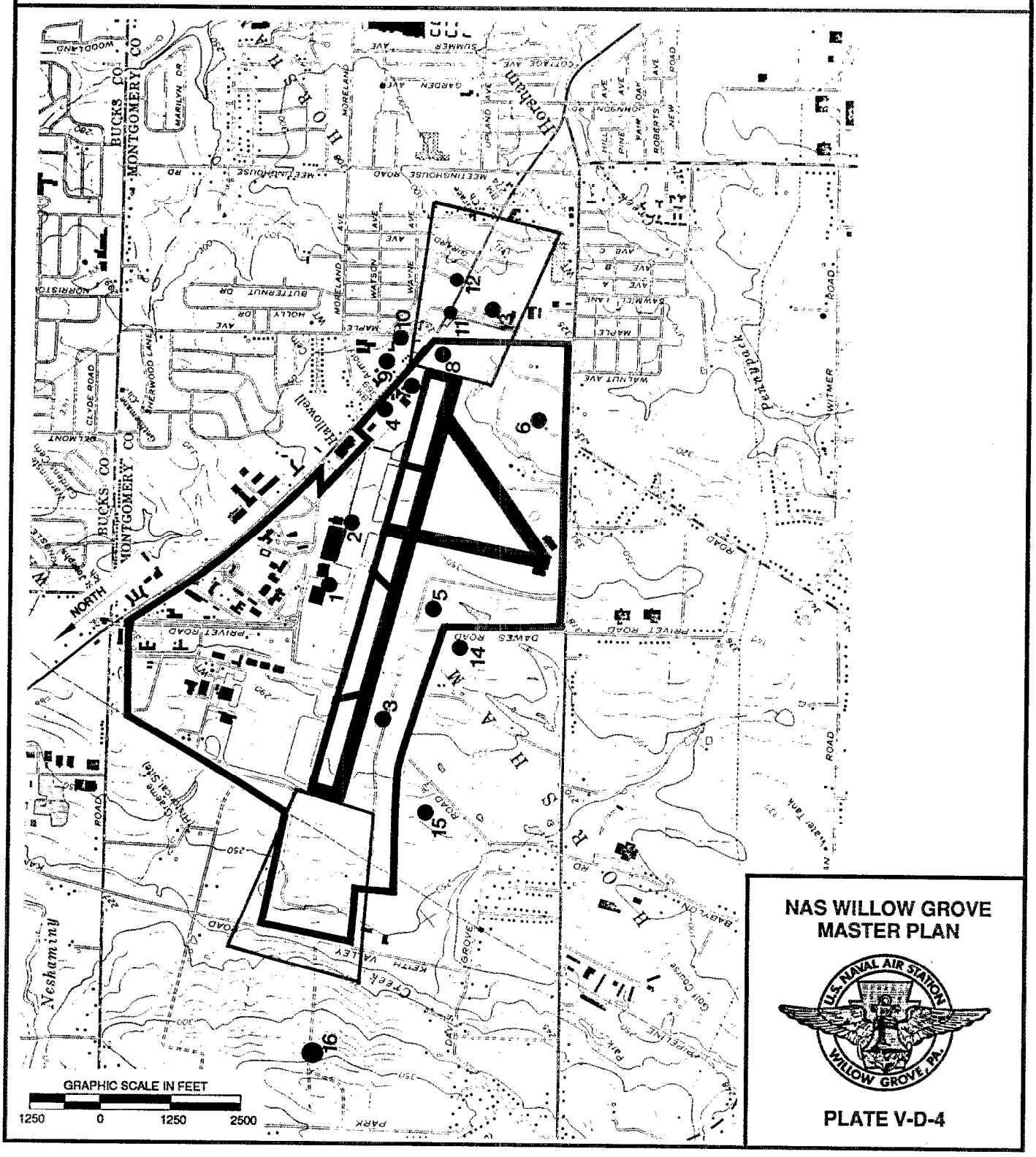


TABLE V-D-2

LIST OF OBSTRUCTIONS AND HAZARDS

Location #	Obstruction and Hazards [1]	Height of Obstruction	Penetrate Permissible Criteria
1	Oper. Tower	80.12 Ft.	16.0 Ft.
2	Hangar	50.57 Ft.	0.0 Ft.
3	Trees	20 Ft.	20.0 Ft.
4	Water Tower	108.59 Ft.	66.4 Ft.
5	Wind Indicators	17.50 Ft.	7.3 Ft.
6	Antenna Field	75 Ft.	0.0 Ft.
7	Hangar	41.05 Ft.	47.3 Ft.
8	Sign	16.95 Ft.	2.5 Ft.
9	Houses	35.98 Ft.	27.1 Ft.
10	Trees	95 Ft.	50.0 Ft.
11	Elec. Poles	22.94 Ft.	7.1 Ft.
12	Houses	32.66 Ft.	0.0 Ft.
13	Trees	60 to 90 Ft.	35.0 Ft
14	Trees	51 to 100 Ft.	60.0 Ft.
15	Trees	37 to 65 Ft.	36.0 Ft.
16	Trees	70 to 80 Ft.	52.0 Ft.

[1]Note: Obstructions penetrate permissible criteria; hazards do not.

5) Airfield Operational Waivers

Existing objects which penetrate the imaginary surfaces are classified as obstructions and require airfield operational waivers. A complete listing of airfield operational waivers for the Station is contained in Appendix E. New facilities must be sited to avoid penetration of imaginary surfaces.

d) Noise Zones

The principal source of noise on the Station is operating aircraft and engine runup test stands. The noisiest assigned aircraft are the A-4's and OA-37's. The noise zones, however, are a composite of all the annual aircraft operations, flight patterns, and day/night flights. Test stand operations and maintenance runup create a noise impact over extended time periods.

As shown on Plate V-D-5, the 75 Ldn contour encompasses the runway, taxiways, parking aprons, aircraft maintenance facilities, and virtually all the entire west side of the airfield. The 65 Ldn contour covers the rest of the Station except for the extreme eastern tip. Both noise zones encompass considerable areas in private ownership.

Acceptable outdoor noise environments for major military and civil land uses areas are contained in NAVFAC P-970, "Planning in the Noise Environment". For many uses, higher levels of exterior noise exposure are acceptable provided there is a proper degree of building noise insulation. Consequently, potential project sitings within existing or adjusted Ldn contours must take into consideration the possibility, depending on facility use, of increased construction and long term operating costs required to adequately isolate interior spaces from outdoor noise levels.

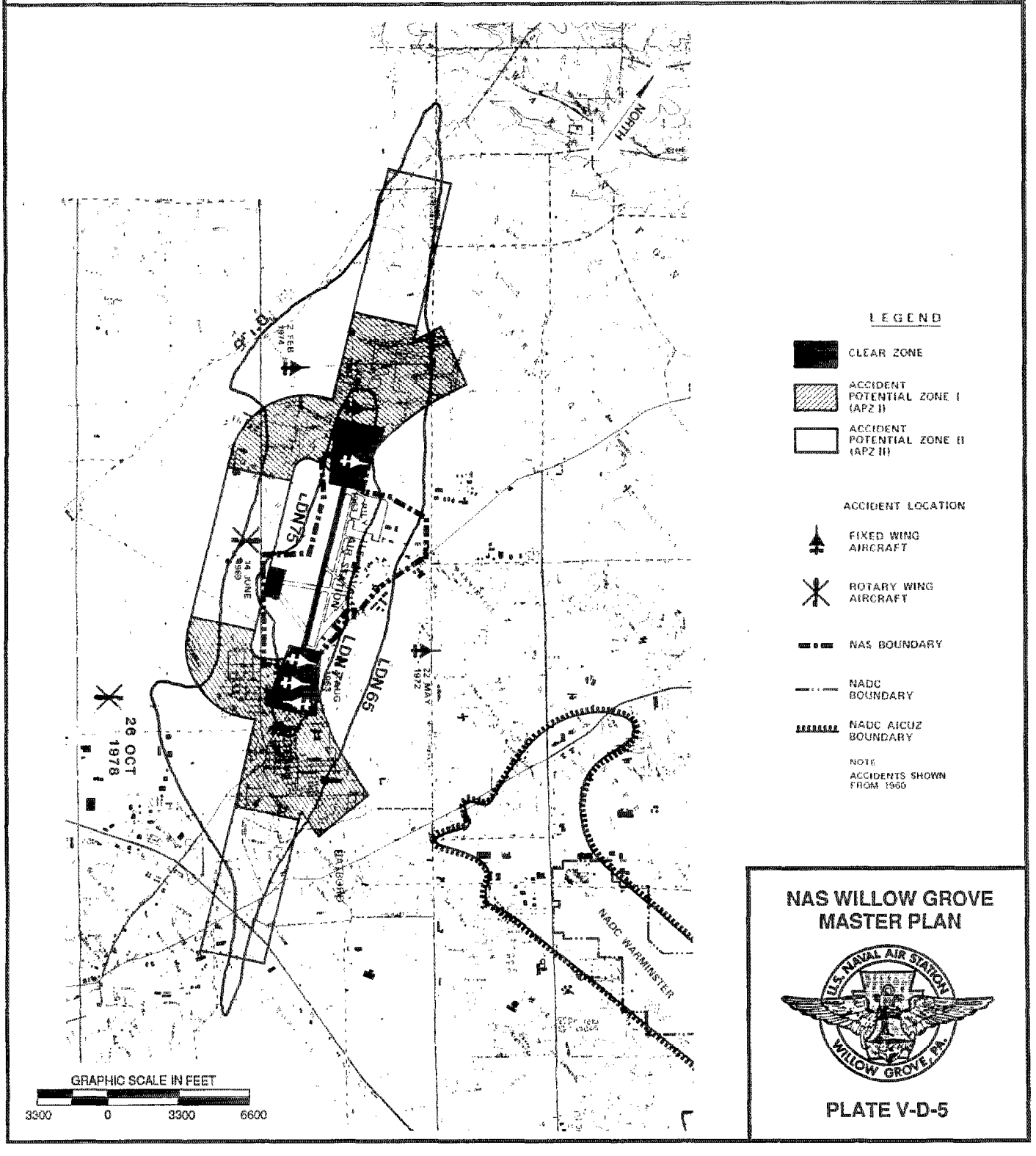
e) Contaminated Areas

1) Background

As part of the DOD Installation Restoration Program, the Navy developed the Navy Assessment and Control of Installation Pollutants (NACIP) program to identify, assess, and control environmental contamination from past methods of storage, handling, and disposal of hazardous substances at naval shore facilities.

As part of the NACIP program, an Initial Assessment Study (IAS) was conducted by the Naval Energy and Environmental Support Activity (NEESA) at NAS Willow Grove. The purpose of an IAS is to identify and assess sites posing a potential threat to human health or to the environment due to contamination from past hazardous materials operations.

NOISE ZONES, APZs, AND ACCIDENT LOCATIONS



Based on information from historical records, aerial photographs, field inspections, and personnel interviews, the IAS identified a total of ten potentially contaminated areas, which were evaluated with regard to contamination characteristics, migration pathways, and pollutant receptors. See Plate V-D-6 for location of these sites and Appendix H in Section IX for a description of the sites.

The IAS concluded that while none of the sites poses an immediate threat to human health or the environment, six sites warrant further investigation under the NACIP program to assess potential long-term impacts, see Table V-D-3. A Confirmation Study was recommended to confirm or deny the presence of suspected contamination and to quantify the extent of any problems which may arise.

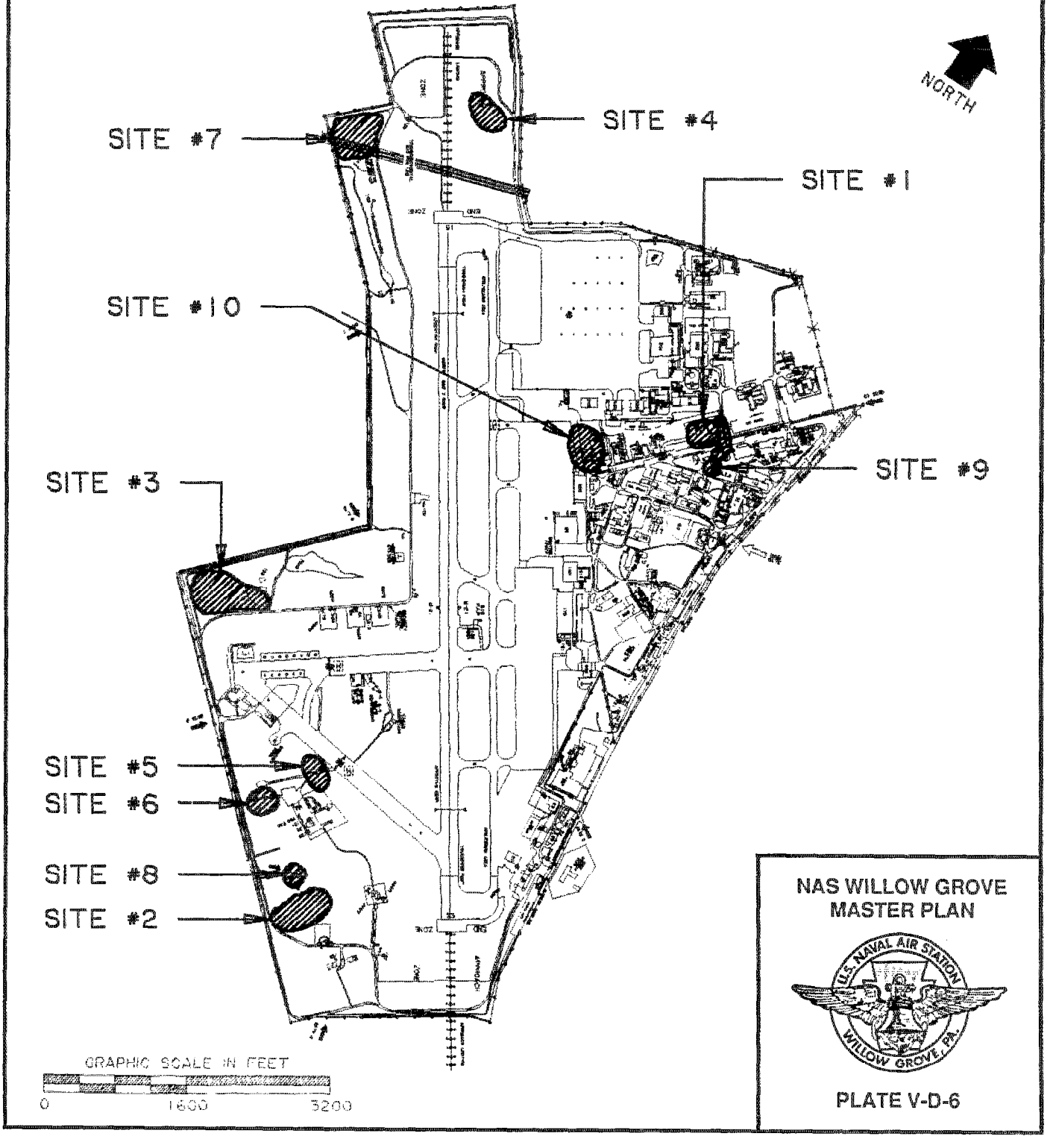
TABLE V-D-3

SITES RECOMMENDED FOR CONFIRMATION STUDY

Site Number	Site Description
1	Privet Road Compound
2	Antenna Field Landfill
3	Ninth Street Landfill
4	North End Landfill
5	Fire Training Area
6	Fuel Farm Area

The results of the Confirmation Studies will be used to evaluate the necessity of conducting remedial measures or clean up operations.

POTENTIALLY CONTAMINATED AREAS



NAS WILLOW GROVE
MASTER PLAN

PLATE V-D-6

f) Electromagnetic Interference and Radiation

Air navigation, air traffic control, and aircraft landing systems generate an electronic environment which must be protected from obstruction, interference, and encroachment. Facility sitings must adhere to the required safety separation distances to avoid hazards to people (HERP), ordnance (HERO), and fuel (HERF) from electromagnetic radiation.

These separation distances are similar, though usually less expansive than the arcs that surround ordnance storage facilities. Separation distances for ordnance are normally greater at air stations than requirements for personnel and fuel. See Plate V-D-7, Electromagnetic Radiating Equipment Locations, for the locations and separation distances of electromagnetic radiating equipment. The HERP distances are based upon the ten milliwatt per square centimeter criteria.

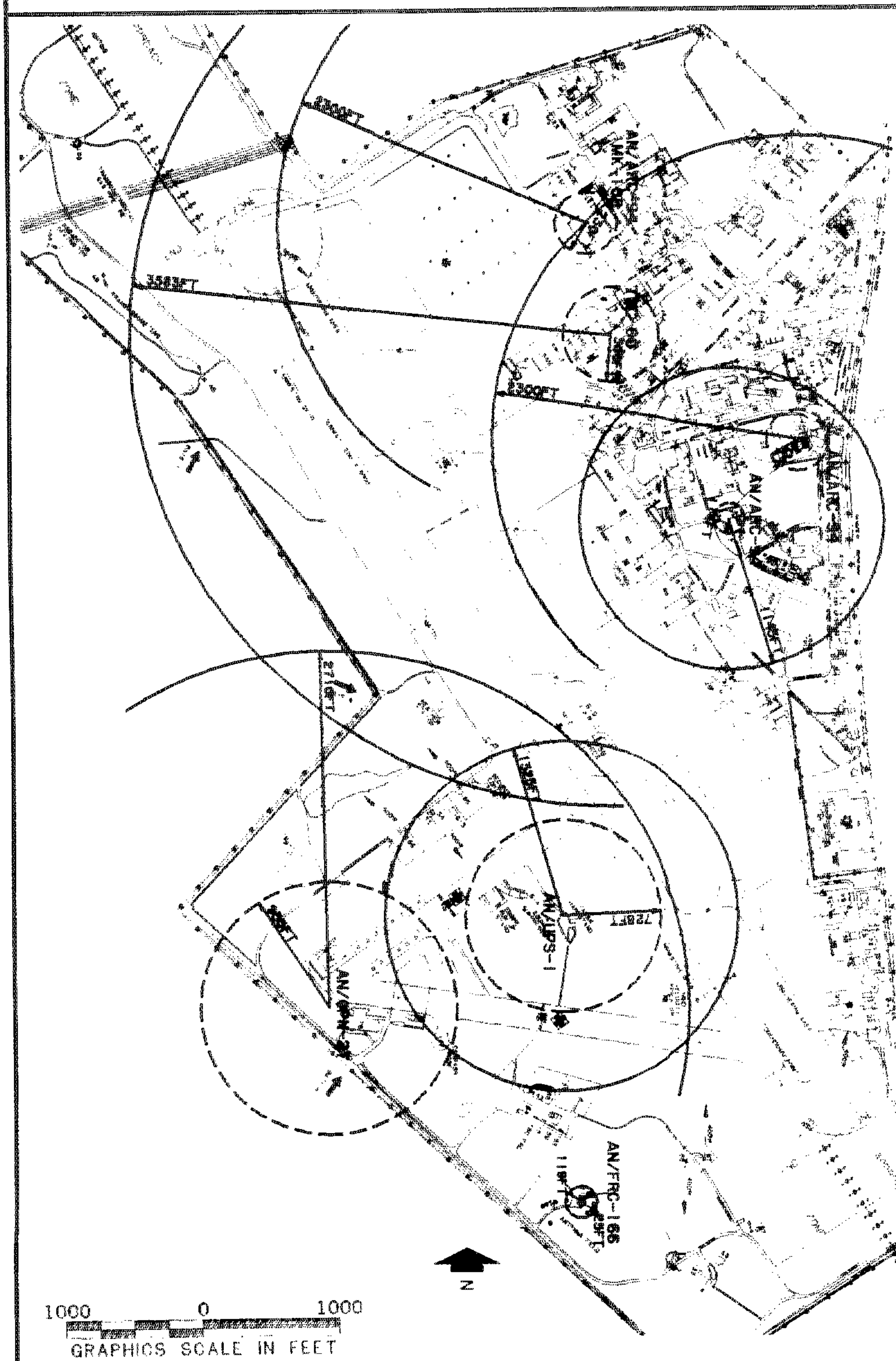
The most serious HERP condition at NAS Willow Grove is not generated by fixed equipment, but by radar equipment mounted in the aircraft being ground tested. Operational procedures require placement of warning signs around the aircraft when the equipment is being ground tested. The P-3 aircraft antennas may radiate harmful rays to a distance of 40 feet. Personnel are warned to remain at least 75 feet from the antennas which are situated in the bow and tail sections of the aircraft.

A theoretical EMR/EMI Survey was prepared by NAVELEXSYSENGCEN, Charlestown, South Carolina in April 1982. The survey provides the safe separation distances for HERO, HERF, and HERP. A more recent study on electromagnetic radiation includes an Electromagnetic Environment Assessment performed by the Naval Surface Weapons Center (NSWC), Dalgren, Virginia in May 1987. However, this survey only provides safe separation distances for ordnance (HERO). Appendix D in Section IX lists all transmitters/antenna systems on Station along with transmitter frequency, power, type of antenna and gain, and the corresponding separation distances.

The EMI/EMR Study indicated that the indicated that the RT-648/ARC-94 at Building 140, the AN/TSC-60 at the Balloon Tent training area behind Building 320, or the AN/ARC-94 at the MATCU site can generate fields in excess of acceptable levels for HERO Unsafe ordnance in several potentially hazardous areas. Restrictions on HF transmitter operation while ordnance is in a HERO Unsafe condition at these locations should preclude any HERO problems from occurring.

On base operation of the AN/TRC-097 mobile transmitter in its high power mode presents some possible HERO Unsafe hazards. Restrictions on where the antenna is aimed will prevent HERO problems from occurring. The proposed AN/GPN-27 radar should be equipped with mechanical blocks to prevent it from being depressed below zero degrees to avoid a potential HERO Unsafe hazard at the proposed Ordnance Assembly area.

ELECTROMAGNETIC RADIATING EQUIPMENT LOCATIONS



NAS WILLOW GROVE
MASTER PLAN

PLATE V-D-7

g) Explosive Safety Quantity Distance (ESQD) Arcs

Ordnance storage facilities at NAS Willow Grove having ESQD arcs include eight magazines located on the Station. There are two main magazine areas; one is approximately 800 feet west of Runway 33 end and the other approximately 1,000 feet northeast of Hangar 177. See Table V-B-1, Ordnance Storage Facilities, in Section V-B of this Plan for a complete listing of magazines and their required clear distance arcs. The ESQD arcs for these buildings are illustrated in Plate V-D-8.

Other ordnance facilities requiring ESQD arcs are the two arming/de-arming pads located at the ends of Runway 15-33. Each pad provides a paved area for activating or deactivating weapons systems on-board aircraft.

NAS Wilow Grove has also submitted a site approval request designating an area on the aircraft parking apron directly in front of the new Marine Hangar for ordnance loading and unloading during flight training. This area would be used for loading and unloading ordnance from A-4H aircraft on weapons training missions. An ESQD arc of 100 feet would be required around each aircraft.

Small arms and ammunition is stored by the Air Force in Building 130. No ESQD arc has been established.

h) Ordnance Handling Routes

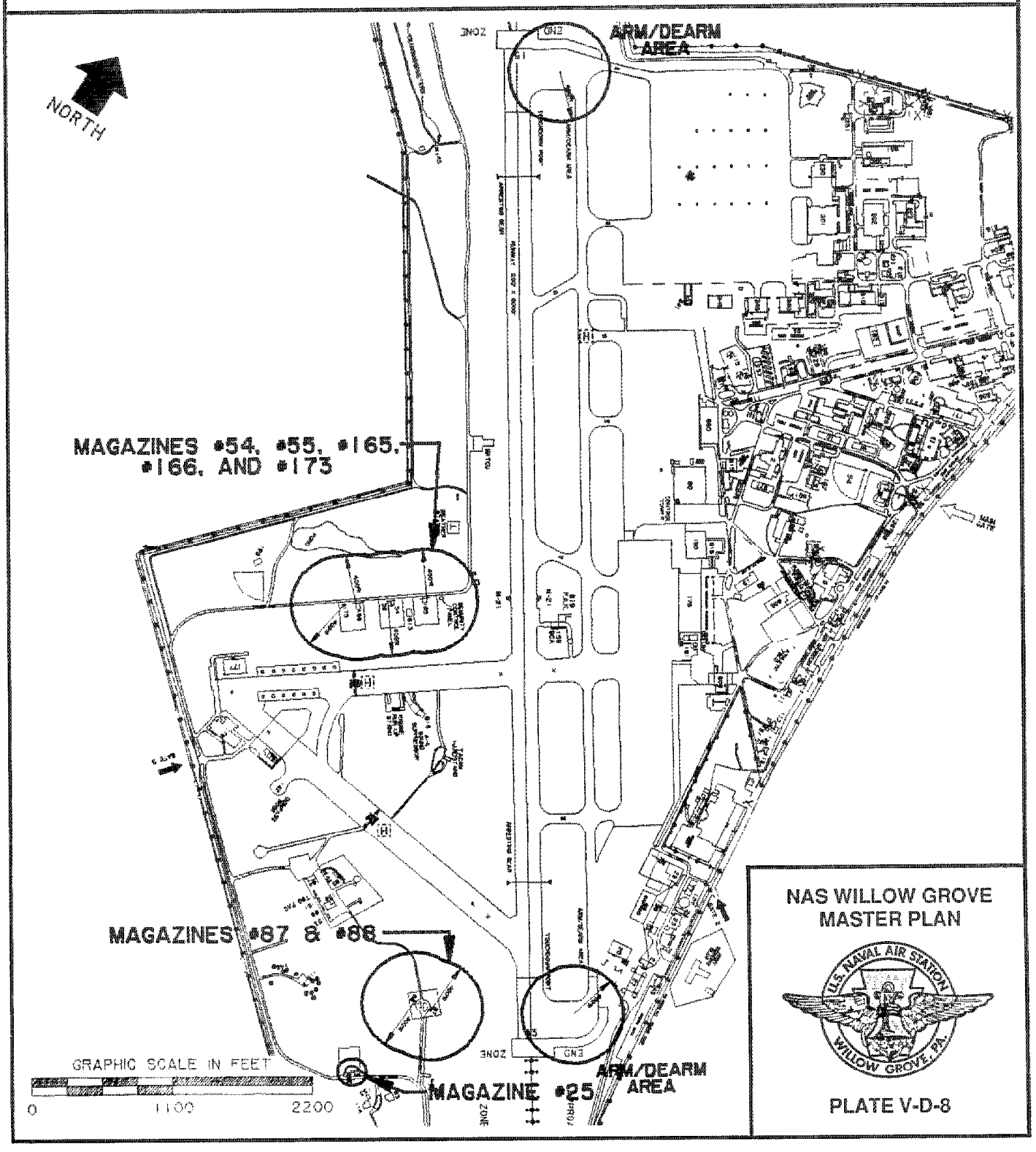
Virtually all of the ordnance materials are delivered to the Station via surface transportation. The primary and secondary ordnance routes to the magazines are shown on Plate V-D-9. The primary ordnance route for shipments are transported through the main gate off Route 611 south on Orion Avenue to the magazine areas. The secondary ordnance route travels north on the crushed stone road to the magazine areas.

i) Compass Calibration Pad Restrictions

This facility must be located in an area free as possible from local, natural, and man-made disturbances. Any change in the physical features of the site may result in magnetic disturbances. Thus, any proposed construction of facilities, utilities, etc., must respect the lateral clearance requirements as outlined in NAVFAC DM-21.

Table V-D-4 provides the recommended minimum lateral clearances from center of calibration pad.

ESQD ARCS


NORTH
ARM/DEARM AREA
MAGAZINES #54, #55, #165, #166, AND #173
MAGAZINES #87 & #88
MAGAZINE #25
ARM/DEARM AREA
GRAPHIC SCALE IN FEET
0
1100
2200
NAS WILLOW GROVE MASTER PLAN
U.S. NAVAL AIR STATION
WILLOW GROVE, PA.
PLATE V-D-8

ORDNANCE HANDLING ROUTES

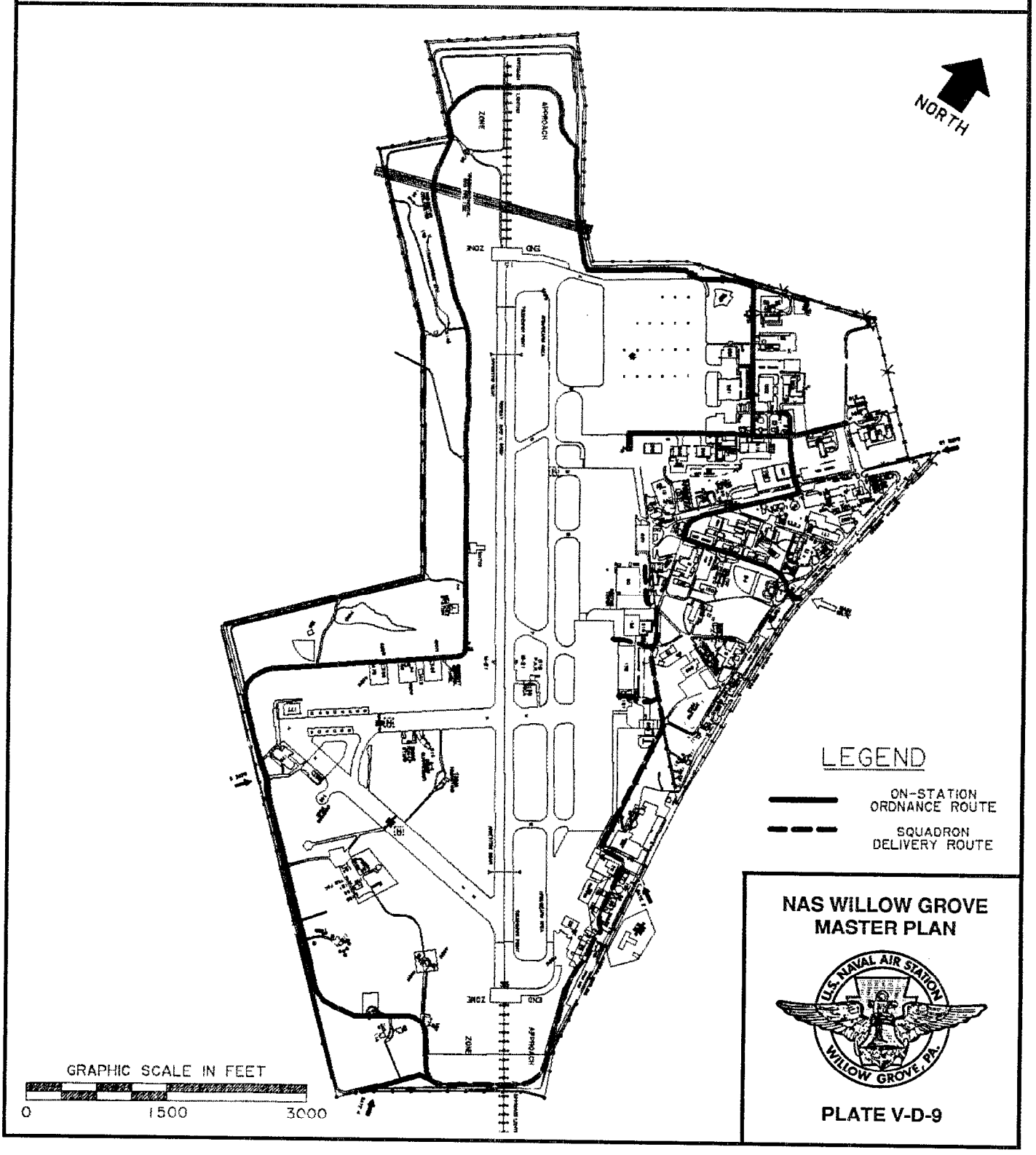


TABLE V-D-4

RECOMMENDED MINIMUM LATERAL CLEARANCES FROM COMPASS CALIBRATION PADS

Maintain the Following Minimum Clearances from Center of Calibration Pad:	Minimum Distance
To nearest portion of building containing any magnetic material such as steel and iron	600 Ft.
To nearest edge of railroad tracks	600 Ft.
To dc power line and/or equipment	1,000 Ft.
To edge of aircraft and vehicle parking lot	275 Ft.
To ac power line and/or equipment	600 Ft.
To underground electric line	500 Ft.
To overhead steam lines	600 Ft.
To underground metal conduits and piping	225 Ft.
To centerline of nearest primary taxiway or towway	275 Ft.

j) Area Search Radar (ASR-8) Restrictions

Siting of the ASR-8 Radar facility is strongly dictated by technical constraints and physical (man-made and natural) conditions. The site selection is dependent upon restrictive distances from large hangars and metallic structures, ordnance and fuel operations facilities, airfield operational and imaginary surfaces, physical terrain, surrounding vegetation, etc.. Conversely, future sitings of other facilities must respect the siting distance requirements contained in Table V-D-5.

TABLE V-D-5

MINIMUM DISTANCES FROM ASR-8 FACILITY

Type of Facility	Distance (Ft.)
Arm/Dearming Pad	1,000
Large Reflecting Surface	3,000
Ordnance Handling	1,000
Fuel Storage	1,000
Reflecting Surface	1,000
Receiver Building - Recommended	1,500
Absolute Minimum	1,000
Runway	1,000
Taxiway	450
TACAN	2,500
Magazine	1,000

For further elaboration, refer to the Base Electronics Systems Engineering Plan (BESEP) for the ASR-8, prepared by NAVELEX Charleston, SC.

k) Control Tower Clear Vision Zones

The control tower is normally sited as near as practical to the centroid of the runway system consistent with airfield safety zone imaginary surface criteria. Consideration is also given toward future airfield operational surface expansion and functional relationship with the air operations building and traffic control complex.

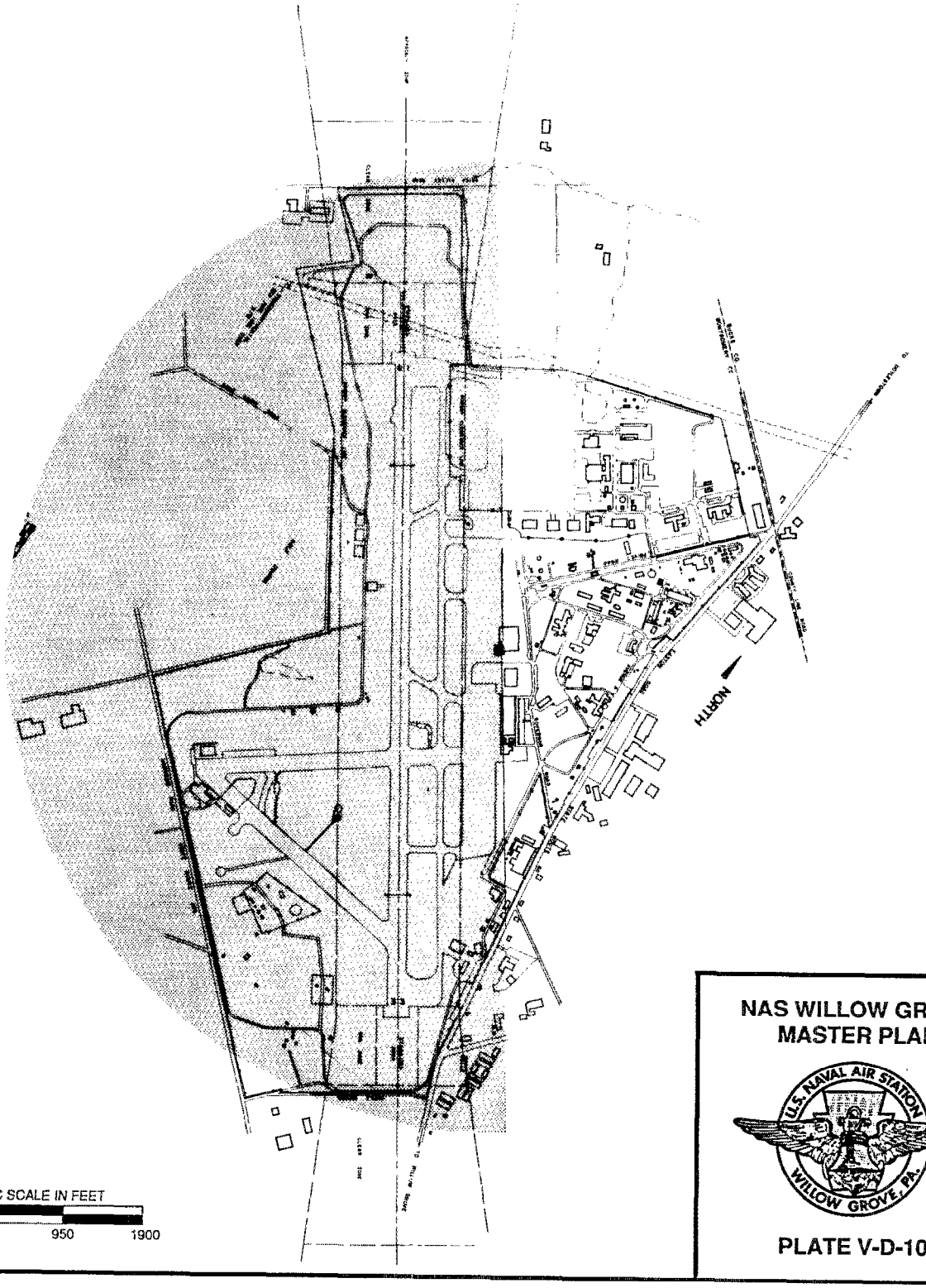
Of paramount importance is the line-of-sight requirements. The location and height of the control tower must provide the air traffic controllers with a complete view of airborne traffic patterns and of all airfield surface areas on which aircraft move under the control of tower personnel. A clear, unobstructed view of all airfield surfaces and the approach to the end of all active runways and other landing areas is mandatory.

The tower cab elevation must provide depth perception of all airfield surface areas to differentiate the number and type of grouped aircraft and/or ground vehicles, and to observe their movements and position relative to the surface areas.

Proper depth perception requires that the line-of-sight intersect each pertinent airfield surface area at a vertical angle of 35 minutes or greater, computed relative to the actual grade of each airfield surface area.

Depth perception is enhanced where the controllers line-of-sight is perpendicular, or oblique, not parallel to the line established by aircraft and/or ground vehicle movement, see Plate V-D-10 for sight limits of existing control tower.

AIR CONTROL TOWER SIGHT LIMITS



NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION
WILLOW GROVE, PA.

PLATE V-D-10

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SECTION VI. AICUZ UPDATE

The AICUZ Update will be issued as an addendum to this Plan.

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VII. DEVELOPMENT CONCEPTS

A. CONCEPTUAL DEVELOPMENT MODEL

The use of conceptual models allows for an unbiased look at general land use principles that apply to the Station. The conceptual sketches are necessarily oversimplified in order to focus on large scale relationships.

The major functions considered in the Conceptual Development Model are:

Administration	Bachelor Housing
Public Works	Medical/Dental
Supply	Training
Airfield Operations	Ordnance (ESQD Safety Arcs)
Personnel Support	Communications Transmitting Antennas
Family Housing	Vehicular Access Routes
Aircraft Maintenance	Outdoor Recreation

Most of the functions described above are self explanatory, however a few require further explanation. The Administration function is intended to describe the Commanding Officer, his Command Staff, as well as certain command support departments, namely the Comptroller and Administration.

The Personnel Support function is intended to represent a wide variety of services primarily in support of the military community, but many of which also serve the civilian work force. Included within this function are the Personnel Support Activity Detachment, Navy Exchange, Religious and Family Services, and Indoor Recreation Services.

Vehicular Access Routes have been divided into three categories; Personnel, Industrial, and Ordnance.

1. Ideal Functional Model

The Ideal Functional Model, Plate VII-1, was developed to illustrate major land use relationships between those functions identified above. The functions are represented as rectangles with the connecting lines between the rectangles representing the degree of association between the functions. The major functions at NAS Willow Grove are; Training, Airfield Operations, and Aircraft Maintenance. Supporting these functions are; Administration, Personnel Support, Public Works, Supply, Medical/Dental, and Housing.

The strongest relationships exist between training and airfield operations, aircraft maintenance and airfield operations, supply and aircraft maintenance, and bachelor housing and training. Since much of the training on Station involves the use of aircraft there is an essential link between the Training Department and the Air Operations Department. The Air Operations Department provides airfield maintenance, air traffic control, and airfield crash protection.

The strong correlation between the Supply Department and the Aircraft Intermediate Maintenance Department is essential to keep the aircraft operational. The Supply Department is responsible for the procurement and distribution of JP-5 and MOGAS.

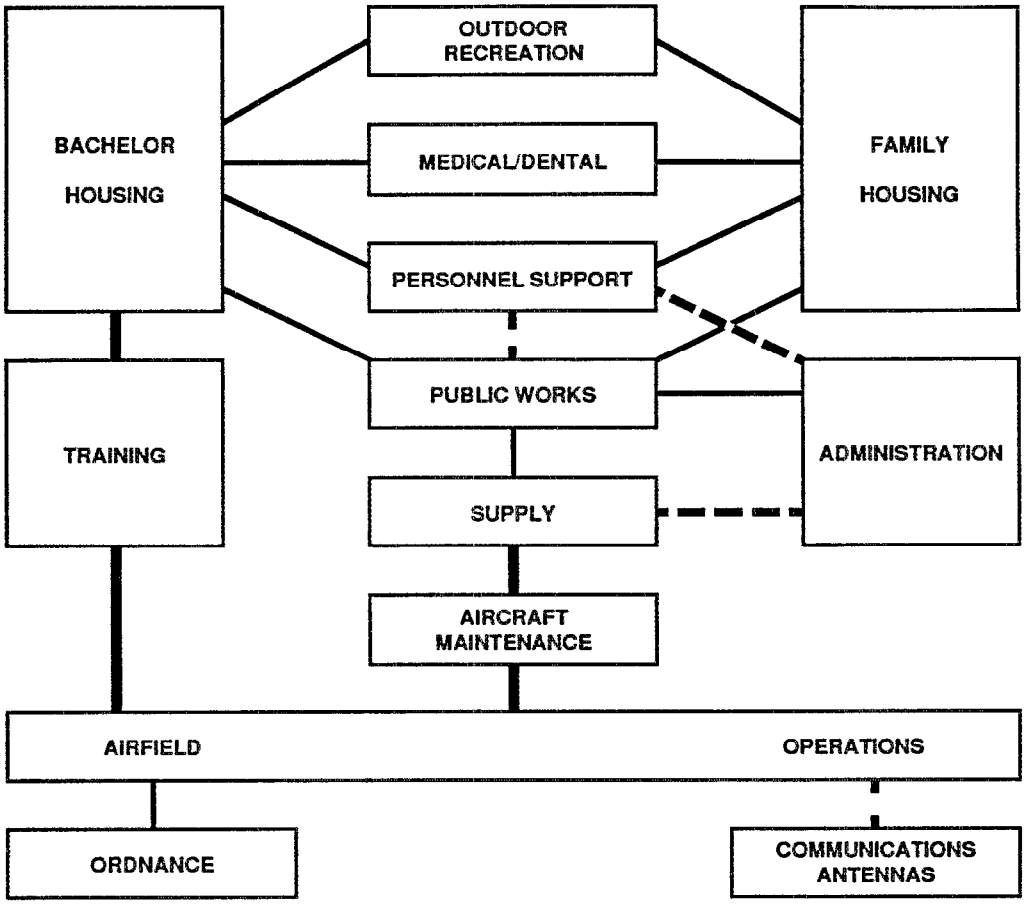
The functional relationship between Bachelor Housing and Training is obvious. All of the on-base training is done with personnel who live in bachelor housing. The proximity of the BEQ's to the galley, personnel support functions, and training areas is essential as the most common form of transportation is walking.

Other highly desireable locational relationships exist between the housing functions and the personnel support, medical/dental, and recreation facilities. Strong ties also exist between Public Works and the Administration and Supply Departments.

Some of the functions described above; Administration, Public Works, and Supply are involved with every department and tenant at the Station. These relationships are too numerous and complex to show graphically, and do not always require the functions to be located in physical proximity to each other. However, it would be prudent to centrally locate these functions to assure reasonable access to and from all departments and tenants on the Station.

Access roads are broken down into three categories; personnel, industrial, and ordnance. Personnel access routes should provide direct access to the major work centers as well as the administrative, personnel support, and housing functions. The industrial access route should service the supply and public works functions and be segregated from the personnel access routes. Ordnance handling routes should provide direct access to the ordnance storage areas and ordnance operating areas. Ordnance should be routed such that it passes through areas with the least amount of development; separate access is preferable.

IDEAL FUNCTIONAL MODEL



LEGEND

- ESSENTIAL
- HIGHLY DESIRABLE
- DESIRABLE

NAS WILLOW GROVE MASTER PLAN

PLATE VII-1

The Ideal Functional Model describes primarily the eastern portion of the Station since the area outside the cantonment area is largely constrained by airfield operations. No functional model has been developed for the area outside of the cantonment area as the airfield function requires large areas of open space. Exceptions will be handled on an individual basis.

2. Existing Conditions

As can be seen on Plates VII-2 and VII-3, Existing Land Use, the general locations of the major functions are in close agreement with the Ideal Functional Model. This is largely due to the implementation of previous master planning objectives. Most of the minor inconsistences occur from temporary and/or substandard/inadequate facilities being utilized for functions that were inconsistent with the land uses for that area. This was done as a "quick fix" that was to have been temporary in duration due to the lack of available space and new project funding.

It should be noted that the development sequence at NAS Willow Grove has not been ideal. The normal separation distances between personnel support and operations are not possible due to the limited area between the Station's boundary, most notably State Route 611 and the flight line. As a result, the best that can be made of the situation is to use the fill in/demolition process, whereby the planning process attempts to place or replace required facilities as near as possible to the ideal location while acknowledging the realities of the constricted site.

B. PROPOSED LAND USE CHANGES

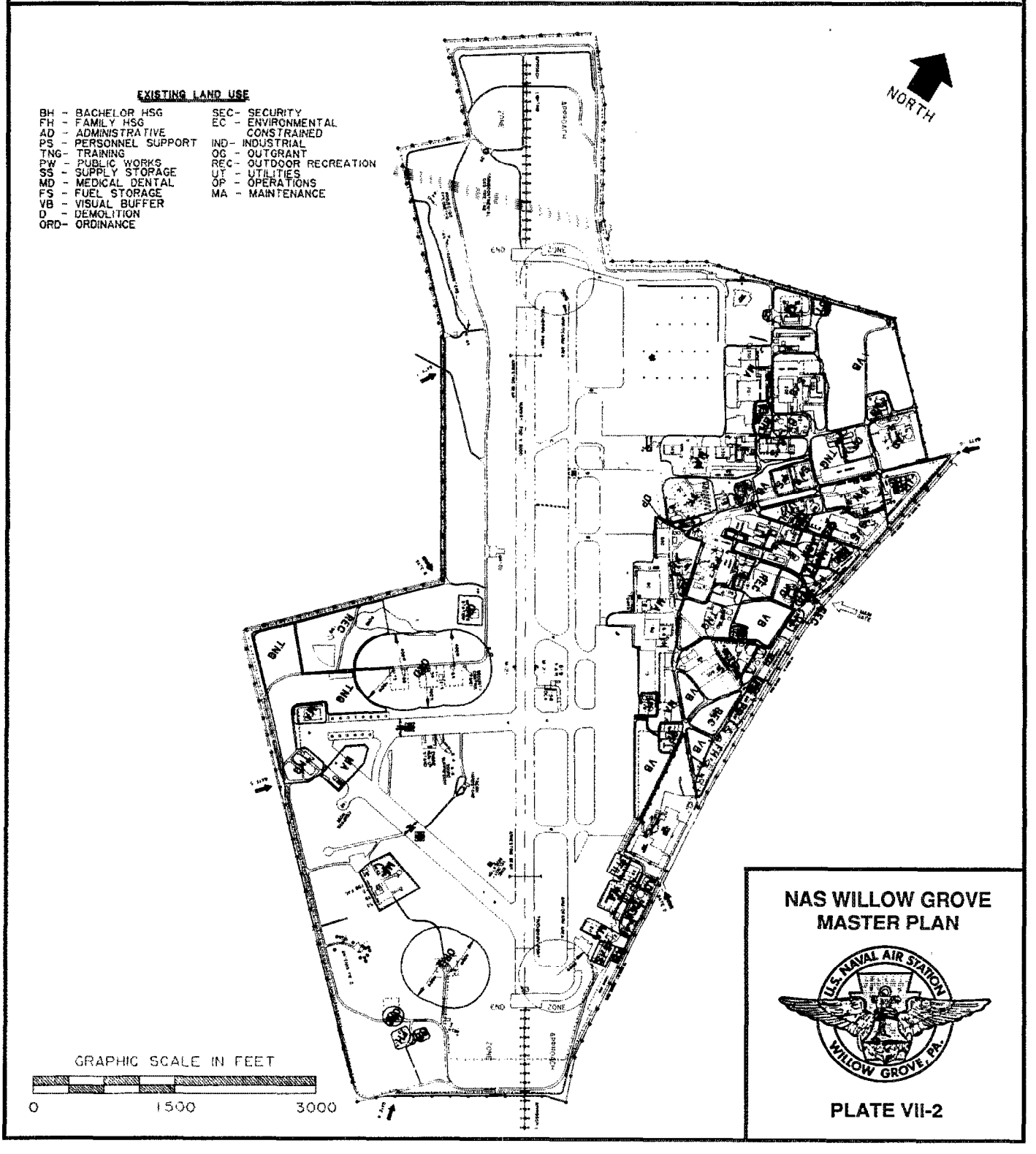
There are numerous factors affecting the land use and development at the Air Station. These factors can be grouped into the following general categories listed below and addressed in more detail.

* Mission Related Changes
* Policy Related Changes
* Economically Driven Changes
* Development Constraints
* Previous Development Plans and General Planning Principles
* Existing Land Uses
* Subjective Decisions

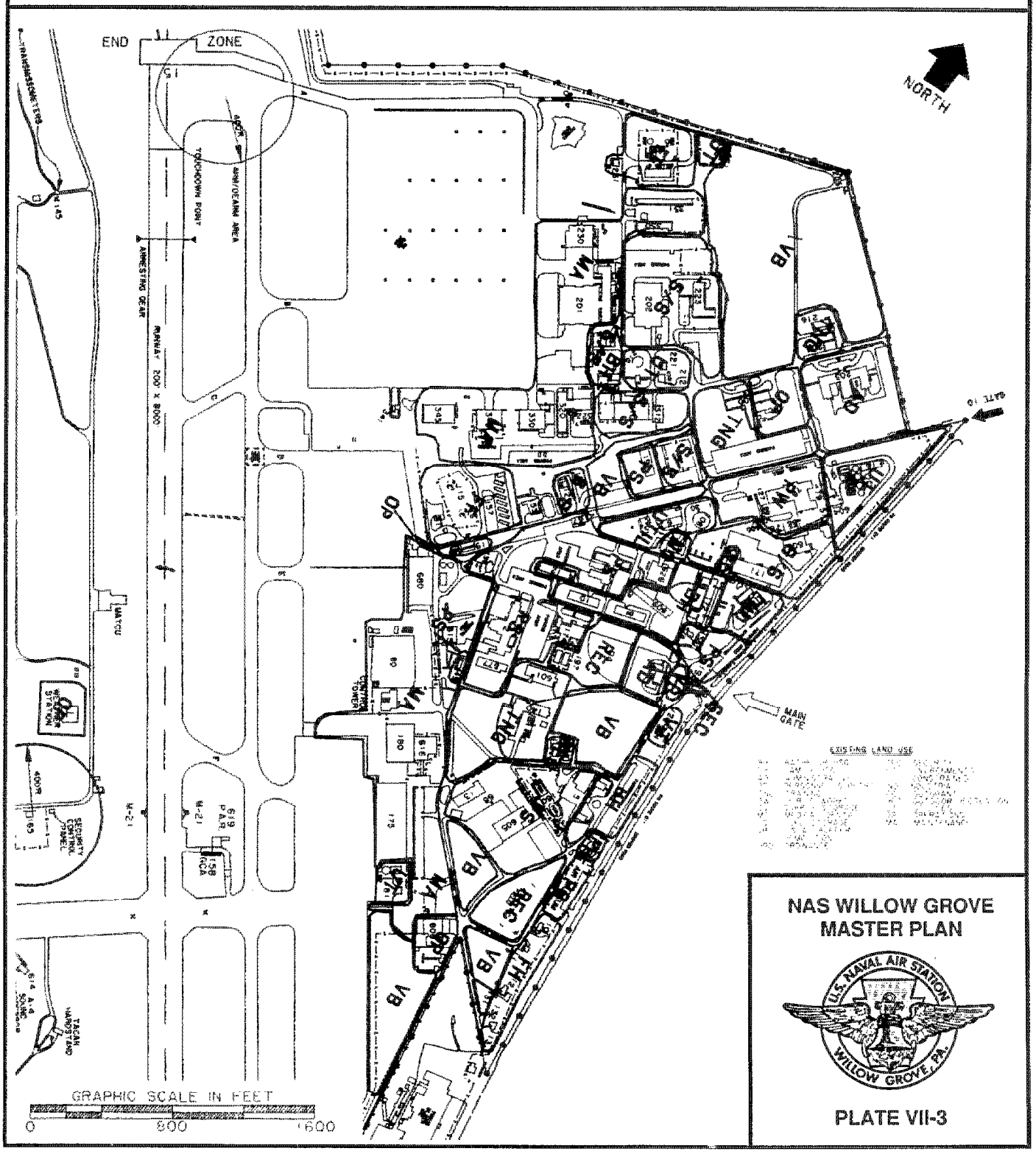
1. Mission Related Changes

Factors which relate to mission changes include new missions or tasks, growth of existing programs, reduced or abolished missions or tasks, new or departing tenants, and expanded or reduced support of these missions.

EXISTING LAND USE



EXISTING LAND USE (DEVELOPED AREA)



NAS WILLOW GROVE
MASTER PLAN

PLATE VII-3

These types of changes which relate to the Installation are the Marine Aircraft Maintenance Hangar, the Air Operations/Passenger Terminal, and the addition of Building #140 to accommodate increased ASW training and flight simulators.

2. Policy Related Changes

Policy related changes are those changes which are brought about by the new or revised policies or guidance such as; Executive Orders, DOD or Navy Instruction, NAVFAC Design or Siting Criteria, Activity Instructions and official guidance, and other Federal, State, and local governmental regulations and policies. The Activity is required to comply with the revised policies. One example of new guidance that will affect the land use planning at the Station is OPNAVINST 5530.14, Physical Security and Loss Prevention Manual. This instruction contains guidance which will affect projects concerning the Station's perimeter fence and roads, and upgraded security for certain sensitive areas.

An example of a policy related change at the Station is the recently constructed flight line security fence. The fence was constructed as a result of the increased security requirements for the flight lines at military installations.

3. Economically Driven Changes

There are changes brought about primarily from an economics or operational efficiency standpoint. Included in this category are facility renovations or replacement which will reduce the life cycle cost for that facility. Also included in this category is the demolition of existing buildings which have outlived their useful life and have become a drain on resources.

4. Development Constraints

Development constraints can either be naturally occurring or man-made conditions which limit or prohibit development. Natural constraints consist of factors such as threatened or endangered species, historic sites, flood-prone areas, and wetlands. Man-made constraints consist of various safety zones for airfield operations, electromagnetic radiation arcs, ordnance handling routes, and explosive safety quantity distance arcs. In addition, certain development limitations are placed on areas of high noise intensity, as well as sites which have become contaminated by past operations on the Station. A detailed description of constraints to development at the Station are contained in Chapter V-D.

5. Previous Development Plans and General Planning Principles

Much of the existing development at the Station has been guided by previous master planning and the applications of general planning principles. The previous Master Plan for the Station was completed in October 1983. Other plans include a Base Exterior Architecture Plan (BEAP) and an Air Installation Compatible Use Zone (AICUZ) Study.

6. Proposed Land Use (Short Range)

The scope of the proposed short range land use plan describes those changes in land use which will most likely occur in the next five to six years. These changes are, for the most part, extensions of the existing land use patterns, see Plate VII-4. In particular, the site locations of the Marine Aircraft Maintenance Hangar, the Air Operations/Passenger Terminal, and the Ground Support Equipment Shop will remain within the area designated as aircraft maintenance. Also, the addition to Building #140 and the Fuel Farm Modernization will remain within each designated land use area, training and supply/storage, respectively.

The location of the Marine Reserve Training Facility will be in the vicinity of the fuel farm/LOX farm which is adjacent to the Marine Aircraft Maintenance Hangar, #680. This location is also near to other Marine facilities.

The only major change in the short range land use would occur as a result of Project P-213, Ground Support Equipment Shop. This new facility will relocate functions performed in Hangar #20, and Buildings #21 and #29. These facilities could then be demolished accomplishing two objectives: (1) the area south of Tinius Olsen would be further "cleared out" for the possibility of an additional aircraft parking apron, and (2) many of the facilities south of Tinius Olsen are airfield obstructions which should be eliminated.

7. Proposed Land Use (Long Range)

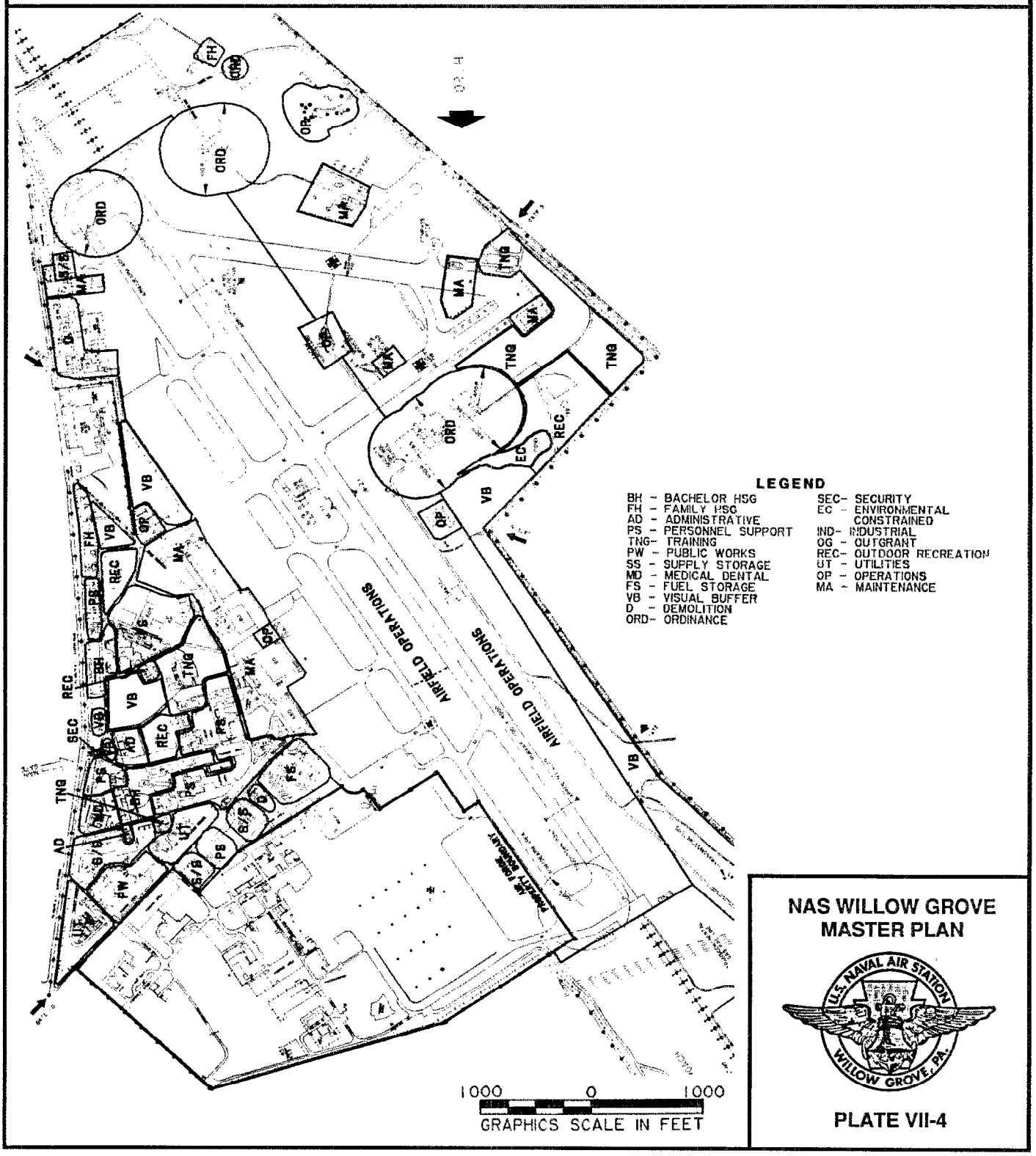
The objective of the proposed long range land use plan is to guide Station growth over the next 10-20 years. This is accomplished by planning for the following; (1) build upon and strengthen the existing land use arrangement, and (2) maintain expansion capability within the designated land use functions. However, several factors combine to affect the magnitude and direction of growth at an activity as previously mentioned, including the political and funding climate at any particular time. Within this context, several shifts are proposed.

Follow through with the proposed POV parking plan in and around the bachelor enlisted quarters area. All available official and unofficial parking in this area is used on the Reserve weekends. Optimizing the use of the available surrounding land with a parking layout will not only yield the maximum number of parking spaces, but will provide an orderly and well kept look and more convenient and rapid ingress/egress.

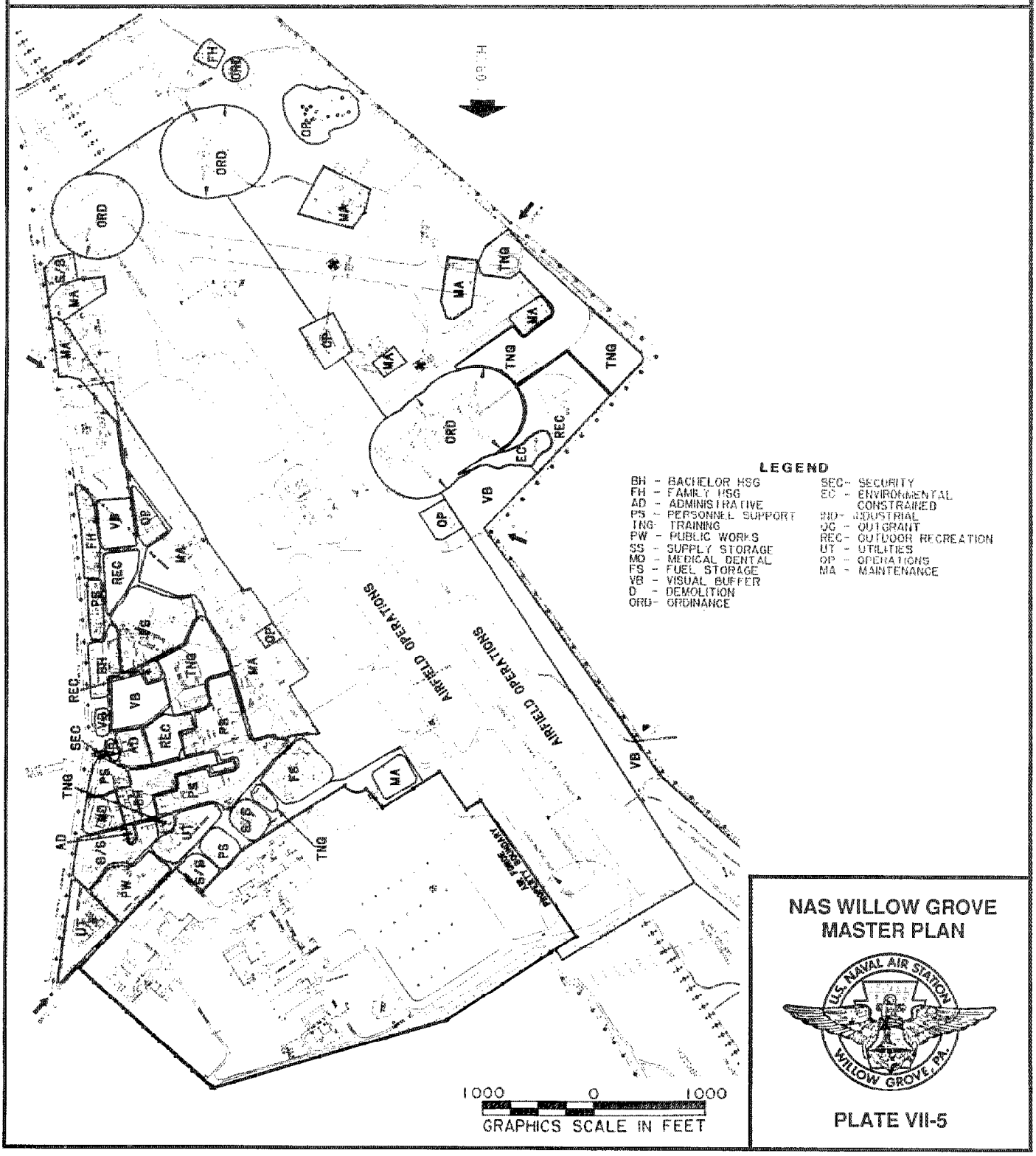
There is no feasible space for any additional family housing on the Station proper. Acquisition of additional land for development or other possible arrangement is necessary to eliminate any deficiency.

Although not in the ideal area, utilities, Supply, and Public Works must remain in their present location.

PROPOSED LAND USE (SHORT RANGE)



PROPOSED LAND USE (LONG RANGE)



NAS WILLOW GROVE
MASTER PLAN

PLATE VII-5

The majority of aircraft parked at NAS Willow Grove are in violation of airfield safety criteria when parked on the apron, but are permitted under several waivers. This problem is resultant from insufficient distance between the runway system and inadequate land area around the operational hangars to properly accommodate the requirement. The expansion of the aircraft parking apron to the south must be implemented in order to eliminate aircraft which must be parked in violation of airfield safety criteria.

Outlying areas around the airfield are largely constrained by natural and man-made conditions. The area west of the airfield is basically reserved for operations and related support systems such as navigational aids, communications, air traffic control, and ordnance. Electronic interference and radiation must be avoided.

Airfield obstructions should be eliminated if possible. If this is not feasible, either due to location off-Station or funding/siting constraints, then action should be initiated to obtain a waiver. On-going land acquisitions will eliminate some off-Station obstructions, but not all. On-Station obstructions are discussed as follows:

Control Tower - This obstruction penetrates the 7:1 slope by approximately 16 feet. There does not appear to be a location available that meets all required criteria and is free of constraints. Therefore, recommend a waiver be obtained for this facility.

Water Tower - This obstruction, located south of Tinius Olsen, penetrates the 7:1 slope by over 66 feet; the largest numerically of any obstruction on the Station. Ideally, the solution would be replacement by a lower profile underground or on-grade tank with pressurization included as required. If this is not considered practical due to budget constraints, then a waiver should be sought.

Hangar Building 20 - This represents probably the worst case in airfield violations in that a large portion of the structure lies within the 750 foot primary airfield surface. Scheduled for demolition in the past, it should be demolished as soon as possible.

Wind Direction Indicator - Penetrates the 7:1 slope by approximately 7 feet. Recommend relocation.

8. Proposed Demolitions

The construction/demolition process is a form of "urban renewal". Although it is a slow and expensive process, it has many positive effects such as: improvements of functional relationships, reduction of energy use and space needs, reduces fire hazards, eliminates handicap barriers, reduces maintenance costs, and it improves the efficiency of land utilization. Those buildings which are currently proposed for demolition are listed in Table VII-1 and illustrated in Plate VII-6.

PROPOSED DEMOLITIONS

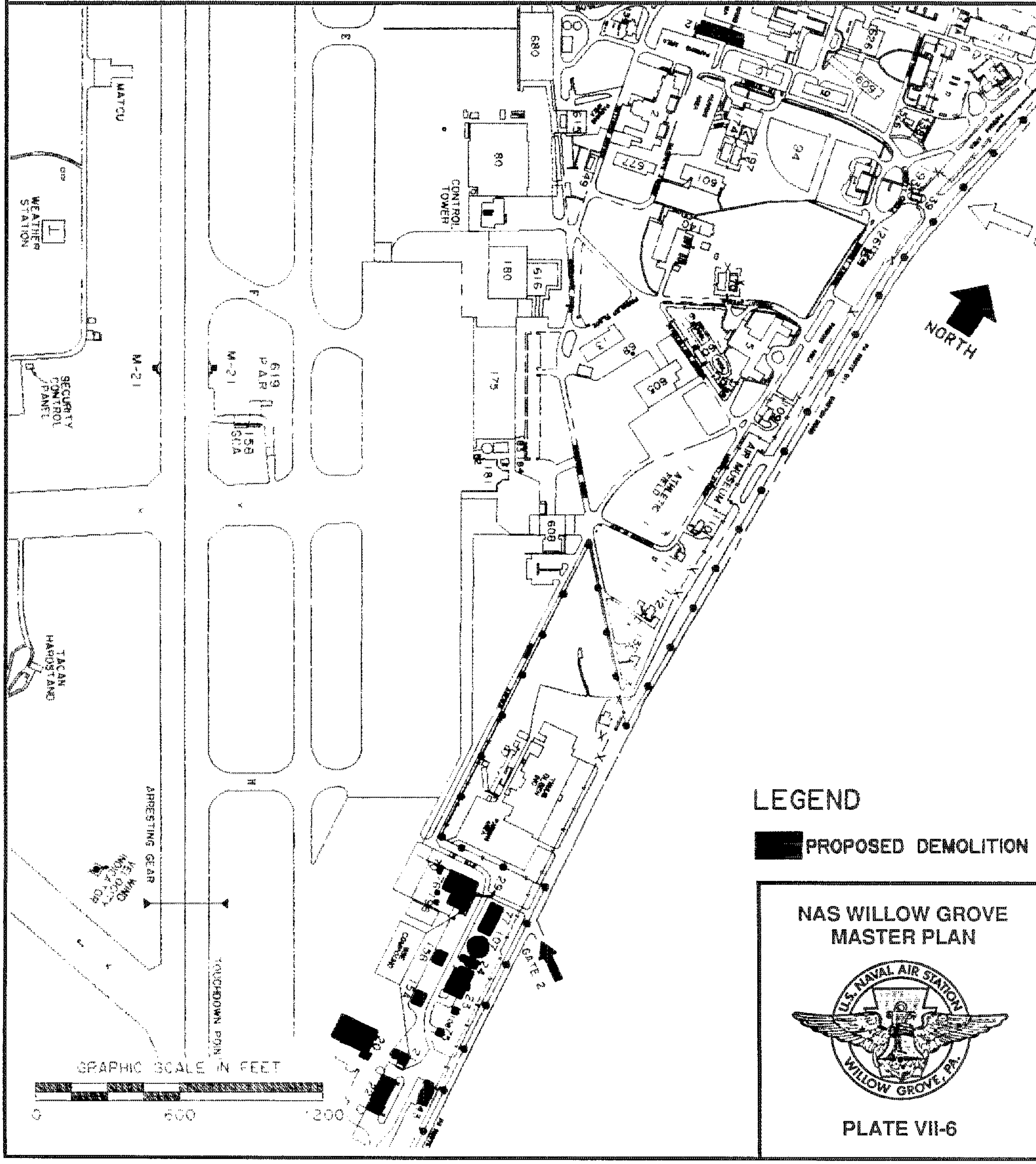


TABLE VII-1

PROPOSED BUILDING DEMOLITIONS

Bldg #	Main Functions	Reason for Demolition	Functions Replaced by	Comments
12	Bachelor Enlisted Quarters	Inadequate facilities to meet BEQ standards.	P-166, BEQ	Bldgs. #9 and #10 to remain.
15A	Utility	See note #1.	No replacement.	See note #2.
15B	Utility	See note #1.	No replacement.	See note #2.
20	Hangar/AIMD	Airfield obstruction located in primary surface; substandard facility	P-213; GSE Facility, MP-201; Addition to GSE, and MP-202; Ord., Para., & Surv.	Various replacement facilities must be readied prior to demolition. See note #2.
21	GSE Shop	Facilities are far from the aircraft it serves.	P-213; GSE Facility.	See note #2.
22	Warehouse	See note #1.		See note #2.
23	Old Hobby Shop	See note #1.		See note #2.
24	Utility	See note #1.	No replacement.	See note #2.
29	GSE Shop	Inadequate facility, far removed from the aircraft it serves.	P-213; GSE Facility, and MP-202; Ord., Para., & Surv. Equip.	See note #2.
43	Recruiting Office	Inadequate facility in poor location.	MP-601; Recruiting Office.	See note #2.
70	Utility	See note #1.	No replacement.	See note #2.
75	Storage	See note #2.	Relocation to #171.	
77	Pass Office	Inadequate facility in poor location, remote from majority of personnel.	P-200; Pass Office.	See note #2.
108	Water Tower	Airfield obstruction, see note #2.	MCNR/Minor MCNR	Should replace with ground level or underground tank.

Note #1 Utility supporting complex south of Tinius Olsen. If complex can be eliminated, no need would remain for these facilities.

Note #2 Supports one of the major recommendations in this Master Plan, to eliminate all facilities at complex south of Tinius Olsen.

9. Potentially Available Sites

The potential expansion capability of the Station is based on many tangible and sometimes intangible factors. The state of national urgency will also alter certain criteria requirements to achieve a timely means to an end. This Study is limited to expansion capability for pre-mobilization.

Potentially available sites within the Station may be classified into three categories; unoccupied/available, occupied but potentially available, and occupied/not available. Definitions for each of these classifications area as follows:

a) Unoccupied/available - presently unoccupied, unimproved but serviced with road access and utilities.

b) Occupied but potentially available - presently occupied by development which is categorized as inadequate. An inadequate facility is one that has deficiencies that would cost greater than 75% of total replacement costs. Replacement would occur rather than rehabilitation.

c) Occupied/not available - presently occupied by existing assets which have a remaining economic life beyond the duration of the Master Plan. Other land areas may not be physically developed but are constrained by other ESQD arcs and airfield safety requirements.

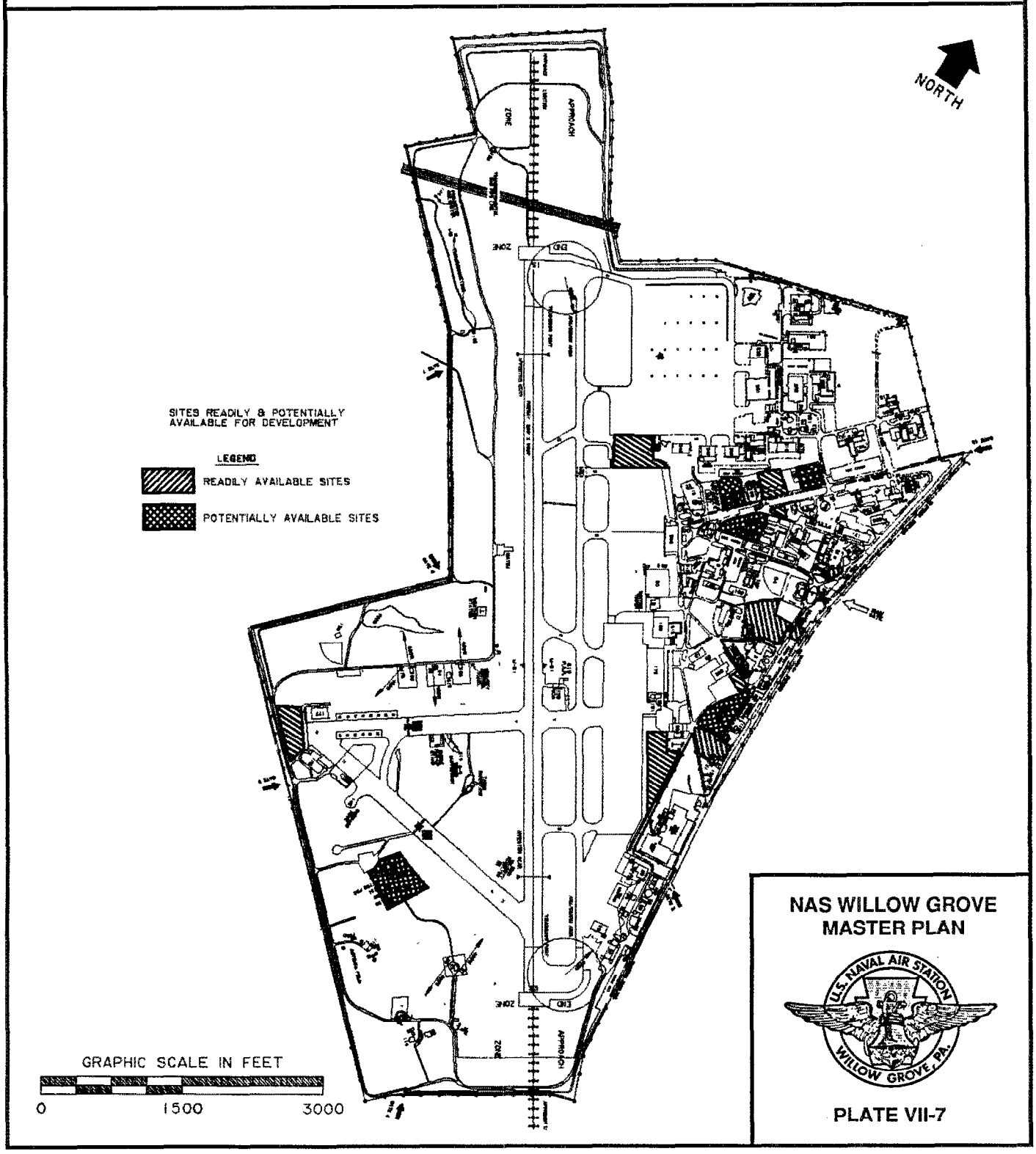
The potentially available sites are illustrated on Plate VII-7. As shown, there are limited open areas available for new facilities as much growth has occurred at NAS Willow Grove over the years. With the exception of the few remaining areas available for expansion, the best that can be made of the situation at the Station is to use the fill in/demolition process, whereby the planning process attempts to place or replace required facilities as near as possible to the ideal location while acknowledging the realities of the constricted site.

10. Proposed Development Plan

The Capital Improvements Plan, see Chapter X, illustrates sitings for proposed development to satisfy the deficiencies identified through the Facilities Planning System. A list of project titles accompanies the Plan. The sitings are in accordance with the foregoing planning rationale and objectives. Sitings are only illustrated for projects that will occupy new land areas, are additions to existing buildings, or are major renovations which will extend the life of the facility. A great majority of the special projects, such as Repairs, Maintenance, and Minor Construction Projects therefore are not shown.

The Capital Improvements Plan addresses in more detail the requirements, rationale, problems, and phasing of individual projects having highest priority and those most imminent to occur.

POTENTIALLY AVAILABLE SITES



11. Base Closure and Realignment Alternatives

On January 29,1990, the Secretary of Defense announced candidate bases to be evaluated for possible closure/realignment. Under the proposed base closure/realignment action, NAS Willow Grove was identified as a potential receptor location for activities from three facilities, including the VP-92 squadron from NAS South Weymouth or the VP-93 squadron from NAF Detroit, one-half the former VR-62 squadron from NAF Detroit, and administrative activities from Naval Complex Philadelphia.

a. NAS Willow Grove Impacts

The addition of a squadron of eight P-3 aircraft would require several changes in land use; demolition of facilities south of Tinius Olsen and relocation of the activities currently located there; construction of a new aircraft maintenance hangar; expansion of AIMD and aircraft parking space; and acquisition of Tinius Olsen property (P-215). Utilities would be required for the new hangar and maintenance facilities. Other expansion and renovation of administrative, bachelor housing, training, and personnel support facilities would also be needed but would serve activities coming from Philadelphia also.

Safety procedures and air space controls in place in the vicinity may have to be adjusted to accommodate additional operations. As the air space is heavily utilized, coordination with the FAA would be necessary.

The increment of 97 active duty military personnel and 111 NAS average-on-board reservists associated with the VP squadron would have no negative impact of its own, but coupled with added weekend reserve activity transferred in from Naval Complex Philadelphia, this increment would negatively impact an already aggravated weekend parking situation.

b. Mitigation and Further Study

The requirements of an additonal VP squadron, one-half the former VR-62 squadron, and administrative activities from Naval Complex Philadelphia would necessitate an in-depth investigation of land use compatibilities prior to implementing the construction and/or expansion of facilities to accommodate the incoming activity.

Investigation of potential air space conflicts and consultation with FAA would be necessary to determine appropriate modification, if any, to air space controls and procedures.

The anticipated additional weekend parking requirements for 417 average-on-board reservists associated with the relocating of VP-92 and others would require investigation. Weekend parking is already severely taxed.

SECTION VIII. PEA

PRELIMINARY ENVIRONMENTAL ASSESSMENT

Prepared by: Northern Division, Naval Facilities Engineering Command for the Naval Air Station Willow Grove, Pennsylvania, in accordance with OPNAVINST 5090.1 in compliance with the Environmental Policy Act of 1969. Northern Division, Naval Facilities Engineering Command may be contacted at the following address for further information.

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Commercial: (215) 897-6255

A. OBJECTIVES

At the outset of this planning effort certain goals and objectives were established to provide a guide for the in-depth analysis which was to follow.

The basic objectives of this Master Plan are to:

1. Improve upon the Station's *FUNCTIONAL RELATIONSHIPS.*

2. Provide cost effective solutions to satisfy facility *DEFICIENCIES* and *SHORTFALLS.*

3. Identify areas of potential *ENCROACHMENT* and suggest mitigating measures.

4. Maintain *EXPANSION POTENTIAL* for peacetime and mobilization scenarios.

5. Improve land utilization to achieve *OPERATIONAL* and *ENERGY EFFICIENCY.*

6. Improve *SAFETY* and *SECURITY* in operations and support areas.

7. Improve *CIRCULATION* and *PARKING.*

8. Review *INFRASTRUCTURE* systems ability to support development and improve reliability.

9. Review and update the *AICUZ.*

B. RECOMMENDATIONS

The following recommendations are put forth in an effort to fulfill the objectives presented above:

1. The limited available land areas on-Station should be preserved and conservatively used to accommodate new or expanding missions.

2. Eliminate all facilities at the south end of the airfield by providing new facilities collocated with related functions in the developed core area. Utility services in the south area will be phased out appropriately.

3. Develop the necessary project documentation required to begin the acquisition process for the facilities identified by the Master Plan (MP) Projects which will satisfy the facilities deficiencies.

4. Build upon the proposed land use plan contained herein. This will improve functional relationships, reduce undesirable environmental conflicts, and eliminate intrusions into airfield surface safety zones.

5. Maintain an active communtiy liaison program and participate as a land owner, in decisions that could affect the operations of the Station.

6. Evaluate recommendations from Utilities Technical Studies for the utilities systems and develop new or revise existing projects to alleviate deficiencies identified within these studies.

7. When feasible, existing buildings should be rehabilitated to improve their energy efficiencies, extend their service life, and to consolidate compatible functions into intensified multiple use facilities in lieu of maintaining and operating small, inefficient, and dispersed facilities.

C. EXISTING CONDITIONS

1. Topography, Geology, and Soils

NAS Willow Grove is in the Triassic Lowlands of the Piedmont physiographic province and the bedrock is of sedimentary origin.

The Montgomery County Soil Survey (US Soil Conservation Service, 1986) indicates that the soil types found on the Station are primarily Lawrenceville silt loam, Lansdale silt loam, and Readington silt loam. Lawrenceville silt loam occurs on the northwest and northeast tips of the Station and the southern end of the Station. This soil is a deep, moderately well-drained silty soil. Permeability is moderately slow. Depth to the shale bedrock is about five feet. Lansdale silt loam, a moderately deep, well-drained soil, occurs in small pockets scattered throughout the Station. Depth to bedrock is about five feet. A somewhat large area of Readington silt loam occurs northeast of the airstrip. This soil is a deep, moderately well-drained soil with a depth to bedrock of four feet.

The remaining areas are disturbed and classified as Made Land. These soils are variable in depth and drainage and are composed of silty materials with shale and sandstone. The areas of made land are extensive and underlie almost all of the buildings on Station, the runways, and the strips of land adjacent to the runways.

According to the soil survey, there are prime agricultural soils in the vicinity of NAS Willow Grove, although none of these soils exist on the Station.

2. Floodplains

There are no flowing streams on the Station that have defined floodplains. The 100 and 500-year floodplains of Park Creek slightly infringe upon the most northerly portion of the Station.

3. Wetlands

The National Wetlands Inventory (NWI) map indicates the presence of Palustrine open water in the north central portion of the NAS, along the southern boundary, and on the western boundary along Dawes Road. A Palustrine Scrub-Shrub/Emergent wetland is mapped along the western boundary directly south of one of the Palustrine Open Waters. NWI maps, due to their margin of error, do not show all wetlands and are not intended to define the limits of federal, state, or local juristiction.

4. Hydrology

The vast majority of the Naval Air Station is underlain by the Stockton Formation. The lower and middle arkosic members of the formation are the best sources of water. Jointing and fracturing is found primarily in the weathered zone in the first 500 feet of the formation.

5. Seismic Zone

NAS Willow Grove in is seismic zone 2; relatively minor damage potential over the long term.

6. Climate

NAS is located in the temperate zone. Precipitation averages 44 inches annually. The average temperatures during the summer months is 24° Centigrade (74° F) and during the winter,1° Centigrade (34° F). Winds are predominately from the west most of the year. Meteorologic extremes are hurricanes and thunderstorms.

7. Threatened or Endangered Species

At this time, there is no State list of endangered and threatened species of birds and mammals in Pennsylvania.

With the exception of the Peregrine Falcon, there are no species of wildlife which are recorded as being present within the local area and recognized as endangered or threatened under the Federal Endangered Species Act of 1973. The Peregrine Falcon is a rare transient in this area during the period of March through November.

8. Cultural Resources

There are no known sites or buildings on the Station that have been listed or determined eligible for listing in the National Register of Historical Places.

9. Disposal Sites

Background. As part of the DOD Installation Restoration Program, the Navy developed the Navy Assessment and Control of Installation Pollutants (NACIP) Program to "identify, assess, and control environmental contamination from past methods of storage, handling, and disposal of hazardous substances at naval shore facilities".

As part of the NACIP Program, an Initial Assessment Study (IAS) was conducted by the Naval Energy and Environmental Support Activity (NEESA) at the Naval Air Station. The purpose of the IAS was to "identify and assess sites posing a threat to human health or the environment due to contamination from past hazardous materials operation".

Based on information from historical records, aerial photographs, field inspections, and personal interviews, a total of ten (10) potentially contaminated sites were identified at NAS Willow Grove. For more detailed information regarding these sites, see Appendix H. Each of the sites was evaluated with regard to contamination characteristics, migration pathways, and pollutant receptors.

Both the surface water and ground water are potential contaminant pathways in the NAS Willow Grove area. Runoff from the Station discharges into two watersheds, the Pennypack Creek and the Little Neshaminy Creek. Both are used to a limited extent for contact recreation. Ground water quality is potentially at risk because NAS Willow Grove and several communities obtain potable and agricultural water supplies from wells in the shallow aquifer. Three (3) such supply wells are located on the Station grounds.

The Study concluded that, while none of the sites pose an immediate threat to human health or to the environment, several sites warrant further investigation under the Navy Installation Restoration (IR) Program to assess potential long-term impacts. A Remedial Investigation Feasibility Study, involving sampling and monitoring of the sites, is to be conducted to confirm or deny the presence of the suspected contamination and to quantify the extent of any problems which may arise. The results of the Confirmation Studies will be used to evaluate the necessity of conducting remedial measures or cleanup operations.

D. PROJECT DESCRIPTIONS AND ENVIRONMENTAL CONSEQUENCES

This section will address projects that are listed in the Five Year Defense Plan (FYDP) as identified by COMNAVRESFOR. Each project will be evaluated for its potential impact without going into extensive detail.

1. P-220: Operational Trainer Facility (FY-90)

a) Project Description

This project will construct an addition to Building #140, Reserve Anti-submarine Warfare Training Center. The proposed addition will be a two-story rectangular building to accommodate the new weapons trainer.

b) Potential Consequences

Potential consequences include: increased noise levels, construction personnel will be exposed to routine construction hazards, and dump trucks, front end loaders, and back hoes will add to the deterioration of air quality.

c) Mitigating Measures

Noise impacts will be short term and confined to daytime hours. Upon completion of the project, noise levels will not increase over current levels. Precautions will be taken to insure worker's safety. Watering down work surroundings will reduce dust clouds.

2. P-213: Ground Support Equipment Shop and Shed (FY-91)

a) Project Description

This project will construct an aircraft Ground Support Equipment maintenance facility fully equipped to efficiently maintain and repair ground support equipment in support of high performance aircraft assigned to the Station.

b) Potential Consequences

There will be dust and noise emissions during construction, utilities may be impacted, and construction will involve the use, storage, and disposal of various petroleum products.

c) Mitigating Measures

Dust and noise impacts will be minor and short term. The current utility systems has enough capacity to handle additional demands of the new facility. A storage area will be designated to ensure that leakage and pollution does not occur.

3. P-195; North Lean-to, Hangar 80 - HVAC (FY-92)

a) Project Description

This project will provide heating and air conditioning in the north lean-to of Hangar 80.

b) Potential Consequences

No adverse impacts will result to the environment from this project other than the temporary degradation of the air quality and noise generated during construction.

c) Mitigating Measures

Air pollutants emitted during construction will be controlled as necessary. Noise impacts will be short term and limited to daytime hours.

4. P-164; POV Parking, BEQ Area (FY-96)

a) Project Description

This project will provide privately owned vehicle (POV) parking in the BEQ area, adjacent to maintenance Hangars 680. A total of approximately 10,500 SY of parking will be constructed to accommodate an additional 300 cars.

b) Potential Consequences

Potential impacts include; increased noise levels, deterioration of the air quality, increased surface water runoff, and a decrease in the amount of "green space" on the Station.

c) Mitigating Measures

Noise impacts will be short term and confined to daytime hours. Watering down work surroundings will reduce dust emissions. Proper construction and storm drainage work should control and channelize runoff water and avoid any adverse impacts.

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IX. APPENDICIES

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APPENDIX A

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APPENDIX B

THREATENED AND ENDANGERED SPECIES

SPECIES OF MAMMALS, REPTILES, AMPHIBIANS, AND BIRDS FOUND IN THE WILLOW GROVE AREA

Mammals

Bat, Big Brown	Eptesicus fuscus
Chipmunk, Eastern	Tamias striatus
Cottontail, Eastern	Sylvilagus floridanus
Fox, Red	Vulpes vulpes
Mink	Mustela vison
Mole, Eastern	Scalopus aquaticus
Woodchuck	Marmota monax
Mouse, House	Mus musculus
Deer, White-tailed	Odocoileus virginianus
Myotis, Little Brown	Myotis lucifugus
Raccoon	Procyon lotor
Rat, Norway	Rattus norvegicus
Shrew, Short-tailed	Blarina brevicauda
Skunk, Striped	Mephitis mephitis
Squirrel, Gray	Sciurus carolinensis
Weasel, Long-tailed	Mustela frenata

Reptiles

Copperhead, Northern	Aglistrodon contortrix
Snake, Queen	Regina septemvittata
Snake, Eastern Garter	Thamnophis sirtalis
Turtle, Red-bellied	Chrysemys rubriventris

Amphibians

Frog, Bull	Rana catesbeiana
Frog, Green	Rana calmitans
Frog, Northern Cricket	Acris creptitans
Frog, Plains Leopard	Rana blairi

Amphibians (continued)

Frog, Wood	Rana sylvatica
Salamander, Four-toed	Hemidactylium scutatum
Salamander, Northern Duskey	Desmognathus fuscus fuscus
Salamander, Redback	Plethodon cinereus
Spadefoot, Eastern	Scaphiopus holbrooki
Toad, American	Bufo americanus

Birds

Bittern, American	Botaurus lentiginosus
Blackbird, Red-winged	Agelaius phoneniceus
Cardinal, Common	Cardinalis cardinalis
Catbird, Gray	Dumetella carolinensis
Chickadee, Carolina	Parus carolinensis
Coot, American	Fulica americana
Cowbird, Brown-headed	Molothrus ater
Crow, American	Corvus brachyrhynchos
Dove, Mourning	Zenaida macroura
Dowitcher, Short-Billed	Limnodromus griseus
Duck, Black	Anas rubripes
Duck, Ring-necked	Aythya collaris
Nighthawk, Common	Chordeiles minor
Nuthatch, Red-breasted	Sitta canadensis
Oriole, Northern	Icterus galbula
Owl, Barn	Tyto alba
Owl, Short-eared	Asoi flammeus
Peewee, Eastern	Contopus virens
Pidgeon	Columba livia
Rail, Virginia	Rallus limicola
Redstart, American	Setophaga ruticilla
Robin, American	Turdus migratorius
Sandpiper, Least	Calidris minutilla
Sapsucker, Yellow-bellied	Sphyrapicus varius
Snipe, Common	Capella gallinago
Sparrow, Song	Melospiza melodia
Sparrow, Tree	Spizella arborea
Sparrow, White Crowned	Zonotrichia leucophrys
Starling, Common	Sturnus vulgaris
Swallow, Barn	Hirundo rustica
Swallow, Cliff	Petrochelidon pyrrhonota
Finch, House	Carpodacus mexicanus
Finch, Purple	Carpodacus prupureus

Birds (continued)

Flicker, Common	Colaptes auratus
Flycatcher, Least	Empidonax minimus
Flycatcher, Yellow-bellied	Empidonax flaviventris
Gnatcatcher, Blue-gray	Polioptila caerulea
Goldfinch, American	Spinus tristis
Goose, Canada	Branta canadensis
Grackle, Common	Quiscalus quiscula
Grosbeak, Evening	Hesperiphona vespertina
Gull, Bonaparte's	Larus philadelphia
Gull, Ring-billed	Larus delawarensis
Hawk, Rough-necked	Bueto lagopus
Heron, Black-crowned Night	Nycticorax nycticorax
Hummingbird, Ruby-throated	Archilochus colubris
Ibis, Glossy	Plegadis falcinellus
Jay, Blue	Cyanocitta cristata
Junco, Dark-eyed	Junoc hyemalis
Kestrel, American	Falco sparverius
Kinglet, Ruby-crowned	Regulus calendula
Loon, Red-throated	Gavia stellata
Mallard	Anas platyrhynchos
Martin, Purple	Progne subis
Mockingbird, Northern	Mimus polyglottos
Swallow, Tree	Iridoprocne bicolor
Swift, Chimney	Chaetura pelagica
Tanager, Scarlet	Piranga olivacea
Thrush, Wood	Hylocichla mustelina
Titmouse, Tufted	Parus bicolor
Towhee, Rufous-sided	Pipilo erythrophthalmus
Turnstone, Ruddy	Arenaria interpres
Vireo, Red-eyed	Vireo olivaceus
Warbler, Black-throated Blue	Dendroica caerulescens
Warbler, Parula	Parula americana
Warbler, Yellow	Dendroica petechia
Waterthrush, Northern	Seiurus noveboracensis
Waxwing, Cedar	Bombycilla cedrorum
Woodcock, American	Philohela minor
Woodpecker, Downy	Dendrocopos pubescens
Wren, Carolina	Thryothorus ludovicianus
Yellowlegs, Greater	Tringa melanoleuca
Yellowthroat, Common	Geothlypis trichas

COMPILATION OF FEDERALLY-LISTED ENDANGERED PLANTS AND ANIMALS IN THE COMMONWEALTH OF PENNSYLVANIA[1]

GROUP	COMMON NAME	STATUS
Bird	Peregrine Falcon	E-(S/A)[2]
Bird	Piping Plover	E
Bird	Eskimo Curlew	E
Bird	Barn Owl	R[3]
Bird	Bald Eagle	E
Mammal	Eastern Cougar	E
Mammal	Indiana Bat	E
Invertebrate	Orange-Footed Pearly Mussel	E
Invertebrate	Pink Muckey Pearly Mussel	E
Plant	Small Whorled Pogonia	E

[1]Source: 50 Code of Federal Regulations 17.11 and 17.12 dtd 10 April 88, and supplement; the above species are listed even if a portion of the state may be incidentally used by the respective species; No threatened species were identified; NAS Willow Grove has not yet been extensively inventoried for these species, hence it is unknown if they are found occupying the area.

[2]Endangered by Similarity of Appearance

[3]Rare

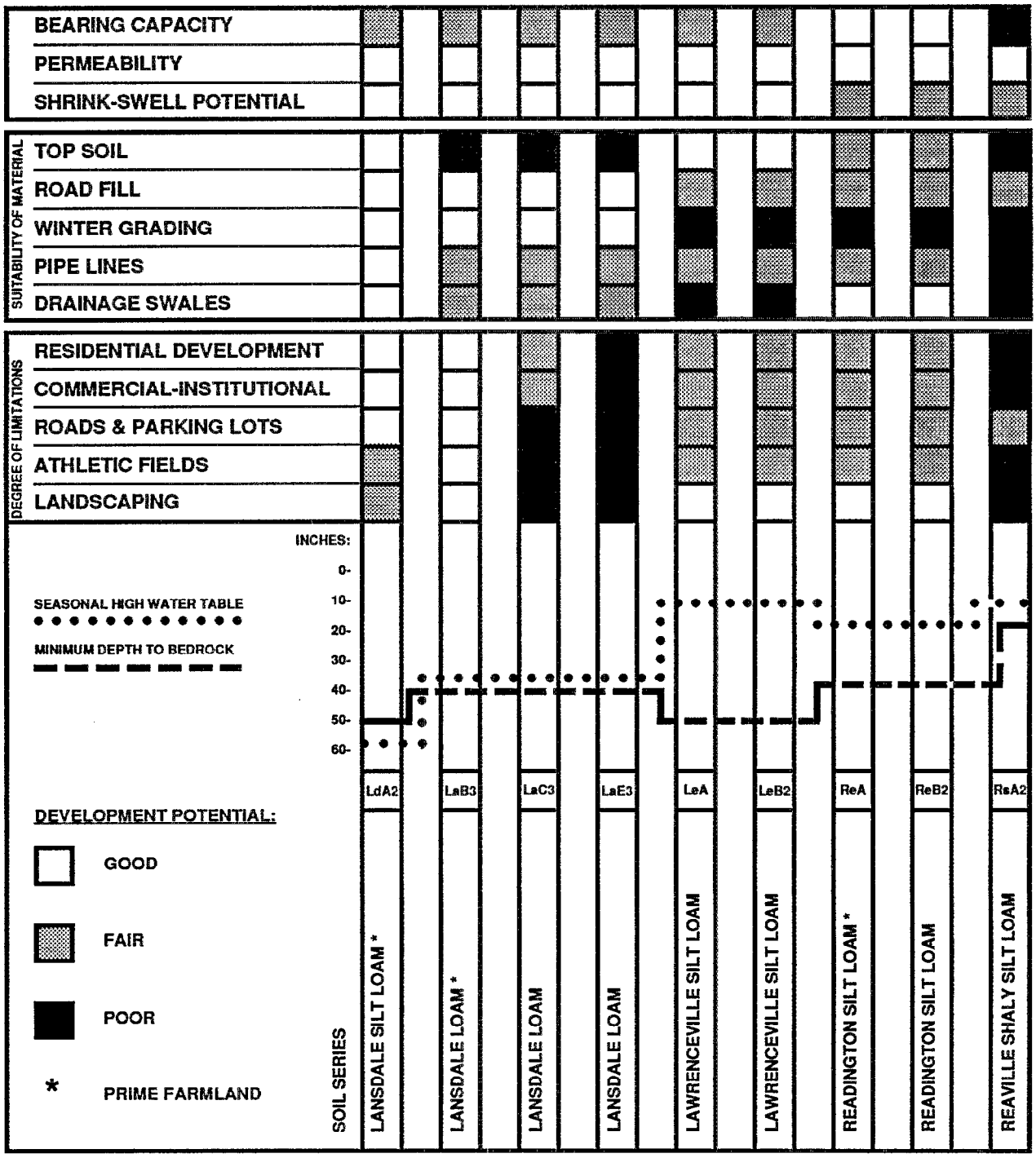
COMPILATION OF STATE-LISTED ENDANGERED/THREATENED SPECIES INTHE COMMONWEATH OF PENNSYLVANIA[1]

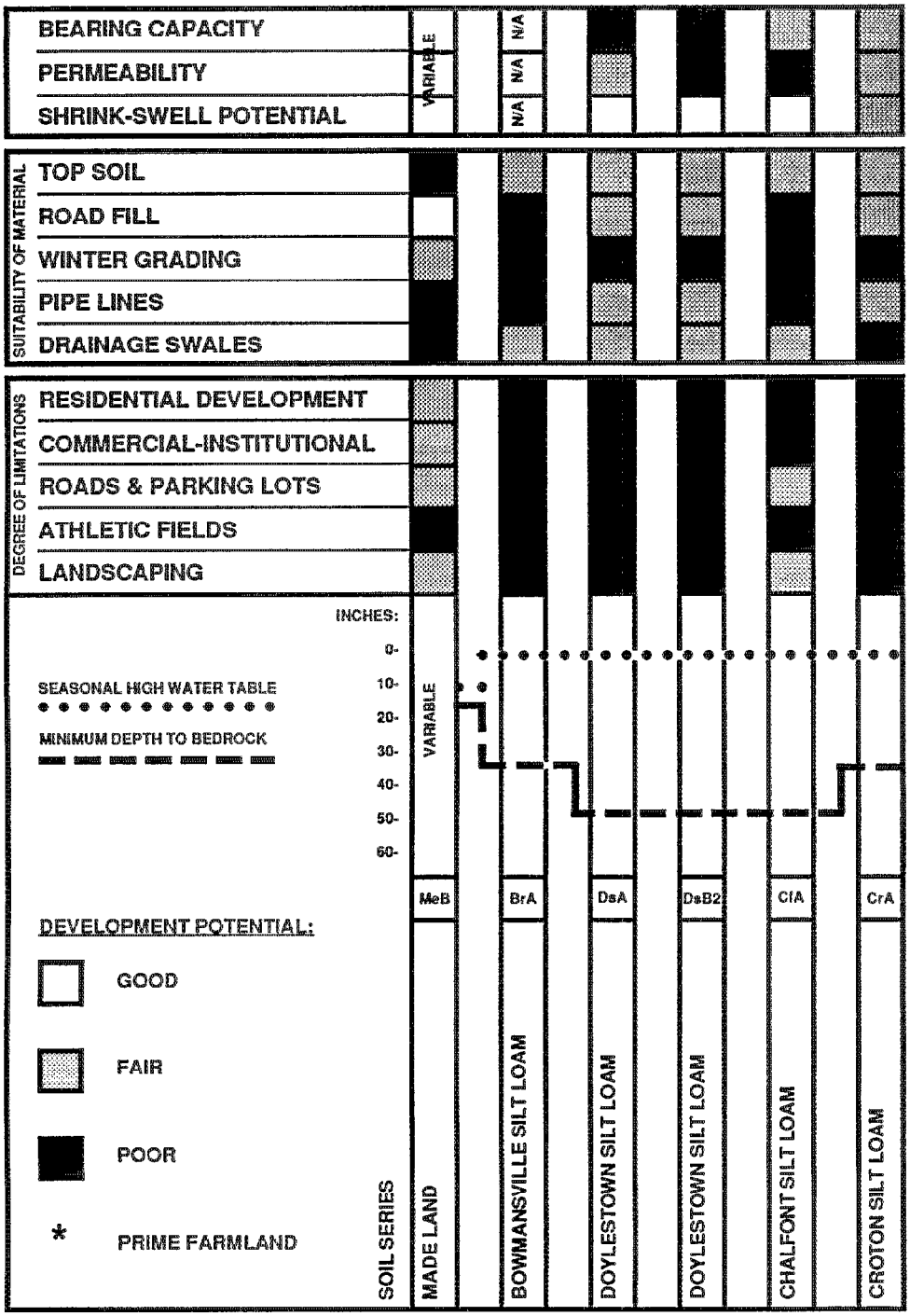
GROUP	COMMON NAME	STATUS
Bird	American Bittern Bird	T
Bird	Bittern, Least	T
Bird	Osprey	E
Bird	Short-eared Owl	E
Bird	King Rail	E
Bird	Black Tern	E
Bird	Bewick's Wren	E
Bird	Sedge Wren	T
Reptile	Red-bellied Turtle	E

[1]Computer-generated list provided by the Pennsylvania Game Commission, Harrisburg, PA; NAS Willow Grove has not yet been extensively inventoried for these species, hence it is unknown if they are occupying the area.

APPENDIX C

CLASS OF SOIL




BEARING CAPACITY
PERMEABILITY
SHRINK-SWELL POTENTIAL
VARIABLE
N/A
N/A
N/A
SUITABILITY OF MATERIAL
TOP SOIL
ROAD FILL
WINTER GRADING
PIPE LINES
DRAINAGE SWALES
DEGREE OF LIMITATIONS
RESIDENTIAL DEVELOPMENT
COMMERCIAL-INSTITUTIONAL
ROADS & PARKING LOTS
ATHLETIC FIELDS
LANDSCAPING
INCHES:
0-
10-
20-
30-
40-
50-
60-
SEASONAL HIGH WATER TABLE
MINIMUM DEPTH TO BEDROCK
VARIABLE
MeB
BrA
DsA
DsB2
CfA
CrA
DEVELOPMENT POTENTIAL:
GOOD
FAIR
POOR
* PRIME FARMLAND
SOIL SERIES
MADE LAND
BOWMANSVILLE SILT LOAM
DOYLESTOWN SILT LOAM
DOYLESTOWN SILT LOAM
CHALFONT SILT LOAM
CROTON SILT LOAM

APPENDIX D

TRANSMITTER/ANTENNA SYSTEMS

The Naval Surface Warfare Center (NSWC), Dalgren, VA recently completed an Electromagnetic Environment Assessment for NAS Willow Grove in June 1987. This survey provides safe separation distances for ordnance. Separation distances for personnel and fuel are obtained from the Theoretical Electromagnetic Radiation Survey by the Naval Electronics Systems Engineering Center (NAVELEXCEN) dated April 1982.

References:

(a) NAVSEA OP 3565/NAVAIR 16-1-529/NAVELEX 0967-LP-624-6010, ELECTROMAGNETIC RADIATION HAZARDS (HAZARDS TO ORDNANCE), Vol. II, Change 5, 1 May 1987.

TRANSMITTER/ANTENNA SYSTEMS
NAS WILLOW GROVE (GROUND ELECTRONICS)

TRANSMITTER TYPE	LOCATION	TRANSMITTER FREQUENCY	TRANS. POWER	ANTENNA NOMENCLATURE	ANTENNA TYPE
AN/GRT-21	Bldg. #118	116-160 MHz	10 W	D-2216	Dipole
AN/GRT-211	Control Tower	116-160 MHz	30 W	D-2213	Dipole
MOCOM 35[1]	Mobile	136-174 MHz	15 W	TAD6111A	Stub
MOCOM 70	Mobile	136-174 MHz	45 W	TAD6111A	Stub
HT-220	Mobile	138-152 MHz	5 W	NAD6221A	Stub
MT-500	Mobile	138-152 MHz	5 W	NAD6221A	Stub
CONVERTACOM[1,3]	Mobile	138-152 MHz	20 W	N/A	Whip
FLEXAR BASE[1]	Bldg. #1	136-174 MHz	25 W	N/A	Whip
AN/VRC-82	Mobile	138-151 MHz	60 W	TAD6111A	Stub
AN/FRC-166	Bldg. #118	138-151 MHz	100 W	D-2216	Dipole
KPFI[1]	Mobile	139.55 MHz	1.5 W	N/A	Whip
AN/URC-101[3]	Mobile Mobile	116-150 MHz 225-400 MHz	5 W 20 W	N/A N/A	Stub Stub
AN/GRT-22	Bldg. #118	225-400 MHz	10 W	D-2217	Dipole
AN/FRN-39[1]	Bldg. #118	225-400 MHz	10 W	D-2217	Dipole
AN/GRC-171	Bldg. #118	225-400 MHz	40 W	D-2217	Dipole
RML 107[1,3]	ASR	7225 MHz	5 W	P671GD	Parabolic
AN/GPN-27	ASR	2705-2765 MHz	625 W	FA-9344	Parabolic
AN/TPX-42	ASR	1030 MHz	2.5 W	AT-309	Slotted array
AN/URN-25	TACAN	1022 MHz	400 W	AS-3240	Parasitic array
AN/FPN-63	TACAN	9080 MHz	52.8 W	AS-3160	Parabolic
AN/URN-5	Bldg. #118	0.2-0.8 MHz	400 W	ZZ/URN-5	Center fed longwire

[1]Equipment not listed in Table 3-1 of reference (a).
[2]These distances vary from those published in Table 3-1 of reference (a).
This list takes precedence as it reflects the equipment configuration at NAS Willow Grove.
[3]Proposed equipment.

TRANSMITTER/ANTENNA SYSTEMS
NAS WILLOW GROVE (GROUND ELECTRONICS)

TRANSMITTER TYPE	ANTENNA GAIN	HERO UNSAFE	HERO SUSCEPTIBLE	HERF	HERP
AN/GRT-21	2 dBi	93 ft/28 m	19 ft/6 m	50 ft	1 ft
AN/GRT-211	2 dBi	70 ft/22 m	10 ft/3 m		
MOCOM 35[1]	2 dBi	43 ft/13 m	10 ft/3 m	50 ft	1 ft
MOCOM 70	2 dBi	80 ft/24 m	20 ft/6 m	50 ft	1 ft
HT-220	1 dBi	21 ft/6 m	10 ft/3 m	50 ft	1 ft
MT-500	1 dBi	21 ft/6 m	10 ft/3 m		
CONVERTACOM[1,3]	2 dBi	49 ft/15 m	10 ft/3 m		
FLEXAR BASE[1]	2 dBi	56 ft/17 m	12 ft/4 m		
AN/VRC-82	2 dBi	69 ft/21 m	13 ft/4 m	50 ft	1 ft
AN/FRC-166	2 dBi	117 ft/36 m	25 ft/8 m		
KPFI[1]	2 dBi	10 ft/3 m	10 ft/3 m		
AN/URC-101[3]	1 dBi 1 dBi	21 ft/6 m 26 ft/8 m	10 ft/3 m 10 ft/3 m		
AN/GRT-22	2 dBi	21 ft/6 m[2]	10 ft/3 m[2]		
AN/FRN-39[1]	2 dBi	21 ft/6 m	10 ft/3 m		
AN/GRC-171	2 dBi	30 ft/9 m[2]	10 ft/3 m[2]		
RML 107[1,3]	40 dBi	57 ft/17 m	40 ft/12 m		
AN/GPN-27	33.5 dBi	2710 ft/1345 m	955 ft/290 m	232 ft	65 ft
AN/TPX-42	19.5 dBi	27 ft/8 m[2]	13 ft/4 m[2]		
AN/URN-25	6 dBi	48 ft/14 m	23 ft/7 m		
AN/FPN-63	39.7 dBi	155 ft/47 m	110 ft/33 m		
AN/URN-5	2 dBi	112 ft/32 m[2]	11 ft/3 m[2]		

[1]Equipment not listed in Table 3-1 of reference (a).
[2]These distances vary from those published in Table 3-1 of reference (a).
This list takes precedence as it reflects the equipment configuration at NAS Willow Grove.
[3]Proposed equipment.

TRANSMITTER/ANTENNA SYSTEMS
NAS WILLOW GROVE (MATCU)

TRANSMITTER TYPE	LOCATION	TRANSMITTER FREQUENCY	TRANS. POWER	ANTENNA NOMENCLATURE	ANTENNA TYPE
AN/MRC-138	Mobile	2-30 MHz	400 W	AT-1011	35 ft Whip
AN/PRC-104	Mobile	2-30 MHz	20 W	AT-271	Whip
AN/ARC-94	Bldg. #140	2-30 MHz	100 W	AT-1011	35 ft Whip
AN/ARC-94	MATCU	30-80 MHz	50 W	AS-1729	Whip
AN/ARC-94	Mobile	2-30 MHz	400 W	AT-1011	35 ft Whip
AN/VRC-46	MATCU	30-76 MHz	50 W	AS-1729	Whip
AN/VRC-78	MATCU	30-76 MHz	50 W	AS-1729	Whip
AN/ARC-101	MATCU	116-150 MHz	25 W	AS-1406	Stub
AN/GRC-171	Bldg. #118	225-400 MHz	40 W	D-2217	Dipole
AN/GRT-22	Bldg. #118	225-400 MHz	50 W	D-2217	Dipole
AN/GRC-205	MATCU	116-150 MHz	40 W	N/A	Whip
AN/TRN-44	MATCU	961-1213 MHz	400 W	OE-258/TRN-44	Cylindrical array
AN/UPS-1	MATCU	1250-1350 MHz	1600 W	ZZ/UPX-1 type	Parabolic reflector
AN/TPN-8	MATCU	9000-9600 MHz	192 W	AS-1292	Parabolic reflector

[1]These distances vary from those published in Table 3-1 of reference (a).
This list takes precedence as it reflects the equipment configuration at NAS Willow Grove.

TRANSMITTER/ANTENNA SYSTEMS
NAS WILLOW GROVE (MATCU)

TRANSMITTER TYPE	ANTENNA GAIN	HERO UNSAFE	HERO SUSCEPTIBLE	HERF	HERP
AN/MRC-138	2 dBi	2292 ft/699 m	229 ft/70 m		
AN/PRC-104	2 dBi	513 ft/156 m	51 ft/16 m		
AN/ARC-94	2 dBi	1145 ft/349 m	114 ft/35 m		
AN/ARC-94	2 dBi	21 ft/6 m	10 ft/3 m		
AN/ARC-94	1 dBi	2292 ft/699 m	229 ft/70 m		
AN/VRC-46	1 dBi	324 ft/99 m	39 ft/12 m		
AN/VRC-78	2 dBi	324 ft/99 m	39 ft/12 m		
AN/ARC-101	2 dBi	70 ft/21 m	20 ft/6 m		
AN/GRC-171	2 dBi	30 ft/9 m[1]	10 ft/3 m[1]		
AN/GRT-22	2 dBi	48 ft/14 m	13 ft/4 m		
AN/GRC-205	2 dBi	83 ft/25 m	17 ft/5 m		
AN/TRN-44	2 dBi	30 ft/9 m	14 ft/5 m		
AN/UPS-1	1 dBi	1325 ft/404 m	728 ft/222 m		
AN/TPN-8	2 dBi	202 ft/61 m	143 ft/44 m		

[1]These distances vary from those published in Table 3-1 of reference (a).
This list takes precedence as it reflects the equipment configuration at NAS Willow Grove.

TRANSMITTER/ANTENNA SYSTEMS
NAS WILLOW GROVE (VP-64/66, MAG-49, VR-52, and HSL-94)

TRANSMITTER TYPE	LOCATION	TRANSMITTER FREQUENCY	TRANS. POWER	ANTENNA NOMENCLATURE	ANTENNA TYPE
AN/ARC-94	Bldg. #1	2-30 MHz	400 W	N/A	Longwire
AN/ARC-51	Aircraft	225-400 MHz	20 W	N/A	Dipole
AN/ARC-114	Aircraft	30-76 MHz	10 W	AS-2670	Dipole
AN/ARC-159	Aircraft	225-400 MHz	40 W	N/A	Blade
AN/ARC-190[1]	Aircraft	2-30 MHz	400 W	N/A	Longwire
618M-2D	Aircraft	118-136 MHz	25 W	N/A	Dipole
FLEXAR BASE	Hangar 80	136-174 MHz	25 W	N/A	Whip
AN/AKT-22(V)6	Aircraft	162-173 MHz	5 W	AS-2744	Dipole
LN-66	Aircraft	9345-9405 MHz	6.25 W	LN-66	Slotted Waveguide
AN/APN-182A(V)[1]	Aircraft	1330 MHz	2 W	RT-0908	Parabolic Reflector
AN/APN-171[1]	Aircraft	4250-4350 MHz	0.39 W	AS-1858	Horn
AN/APN-52[1]	Aircraft	962-1213 MHz	75 W	N/A	Blade
AN/APN-154	Aircraft	8500-9600 MHz	1.6 W	AS-1739	Dipole
AN/APN-118	Aircraft	13250-13400 MHz	1.5 W	ZZ/APN-118	Lens
AN/APN-153	Aircraft	13325 MHz	10 W	AS-1349	Slotted Waveguide
AN/APS-80	Aircraft	8500-9600 MHz	143 W	AS-1000	Aperture
AN/APN-194	Aircraft	4290-4310 MHz	0.25 W	AS-2595	Horn
AN/APX-72	Aircraft	1090 MHz	2.5 W	AS-177A/UPX	Dipole

[1]Equipment not listed in Table 3-1 of reference (a).
[2]These distances vary from those published in Table 3-1 of reference (a).
This list takes precedence as it reflects the equipment configuration at NAS Willow Grove.

TRANSMITTER/ANTENNA SYSTEMS
NAS WILLOW GROVE (VP-64/66, MAG-49, VR-52, and HSL-94)

TRANSMITTER TYPE	ANTENNA GAIN	HERO UNSAFE	HERO SUSCEPTIBLE	HERF	HERP
AN/ARC-94	2 dBi	2300 ft/701 m	230 ft/70 m		
AN/ARC-51	2 dBi	30 ft/9 m	10 ft/3 m		
AN/ARC-114	2 dBi	362 ft/110 m	19 ft/6 m		
AN/ARC-159	2 dBi	24 ft/7 m	10 ft/3 m		
AN/ARC-190[1]	2 dBi	2300 ft/701 m	230 ft/70 m		
618M-2D	2 dBi	70 ft/21 m	14 ft/4 m		
FLEXAR BASE	2 dBi	56 ft/17 m	12 ft/4 m		
AN/AKT-22(V)6	2 dBi	10 ft/3 m	10 ft/3 m		
LN-66	32 dBi	18 ft/5 m	12 ft/4 m		
AN/APN-182A(V)[1]	28 dBi	10 ft/3 m	10 ft/3 m		
AN/APN-171[1]	13 dBi	10 ft/3 m	10 ft/3 m		
AN/APN-52[1]	2 dBi	87 ft/26 m	41 ft/12 m		
AN/APN-154	6 dBi	10 ft/3 m	10 ft/3 m		
AN/APN-118	27 dBi	10 ft/3 m	10 ft/3 m		
AN/APN-153	21 dBi	10 ft/3 m[2]	10 ft/3 m[2]		
AN/APS-80	35 dBi	140 ft/43 m	90 ft/27 m		
AN/APN-194	12.5 dBi	10 ft/3 m	10 ft/3 m		
AN/APX-72	2 dBi	10 ft/3 m	10 ft/3 m		

[1]Equipment not listed in Table 3-1 of reference (a).
[2]These distances vary from those published in Table 3-1 of reference (a).
This list takes precedence as it reflects the equipment configuration at NAS Willow Grove.

TRANSMITTER/ANTENNA SYSTEMS
PA AIR NATIONAL GUARD AND AIR FORCE RESERVE

TRANSMITTER TYPE	LOCATION	TRANSMITTER FREQUENCY	TRANS. POWER	ANTENNA NOMENCLATURE	ANTENNA TYPE
AN/ARC-94	PAANG	2-30 MHz	400 W	N/A	Longwire
MK-108[1]	PAANG	2-30 MHz	400 W	AT-1042	15 ft Whip
AN/PRC-47	Mobile	2-12 MHz	100 W	AT-271A	12 ft Whip
TSC-60	PAANG	2-30 MHz	1000 W	AS-2459	Inverted Dipole
AN/VRC-46	Mobile	30-76 MHz	50 W	AS-1730	Dipole
AN/PRC-77	Mobile	30-76 MHz	5 W	AT-271A	12 ft Whip
ED-7	Aircraft	118-136 MHz	30 W	437Z-1	Dipole
WILLCOX 807[1]	Aircraft	116-150 MHz	40 W	AT-741	Blade
AN/PRC-66[1]	Mobile	225-400 MHz	3 W	AS-2117	Blade
AN/ARC-164	Aircraft	225-400 MHz	10 W	AT-256	Dipole
AN/ARC-51	Aircraft	225-400 MHz	20 W	AS-1404	Dipole
AN/ARC-164[2]	Aircraft	225-400 MHz	10 W	N/A	Dipole
AN/ARC-186[2]	Aircraft	30-88 MHz	10 W	N/A	Blade
AN/ARC-118[1,2]	Aircraft	13250-13400 MHz	1.5 KW	AS-1168	Horn
618T-2[1]	AF Res	2-30 MHz	400 W	N/A	32 ft Whip
AN/ARC-186	Aircraft	30-88 MHz	10 W	N/A	Blade
AN/ARC-164	Aircraft Aircraft	225-400 MHz 108-152 MHz	10 W 10 W	N/A N/A	Dipole Blade
AN/APN-150[1]	Aircraft	4280-4380 MHz	0.3 W	T-0853	Horn
AN/APN-147[1]	Aircraft	8755-8815 MHz	5 W	AS-1168	Horn
AN/ARN-118[1]	Aircraft	13250-13400 MHz	1.5 W	ZZ/APN-118	Lens
AN/APN-133A	Aircraft	1600-1660 MHz	100 W	AT-913	Blade

[1]Equipment not listed in Table 3-1 of reference (a).
[2]Proposed equipment.

TRANSMITTER/ANTENNA SYSTEMS
PA AIR NATIONAL GUARD AND AIR FORCE RESERVE

TRANSMITTER TYPE	ANTENNA GAIN	HERO UNSAFE	HERO SUSCEPTIBLE	HERF	HERP
AN/ARC-94	2 dBi	2300 ft/701 m	230 ft/70 m		
MK-108[1]	2 dBi	2300 ft/701 m	230 ft/70 m		
AN/PRC-47	2 dBi	1200 ft/369 m	120 ft/37 m		
TSC-60	2 dBi	3583 ft/1093 m	358 ft/109 m		
AN/VRC-46	2 dBi	324 ft/99 m	39 ft/12 m		
AN/PRC-77	2 dBi	257 ft/78 m	13 ft/4 m		
ED-7	2 dBi	70 ft/21 m	14 ft/4 m		
WILLCOX 807[1]	2 dBi	82 ft/25 m	16 ft/5 m		
AN/PRC-66[1]	2 dBi	10 ft/3 m	10 ft/3 m		
AN/ARC-164	2 dBi	67 ft/20 m	18 ft/5 m		
AN/ARC-51	2 dBi	30 ft/9 m	10 ft/3 m		
AN/ARC-1642	2 dBi	120 ft/7 m	10 ft/3 m		
AN/ARC-186[2]	2 dBi	402 ft/122 m	21 ft/6 m		
AN/ARN-118[1,2]	25 dBi	10 ft/3 m	10 ft/3 m		
618T-2[1]	2 dBi	2300 ft/701 m	230 ft/70 m		
AN/ARC-186	2 dBi	402 ft/122 m	21 ft/6 m		
AN/ARC-164	2 dBi 2 dBi	120 ft/7 m 83 ft/25 m	10 ft/3 m 17 ft/5 m		
AN/APN-150[1]	8.5 dBi	10 ft/3 m	10 ft/3 m		
AN/APN-147[1]	25 dBi	10 ft/3 m	10 ft/3 m		
AN/ARN-118[1]	27 dBi	10 ft/3 m	10 ft/3 m		
AN/APN-133A	2 dBi	10 ft/3 m	10 ft/3 m		

[1]Equipment not listed in Table 3-1 of reference (a).
[2]Proposed equipment.

TRANSMITTER/ANTENNA SYSTEMS
PA AIR NATIONAL GUARD AND AIR FORCE RESERVE (con't.)

TRANSMITTER TYPE	LOCATION	TRANSMITTER FREQUENCY	TRANS. POWER	ANTENNA NOMENCLATURE	ANTENNA TYPE
AN/APN-169	Aircraft	3300-3600 MHz	0.9 W	AS-1799	Dipole
AN/APX-72	Aircraft	1090 MHz	2.5 W	N/A	Blade

TRANSMITTER/ANTENNA SYSTEMS
PA AIR NATIONAL GUARD AND AIR FORCE RESERVE (cont'd.)

TRANSMITTER TYPE	ANTENNA GAIN	HERO UNSAFE	HERO SUSCEPTIBLE	HERF	HERP
AN/APN-169	2 dBi	10 ft/3 m	10 ft/3 m		
AN/APX-72	2 dBi	10 ft/3 m	10 ft/3 m		

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APPENDIX E

AIRFIELD OPERATIONAL WAIVERS

Waivers are granted for specific existing facilities and conditions that cannot be easily eliminated by the Activity.

The following Airfield Safety Waivers are currently on file with the Naval Air Systems Command for Naval Air Station, Willow Grove, PA. See Plate IX-E-1 on page IX-E-5 for waiver locations.

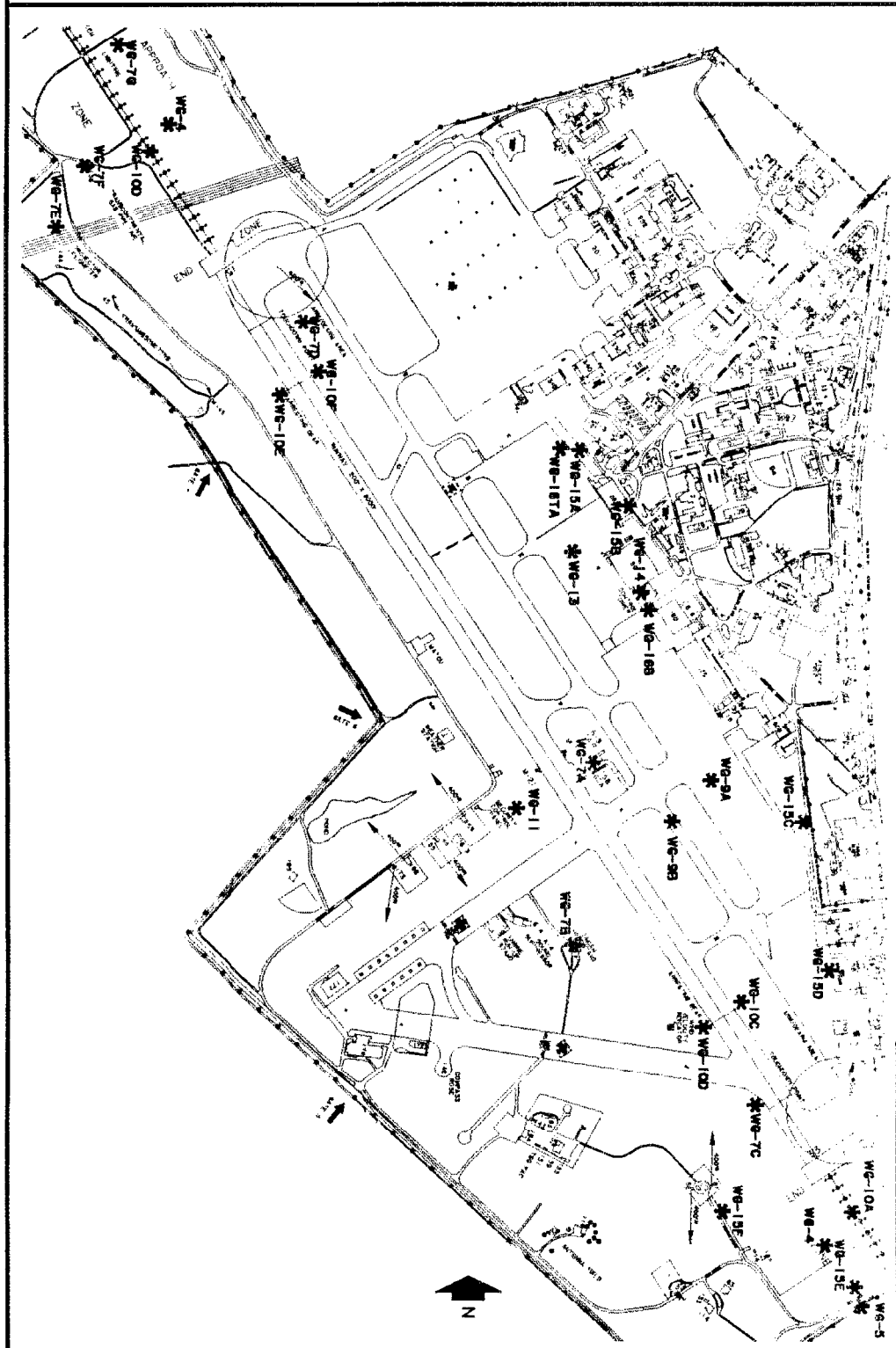
WAIVER #	DESCRIPTION
WG-1	Cancelled.
WG-2	To permit installation by Philadelphia Electric Company of a street light at the northeast corner of Easton Road and Maple Avenue located in the approach zone to Runway 33.
WG-3	Cancelled.
WG-4	To permit the remaining obstruction located in the approaches to Runway 15-33 until such time as a complete engineering evaluation is made.
WG-5	To permit the widening of Maple Avenue East as set forth in Easement No. (R)-98202 and as shown on NAS Willow Grove Drawing 44-62.
WG-6	Cancelled.
WG-7	To permit the following existing navigational aids to remain: a) GCA (Ground Control Approach) trailer located 200 ft. northeast of Runway 15-33 and 3,300 ft. inboard at Runway 33 end, extending 25 ft. above the runway centerline elevation. b) TACAN (Tactical Air Navigation) trailer located 500 ft. southwest of Runway 15-33 and 2,100 ft. inboard at Runway 33 end, extending 18 ft. above the runway centerline elevation.

WAIVER #	DESCRIPTION
WG-7 (cont'd)	c) Optical landing mirrors located 110 ft. southwest of Runway 15-33 and 800 ft. and 7,200 ft. inboard of the Runway 33 end, extending 7 ft. above the runway centerline elevation. d) GCA touchdown MT-1 reflector located 250 ft. northeast of Runway 33 and 7,200 ft. inboard of the Runway 33 end, extending 9 ft. above the runway centerline elevation. e) Transmissometer Projector Receiver located 650 ft. southwest of Runway 15-33 and 7,200 ft. inboard of the Runway 33 end, extending 16 feet above the runway centerline elevation. f) Vault located 125 ft. southwest of Runway 15-33 and 7,600 ft. inboard of Runway 33 end, extending 30 ft. above the runway centerline elevation. g) TACAN check signs located 250 ft. northeast of runway 15-33 and 400 ft. and 7,600 ft. inboard of Runway 33 end, extending 5 ft. above the runway centerline elevation. h) MARTD (Marine Air Reserve Training Detachment) equipment located 600 ft. southwest of Runway 15-33 and 4,000 ft. inboard the Runway 33 end, extending 8 ft. above the runway centerline elevation.
WG-8	Cancelled.
WG-9	To permit the following violations to remain on the aircraft parking apron located 1,800 ft. (scaled) to 4,000 ft. (scaled) inboard the Runway 33 end: a) The tails of 16 P-3A's to penetrate the 7:1 transitional surface of Runway 15-33 by 12 ft. b) The north and south taxi-lanes to have taxi-lane widths of 120 ft. and 125 ft., respectively.
WG-10	To permit the following GCA reflectors to be located as follows: a) Centerline reflector, 18 ft. high, 830 ft. outboard the threshold end of Runway 33 and on the centerline extended. b) Touchdown reflectors, 10 ft. high, 500 ft. inboard the threshold end of Runway 33, 200 ft. and 220 ft. west of the Runway 15-33 centerline.

WAIVER #	DESCRIPTION
WG-10 (cont'd)	c) Touchdown reflector, 10 ft. high, 500 ft. inboard the threshold end of Runway 33 and 260 ft. east of Runway 15-33 centerline. d) Centerline reflector, 12 ft. high, 830 ft. outboard the threshold end of Runway 15 and on the centerline extended. e) Touchdown reflectors, 5 ft. high, 650 ft. inboard the threshold end of Runway 15, 200 ft. and 220 ft. west of the Runway 15-33 centerline. f) Touchdown reflector, 10 ft. high, 650 ft. inboard the threshold end of Runway 15 and 200 ft. east of the Runway 15-33 centerline.
WG-11	To permit a MATCU to be located 4,330 ft. (scaled) to 4,634 ft. (scaled) inboard the Runway 15 threshold end and 400 ft. to 600 ft. west of the Runway 15-33 centerline. The installation will consist of the following components: a) Two 18 ft. high radomes. b) ALCC, GCA, ASR, supply van, test equipment van, two maintenance vans - all 7 ft. 9 in. high. c) A 107 van - 7 ft. high. d) ATC ready room (provided this facility is not a continuously occupied building). e) Four generators and a power converter.
WG-12	Cancelled.
WG-13	To permit two C-9's and one C-130 to park in front of Hangar No. 80 and to penetrate the 7:1 transitional surface of Runway 15-33 by 11 ft. and 23 ft., respectively.
WG-14	To permit a 21 ft. by 25 ft. line shack to be located 3 ft. south of Hangar No. 80's aircraft parking apron edge and 45 ft. (scaled) north of Building No. 180. This line shack violates aircraft parking apron criteria.

WAIVER #	DESCRIPTION
WG-15	To permit a security fence to be located as follows: a) Within 100 feet of the peripheral taxiway from the northerly corner of the north parking apron to the proposed Aircraft Maintenance Hangar (P-190). b) A distance varying from 20 to 40 feet from the edge of the apron between proposed Aircraft Maintenance Hangar (P-190) and existing Hangar Building 80. c) That length of fence parallel to Avenue B, north of GSE Building 29 that lies within 100 feet of the peripheral taxiway and P-3 Aircraft Parking Apron. d) Fencing around and equipment within the GSE Compound. e) That length of fence parallel to First Street just outside the Runway 33 Type I Clear Zone. This fence crosses the Type III and Type II Clear Zones approximately 1,001 feet from the end of Runway 33 and perpendicular to the extended runway centerline. f) To permit security fences to be located in the Runway 33 Type I and Type III Clear Zones: 1. West of the extended centerline parallel to the peripheral road 185 feet inboard. 2. East of the extended centerline parallel to the peripheral road 67 feet inboard.
WG-16(T)	To permit a fence to exist as follows: a) Within the footprint of proposed Aircraft Maintenance Hangar (P-190). b) Between Aircraft Maintenance Center (Bldg. 80) and AIMD (Bldg. 180).

LOCATION OF WAIVERS



LEGEND

✱ LOCATION OF WAIVERS

NAS WILLOW GROVE MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE IX-E-1

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APPENDIX F

FACILITIES REQUIREMENTS PLAN SUMMARY

F A C I L I T I E S R E Q U I R E M E N T S P L A N S U M M A R Y
ACTIVITY UIC. N-00158 ACTIVITY NAME. NAS WILLOW GROVE PA 10/25/89
CFD CERTIFICATION DATE:

CCN	CATEGORY CODE DESCRIPTION	UM	BASIC FACILITY REQUIREMENT	ASSETS ADEQUATE SUBSTNRD INADEQTE OTHER	A S I O	EXISTING QUANTITY SURPLUS+ DEFICIENT-	PROPOSED QUANTITY SURPLUS+ DEFICIENT-
111-10	RUNWAY/FIXED W	SY	211111	177777	A	33334 -	33334 -
111-20	HLCPTR LDG PAD	SY	1100			1100 -	1100 -
112-10	TAXIWAY	SY	173322	269860	A	137788 +	137788 +
				41250	S		
113-20	ACFT PRKG APRN	SY	278261	269999	A	8262 -	3738 +
113-40	ACFT ACC APRN	SY	7462	4194	A	3268 -	3268 -
116-10	ACFT W/RCK PV	SY	2625	2333	A	292 -	292 -
116-15	ACFT RINSE FAC	SY	1710			1710 -	
116-20	COMPASS CAL PAD	SY	1600	1257	A	343 -	343 -
116-35	ARM & DEARM PAD	SY	16800			16800 -	
121-20	ACFT TRK FU FAC	GM	600	600	S	600 -	
123-15	FILLING STN BLD	SF	72			72 -	
124-30	ACFT R/FUEL ST	GA	198096	425000	A	226904 +	226904 +
124-50	VEH R/FUEL ST	GA	24500	24500	A		
131-15	COMM CENTER						
TENANT..	M-67256	SF		1280	A	1280 +	1280 +
131-42	AU/COM SWT CTR	SF	800	623	A	177 -	177 -
131-50	TRANSMITTER BLD	SF	3240	3240	A		
133-25	TACAN BLDG	SF	454			454 -	
133-35	UHF HOMER BLDG	SF	120	96	A	24 -	24 -
133-65	AIR NAVIG BLDG	SF		1083	A	1083 +	1083 +
134-40	GCA SYSTEM	EA	1			1 -	
141-11	AIR PSG TERM	SF	6750			6750 -	
141-25	CMB FIR/RES STN	SF	12708	12841	A	133 +	12841 +
141-30	ACFT LN OP BLDG	SF	1440	525	A	915 -	525 +
141-40	ACFT OPER BLDG	SF	12637	2989	A	9648 -	
141-41	MATCU OPS BLDG						
TENANT..	M-67256	SF	9130	1860	A	7270 -	
141-60	PHOTO BUILDING	SF	1880	2040	A	160 +	160 +
141-70	CONTROL TOWER	SF	2100	2100	A		
141-81	GCA CREW FAC	SF	480			480 -	
141-87	LOX/NITROGN FAC	SF	2150	1184	A	966 -	966 -
143-20	ORD OPER BLDG	SF	1280	480	A	7356 +	8156 +
				8156	I	800 -	
143-45	ARMORY	SF	576			576 -	576 -
TENANT..	M-67256	SF	576			576 -	
143-75	POL OP BLDG	SF	1600	1650	S	50 +	50 +
						1600 -	
143-77	OPERTNL STRG	SF	1000	500	A	5100 +	
				5600	I	500 -	
149-85	EXPD AIR CTL SI						
TENANT..	M-67256	EA	1	1	A		
171-10	ACD/GEN INS BLD						
TENANT..	M-67256	SF	1500			1500 -	24 -
171-15	RESV TRAIN BLDG	SF	19625	23395	A	4192 +	4192 +

UIC.. N-00158 SUMMARY PAGE 1

F A C I L I T I E S R E Q U I R E M E N T S P L A N S U M M A R Y

ACTIVITY UIC. N-00158 ACTIVITY NAME. NAS WILLOW GROVE PA 10/25/89

EFD CERTIFICATION DATE:

CCN	CATEGORY CODE DESCRIPTION	UM	BASIC FACILITY REQUIREMENT	ASSETS ADEQUATE SUBSTNRD INADEQTE OTHER	ASSETS	EXISTING QUANTITY SURPLUS+ DEFICIENT-	PROPOSED QUANTITY SURPLUS+ DEFICIENT-
				422	S		
TENANT..	M-67256	SF		2631	A	2631 +	2631 +
CATEGORY	CODE 171-15 TOTAL	SF	19625	26026	A	6823 +	6823 +
				422	S		
171-20	APPL INSTR BLDG	SF	60875	44672	A	16203 -	255 -
171-35	OP TRAINER BLDG	SF	5504	1184	A	4320 -	
211-05	MAINT HNGR-OH S	SF	9984	7000	I	9984 -	9984 -
TENANT..	M-67256	SF	29952	18000	A	11952 -	
TENANT..	N-08981	SF	14280	8560	A	5720 -	
TENANT..	N-09031	SF	9984	8560	A	1424 -	
TENANT..	N-09172	SF	28560	28560	A		
TENANT..	N-09174	SF	28560	28560	A		
CATEGORY	CODE 211-05 TOTAL	SF	121320	92240	A	29080 -	9984 -
				7000	I		
211-06	MAINT HNGR-01 S	SF	7961	6200	I	7961 -	1761 -
TENANT..	M-67256	SF	15339	5500	A	9839 -	
TENANT..	N-08981	SF	14280	1000	A	13280 -	13280 -
TENANT..	N-09031	SF	5113	4400	A	713 -	713 -
TENANT..	N-09172	SF	12050	12662	A	612 +	612 +
TENANT..	N-09174	SF	12050	12662	A	612 +	612 +
CATEGORY	CODE 211-06 TOTAL	SF	66793	36224	A	30569 -	14530 -
				6200	I		
211-07	MAINT HNGR-02 S	SF	8851			8851 -	8851 -
TENANT..	M-67256	SF	12960	8640	A	4320 -	
TENANT..	N-08981	SF	6000	5190	A	810 -	810 -
TENANT..	N-09031	SF	4320	7630	A	3310 +	3310 +
TENANT..	N-09172	SF	12000	12662	A	662 +	662 +
TENANT..	N-09174	SF	12000	12662	A	662 +	662 +
CATEGORY	CODE 211-07 TOTAL	SF	56131	46784	A	9347 -	5027 -
211-08	AIRFRAMES SHOP	SF	13800	10829	A	2971 -	2971 -
211-15	LINE MAINT SHEL	SF	1440			1440 -	1440 -
211-21	ENG MAINT SHOP	SF	25600	8968	A	16632 -	16632 -
211-45	AVIONICS SHOP	SF	23000	6985	A	7241 +	7241 +
				23256	S	16015 -	
211-54	AVIATION ARMAMT	SF	4712			4712 -	6088 +
211-75	PARACHUTE/SURVI	SF	4400	1776	A	2624 -	974 +
211-88	POWER CK PAD/SU	EA	1	1	A		1 +
211-89	POWER CK PAD WO	EA	2	2	A		
211-96	MAINT,A/C SPARE	SF	5000	3500	A	1500 -	3500 +
214-20	AUTO VEH SHOP	SF	7225	7945	A	720 +	
TENANT..	M-67256	SF	3000	210	S	3000 -	
				2067	I		
CATEGORY	CODE 214-20 TOTAL	SF	10225	7945	A	2280 -	
				210	S		
				2067	I		

F A C I L I T I E S R E Q U I R E M E N T S P L A N S U M M A R Y
ACTIVITY UIC. N-00158 ACTIVITY NAME. NAS WILLOW GROVE PA 10/25/89
EFF CERTIFICATION DATE:

CCN	CATEGORY CODE DESCRIPTION	UM	BASIC FACILITY REQUIREMENT	ASSETS ADEQUATE SUBSTNRD INADEQTE OTHER	ASSETS	EXISTING QUANTITY SURPLUS+ DEFICIENT-	PROPOSED QUANTITY SURPLUS+ DEFICIENT-
214-40	VEH HOLD SHED	SF	3360	3360	A		
214-51	AUTO ORGNL SHOP						
TENANT..	M-67256	SF	3000			3000 -	360 +
217-30	COMM/EL FLD MNT						
TENANT..	M-67256	SF	2340	765	S	2340 -	
218-20	CON W/HND EQ SH						
TENANT..	M-67256	SF	6340	1320	I	6340 -	761 +
218-25	MAR AIR BASE SQ						
TENANT..	M-67256	SF		2336	A	2336 +	2336 +
218-45	INSTRUMNT CAL/S	SF	1600			1600 -	
218-50	BATTERY SHOP	SF	645	645	I	645 -	645 -
218-60	ACFT G/SPT SHOP	SF	10801	6482	I	10801 -	4551 -
218-61	G/SPT EQ HLD SH	SF	14581	6000	I	14581 -	8581 -
219-10	PW SHOP	SF	14750	14750	A		
219-20	PAV/GRNDS EQ SH	SF	850	850	A		
219-25	PW SHOP STOR	SF	1100	1100	A		
219-77	PW MAINT STRGE	SF	5700	3940	A	1760 -	
319-30	SURVIV EQ/CLOTH	SF		1200	S	1200 +	1200 +
411-84	BLK HEAT FUEL S	BL	3571	3571	A		
421-12	FUSE & DET MAG	SF	75	75	A		
421-22	HIGH EXP MAG	SF	1250	1250	A		
421-32	INERT STOREH	SF	10000			10000 -	
421-35	READY MAGAZINE	SF	288	264	A	24 -	24 -
421-42	SMOKEDRUM ST	SF	48			48 -	417 +
421-48	S ARMS/PYRO MAG	SF	288	2155	A	1867 +	1402 +
421-52	SMOKELESS/P/P/M	SF	188			188 -	129 +
441-10	GEN WHSE/BULK	SF	27880	28128	A	248 +	452 -
TENANT..	M-67256	SF	18225			18225 -	18225 -
CATEGORY	CODE 441-10 TOTAL	SF	46105	28128	A	17977 -	18677 -
441-11	GEN WHSE MARCOR						
TENANT..	M-67256	SF		9563	A	9563 +	12235 +
441-30	HAZ FLAM STHSE	SF	3140	3046	A	94 -	94 -
441-35	GEN STRG SHED	SF		300	A	300 +	4515 +
TENANT..	M-67256	SF	2053	860	A	1193 -	2053 -
CATEGORY	CODE 441-35 TOTAL	SF	2053	1160	A	893 -	2462 +
441-72	SERVMARTS	SF	2210	2175	A	35 -	35 -
451-10	OPEN STORAGE AR	SY	1530	7178	A	5648 +	5648 +
TENANT..	M-67256	SY	503			503 -	503 -
CATEGORY	CODE 451-10 TOTAL	SY	2033	7178	A	5145 +	5145 +
610-10	ADMIN OFF	SF	27900	22252	A	8219 +	3646 -
				13867	I	5648 -	
TENANT..	M-67256	SF	17952	13004	A	4948 -	208 -
				2475	I		
TENANT..	N-68629	SF	9425	10000	A	575 +	10000 +
CATEGORY	CODE 610-10 TOTAL	SF	55277	45256	A	6321 +	8769 +

UIC.. N-00158 SUMMARY PAGE 3

F A C I L I T I E S R E Q U I R E M E N T S P L A N S U M M A R Y
ACTIVITY UIC. N-00158 ACTIVITY NAME. NAS WILLOW GROVE PA 10/25/89
EFD CERTIFICATION DATE:

CCN	CATEGORY CODE DESCRIPTION	UM	BASIC FACILITY REQUIREMENT	ASSETS ADEQUATE SUBSTNRD INADEQTE OTHER		EXISTING QUANTITY SURPLUS+ DEFICIENT-	PROPOSED QUANTITY SURPLUS+ DEFICIENT-
				16342	I	10021 -	
610-20	DATA PROC CTR	SF	3076	879	A	2197 -	797 -
610-77	ADMIN STRG RDY						
TENANT..	N-68629	SF	471			471 -	1 -
721-11	BEQ E1/E4	PN	311	224	A	71 +	1 -
				158	S	87 -	
721-12	BEQ E5/E6-MC E5	PN	155	87	A	87 +	25 -
				155	I	68 -	
721-13	BEQ E7/9-MC 6/9	PN	17	24	A	27 +	7 +
				20	I		
722-10	ENLST DINIG FAC	PN	535			535 -	10823 +
724-11	BOQ,W-1/0-2	PN	19	80	S	61 +	61 +
						19 -	
724-12	BOQ,O-3 & ABOVE	PN	49	70	S	21 +	21 +
						49 -	
730-20	POLICE STATION	SF	300	300	A	1345 +	1345 +
				1345	S		
730-25	GATE/SENT HOUSE	SF	636	913	A	277 +	277 +
730-36	LUNCH/LOCKER RM	SF		500	A	500 +	500 +
730-65	FALLOUT SHELTER	SF	32540			32540 -	32065 -
730-66	MISC WTHR SHLTR	SF	75	75	A		
730-77	MISC PERS SUP S	SF	1060	475	A	475 +	585 -
				1060	S	585 -	
730-83	CHAPEL	SF	5000	5000	A		
730-84	RELIGIOUS ED	SF	3855			3855 -	
730-85	POST OFFICE	SF	2925	486	A	2439 -	1955 -
740-01	EXCHANGE RETAIL	SF	16274	13054	A	3220 -	3220 -
740-03	EX CNTL ADMIN	SF	2100	3949	I	1849 +	1849 +
						2100 -	2100 -
740-04	EX CAFE	SF	5400			5400 -	
740-05	EX SNACK STAND	SF	1100	1711	A	611 +	611 +
740-09	EX SVC OUTLETS	SF	11389	4272	A	7117 -	7117 -
740-12	RD CRSS/NVY RLF	SF		2394	A	2394 +	2394 +
740-16	EX MAINTE SHOP	SF	600			600 -	
740-19	CREDIT UNION	SF	3850	696	A	3154 -	1709 -
740-25	FAMILY SVC C	SF	1150	735	A	415 -	735 +
740-28	AMUSEMENT CENTR	SF	1800	8897	A	7097 +	8897 +
740-29	AREA/REG EX ADM	SF	900	1159	A	259 +	259 +
740-30	EX SERV STATION	SF	2540	1616	A	924 -	924 -
740-32	EX C/O CAR WASH	SF	720			720 -	720 -
740-34	THRIFT SHOP	SF	2000	1683	A	317 -	317 -
740-36	HOBBY SHOP-AR/C	SF	2244	1803	S	2244 -	1803 +
740-37	SPEC SERV CTR	SF	2275	690	A	1559 +	963 -
				2344	S	1585 -	
				800	I		

F A C I L I T I E S R E Q U I R E M E N T S P L A N S U M M A R Y

ACTIVITY UIC. N-00158 ACTIVITY NAME. NAS WILLOW GROVE PA 10/25/89

EFD CERTIFICATION DATE:

CCN	CATEGORY CODE DESCRIPTION	UM	BASIC FACILITY REQUIREMENT	ASSETS ADEQUATE SUBSTNRD INADEQTE OTHER	ASSETS	EXISTING QUANTITY SURPLUS+ DEFICIENT-	PROPOSED QUANTITY SURPLUS+ DEFICIENT-
740-38	AUTO HOBBY SHOP	SF	6000	6801	S	9909 +	
				9108	I	6000 -	
740-40	BOWLING ALLEY	SF	6000	6232	A	232 +	232 +
740-43	GYMNASIUM	SF	11276	8153	S	11276 -	1088 -
740-55	YOUTH CENTER	SF	3625	2592	A	1033 -	3625 -
740-56	THEATER	SF	3500			3500 -	
740-60	OFFICERS CLUB	SF	13600	10479	A	3121 -	2321 -
740-64	EM MESS OPEN	SF	18128	11200	A	6928 -	5128 -
740-71	CLASS VI STORE	SF	5900	4291	I	5900 -	5900 -
740-74	CHILD CARE CTR	SF	7538	16272	S	8734 +	652 +
						7538 -	
740-75	AERO CLUB FAC	SF	5000			5000 -	5000 -
740-76	LIBRARY	SF	2250	2754	A	504 +	504 +
740-78	RECREATION PAV	SF	1350	800	A	550 -	25 -
740-84	INDR PLAY CRTS	SF	2400	989	A	1411 -	567 +
740-85	EX CNTL WRHSE	SF	3387	3387	A		
740-86	RETAIL WAREHSE	SF	5214	5538	A	324 +	324 +
740-89	BATHHOUSE	SF	7400	1290	A	6110 -	2700 -
750-10	PLAYING COURT	EA	5	5	A		1 +
750-20	PLAYING FIELD	EA	4	4	A		
750-30	OUTDR SWIM POOL	ME	75	50	A	5 +	
				30	S	25 -	
750-34	WADING POOL	EA		1	A	1 +	1 +
750-57	RECREATION GDS	EA		15	A	15 +	15 +
852-10	PARKING AREA	SY		96927	A	96927 +	96927 +
TENANT..	N-68629	SY	1365			1365 -	1365 -
CATEGORY	CODE 852-10 TOTAL	SY	1365	96927	A	95562 +	95562 +

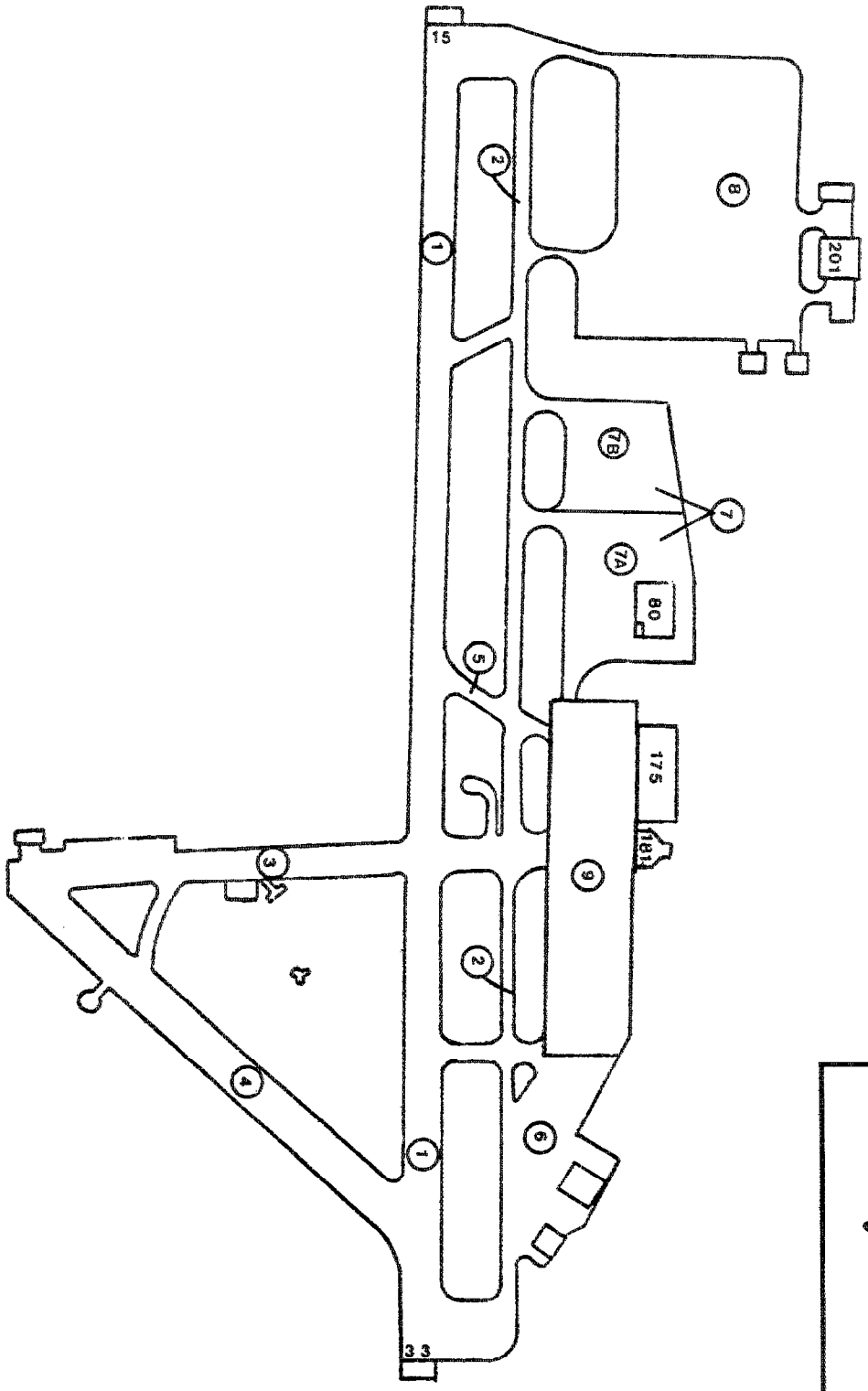
APPENDIX G

AIRFIELD PAVEMENT EVALUATION

	PAVED AREA DESIGNATION	TYPE OF SURFACE	ALLOWABLE GROSS AIRCRAFT LOAD (LBS.) FOR AIRCRAFT WITH: Single-Wheel Gear 150 psi	Single-Wheel Gear 400 psi	Dual-Wheel Gear 150 psi	Dual-Tandem Gear 150 psi
1	Runway 15-33	asphalt/concrete	95,000	76,000	161,000	318,000
2	Taxiway 15-33	asphalt/concrete	149,000	96,000	241,000	370,000
3	Runway 06-24 (abandoned)	asphalt	193,000	99,000	251,000	377,000
4	Taxiway 10-28	asphalt	196,000	114,000	255,000	382,000
5	Taxiway 2	asphalt	101,000	52,000	131,000	197,000
6	South Parking Apron access taxiway	asphalt	78,000	36,000	101,000	152,000
7A	Navy Parking Apron (10" portion)	concrete	101,000	81,000	177,000	348,000
7B	Navy Parking Apron (12" portion)	concrete	192,000	160,000	335,000	525,000
8	Air Force Parking Apron	concete	105,000	82,000	165,000	315,000
9	Navy P-3 Aircraft Parking Apron (9" PCC)	concrete	79,000	64,000	149,000	293,000

Note: These figures were taken from the NAVFAC P-18, Pavement Evaluation Data for Naval and Marine Corps Air Stations dated April 1978.

AIRCRAFT WHEEL LOADING CAPACITY



NAS WILLOW GROVE
MASTER PLAN

PLATE IX-G-1

APPENDIX H

SUMMARY OF DISPOSAL AND SPILL SITES AT NAS WILLOW GROVE

Area of Concern	Period of Operation	Types of Waste Disposed of or Spilled	Comments
Site 1 Privet Road Compound	1967-1975	Wooden crates, empty drums, tires, metal scrap, paint wastes, general refuse, coal ash, sewage sludge, PCB fluid, asbestos, oil from separators, grease emulsions from same source	The site was used to drain engine oil by refueling contractors. The debris was peroidically burned and buried. In 1972 on-site disposal was terminated. The location has been used since as a waste transfer and recycling station.
Site 2 Antenna Field Landfill	1948-1960	General refuse, paint materials, tires, shingles, furniture, metal scrap, coal ash, sewage sludge, oil and grease emulsions from separators	The antenna Field Landfill consists of trenches in which trash was burned prior to burial.
Site 3 9th Street Landfill	1960-1967	General refuse, paint materials, tires, shingles, furniture, metal scrap, coal ash, sewage sludge, oil and grease emulsions from separators, asbestos	This landfill was run in a similiar fashion to Site 2, Antenna Field Landfill. A salvage yard was constructed over part of the site in 1967. Spills of PCB fluid in this area associated with the servicing of transformers may have occurred.
Site 4 North End Landfill	1967-1969	General refuse, wooden crates, metal scrap, paint wastes, sewage sludge, asbestos, oil and grease from separators	Believed to have received overflow from Site 1, Privet Road Compound. Black tarry waste POL is currently escaping from the surface of this site.

Area of Concern	Period of Operation	Types of Waste Disposed of or Spilled	Comments
Site 5 Fire Training Area	1942-1975	Waste POL and flammable solvents	Flammable liquids were stockpiled and burned in this area during fire training exercises.
Site 6 Abandoned Rifle Range No. 1	1942-1965	Lead projectiles	No record of removal of lead prior to regrading of the location is available.
Site 7 Abandoned Rifle Range No. 2	1965-1977	Lead projectiles	A demolition landfill was established at this location in 1977. The landfill received clean fill as well as sewage sludge and oil from separators.
Site 8 Building 118 Abandoned Fuel Tank	1959-1980	No. 2 Fuel Oil	The old storage tank is still in the ground.
Site 9 Steam Plant Building 6 Tank Overfill	1978-	No. 2 Fuel Oil	Available information suggests that very little fuel from the spill infiltrated. A containment pad has been installed to prevent another occurrance.
Site 10 Fuel Farm Area	1942-	JP-5, AVGAS, and other petroleum based products	A Site Investigation Study is currently being performed at this site.

APPENDIX I

ZONING CLASSIFICATIONS

Zoning Districts	Density	Principal Permitted Uses	Special Uses
HORSHAM TOWNSHIP			
R-1 Residential	3 acres per Dwelling unit	Woodland, Conservation, Agriculture, Public Parks, Single Family Detached Dwelling	Cemetery, Golf Course, Convelescent Home, Churches, Stables, Professional Home Office
R-2 Residential	50,000* SF 35,000 SF	Same as R-1	Same as R-1, Day Nursery
R-3 Residential	40,000* SF 25,000 SF	Same as R-1	Same as R-2
PR-2 Planned Res.	25,000 SF	Single Family Detached Dwelling	-
PR-3 Planned Res.	20,000 SF	Single Family Detached Dwelling	-
R-4 Residential	12,000 SF	Same as R-1	Same as R-1
R-5 Residential	10,000 SF	Same as R-1, Two Family Dwellings, Duplexes	Same as R-1
R-6 Residential	5,400 SF (2 acres)	Multiple Dwellings, Apartments, Town Houses, Convelescent Homes, Professional Offices	None
R-7 Residential	4,400 SF (5 acres)	Same as R-6, Garden Apartment	Same as R-6

* Without public sewer system and water supply

Note: R-1 and R-2 are classified as Low Density.
R-3 through PR-3 are classified as Medium Density.
R-4 through R-7 are classified as High Density.

Zoning Districts	Density	Principal Permitted Uses	Special Uses
C-1 Shopping Center	6 acres	Retail Stores, Restaurants, Personal Service Shops, Assembly Halls, Community Bldgs., Indoor Rec., Library, Child Day Care, Theater, Retail Services Shops, Offices	None
C-2 General Commercial	10,000 SF	Retail Stores, Restaurants, Personal Service Shops, Retail Service Shops, Office & Studio, Banks, Auto Parking Lot	Contractor's Shop, Wholesale Business, Staff Service Labratory, Farm and Garden Center
C-3 Highway Commercial	30,000 SF	Auto Service Establishments, Contractor's Shops, Wholesale Business, Indoor Storage & Warehouse, Dry Cleaning Shop	Drive-in Theatre and other outdoor amusements, Trucking or Hauling station, Motor Vehicle Repair, Used Car Lot, Car Wash, Outside Storage Yards, Greenhouse, Wholesale Dairy, Hotels, Motels, Restaurants
C-4 General Office	20,000 SF	Professional Offices, Banks Business School, Kindergarten, Child Nursery, Clubs, Convelescent Homes, Medical Clinics	None
C-5 Limited Commercial	30,000 SF	Wholesale Business, Indoor Storage, Warehouse, Outdoor Storage, Used Car Sales Lots	None
I-1 Industrial	25 acres	Processing & Fabricating Activities, Laundry Dry Cleaning Plants, Laboratory, Research, Printing and Publishing Office Bldgs., Wholesale, Warehouse Storage, Distribution Center, Indoor Recreation - Tennis, Basketball, etc.	Motels, Hotels, Banks, Restaurants
I-2 Industrial	4 acres	Same as I-1	Same as I-1
I-3 Industrial	2 acres	Same as I-1	Same as I-1
O-1 Office/Non-Manufacturing	10 acres	Scientific/Industrial Research Laboratories, Office and Admin. Bldgs., Recreation for Occupants, Living Quarters for watchman and caretakers	None

Zoning Districts	Density	Principal Permitted Uses	Special Uses
O-2 Office/Non-Manufacturing	4 acres	Same as O-1	Same as O-1
UPPER MORELAND TOWNSHIP			
R-Residence	3 acres	Single Family Detached Dwelling, Schools & Churches, Agriculture, Nursery and Greenhouse, Keeping of Livestock	Cemetery
R-1 Residence	1 acre	Same as R	Same as R
R-2 Residence	20,000 SF	Same as R-1 except no livestock may be kept	Same as R-1
R-3 Residence	14,000 SF	Same as R-2 Municipal Use	Same as R-2
HRM-O High Rise Multiple and Office	10 acres (1,500 SF/ D.O.)	Multiple Dwellings, High Rise Apartment, Condominium, Municipal Use, Public Utility Building, Educational Offices, Professional Offices	None
M-O Multiple Dwelling and Office	3 acres (15,000 SF)	Offices and Professional Offices, Banks, Multiple Dwellings, Town Houses, Single Family Dwelling - Detached, Schools and Churches	Sanitorium or Rest Home
M-1 Multiple Dwelling	4 acres (4,000 SF)	Multiple Dwellings, Group Dwellings, Schools & Churches, Professional Office	None
M-2 Multiple Dwelling	10 acres (5,000 SF)	Same as M-1	-
C-1 Commercial	Variable	Same as R-3, M-O, Retail Sales, Personal Services, Restaurants, Indoor Theater, Bowling, Billiards, Indoor Amusements, Newspaper Printing, Greenhouse, Nursery, Clubs, Pet Shops	None specified
C-2 Commercial	Variable	Same as C-1, Animal Hospital	Restaurant, Gasoline Service Stations, Outdoor Theater, Electric Substation, Motel, New & Used Car Sales, Body Shop

Zoning Districts	Density	Principal Permitted Uses	Special Uses
HATBORO BOROUGH			
R-1 Residential	10,000 SF	Single Family Detached Dwelling, Agriculture	Schools, Churches, Commercial Recreation, Parks & Recreation, Cemetery, Train Station
R-2 Residential	7,000 SF	Same as R-1 except agricultural use not permitted	Same as R-1
R-3 Residential	7,000 SF	Two-Family Dwellings, Town-House (3,000 sf min. lot size), Parks and Recreation	Indoor Recreation Facilities, Community Center, Professional Office
R-4 Residential	3 acre min. land area - 15 DU/ac max.	Garden Apartment, Parks & Recreation	Elderly Housing, Indoor Recreation
O - Office	7,000 SF	Office Building (not to exceed 35 feet on height)	-
R-C Retail Commercial	-	Retail Shops, Service Commercial Restaurant, Business & Professional Office, Clubs, Lodges, Fraternal, Greenhouse, Nursery Sales, Indoor Theater, Newspaper Publishing, Schools, Churches,	Elderly Housing
	1 acre min. land area - 3 DU/ac 65' height	Mid-Rise Apartments	
H-B Highway Business	6,000 SF 65' height	Service to Traveling Public, Commercial Recreation - Bowling, Skating Rinks, Amusement Parks, Theaters, Miniature Golf, Automotive & Allied Sales and Services, Miscellaneous Sales	-
L-1 Limited Industrial	1 acre 60' height	Assembly and Manufacture Confections	-

Zoning Districts	Density	Principal Permitted Uses	Special Uses
WARRINGTON TOWNSHIP			
RA-1 Residential Agricultural	40,000 SF	Single Family Dwelling, Agriculture (5 acre min.), Greenhouse, Roadside Stand, Municipal Uses, Home Occupation, Cluster Development Option (30,000 SF)	Keeping & Raising of Livestock, Greenhouse as a principal use, Private Schools, Churches, Hospitals, Sanitariums, Convalescent Homes, Camps, Lodges, Public Utilities, Cemeteries, Dog Kennels, Schools
RA-2 Residential Agricultural	1 acre	Same as RA-1	Same as RA-1
R-1 Low Density Residential	40,000 SF	Single Family Detached Dwelling, Municipal Uses, Cluster Development Option (22,500 SF)	Private Schools, Churches, Public Uses & Services, Schools, Planned Residential Development
R-2 Medium Density Residential	30,000 SF* 20,000 SF	Single Family & Two-Family Dwellings, Municipal Uses, Cluster Development Option (13,500 SF)	Private Schools, Churches, Public Schools, Multi-Family Dwellings, Apartment Complexes, Planned Residential Development
C-1 Commercial	5 acres 35' height	Retail Shopping Center	
C-2 Commercial - General	20,000 SF	Retail Shops, Professional Offices, Clubs, Lodges, Hotels, Motels, Amusement Recreation	Auto Service Stations, Single Family Housing, Apts. in conjunction with Businesses, Wholesale and Warehousing Truck Terminals, Schools, Churches, Auto Repair, Drive-in Theater
PI-1 Planned Industrial	2 acres	Industrial Park	
PI-2 Planned Industrial	20 acres	Industrial Park, Mobile Home Park (with S&W only)	-
Q - Quarry	-	Quarrying and/or Stone Excavation, Agricultural, Light Industrial	-

Zoning Districts	Density	Principal Permitted Uses	Special Uses
S-C Shopping Center	6 acres (25,000 SF)	Retail Stores, Restaurants, Offices, Personal Service Shops, Movie Theater, Bakery, Banks, Bus Station, Business Services, Motel, High Rise Apartment, Swimming Pool, Gas Stations	Heliport
I - Limited Industry	4 acres	None Specified	Manufacturing and Processing Establishments
S - Small Limited Industrial	2 acres	None Specified	Same as I
RC - Recreational Conservation	5 acres	Wildlife Preserve, Stream Valley, and Forest Preserve Public Parks	Agriculture, Greenhouse, Keeping of Livestock, Private Parks, Picinic Grounds, Swimming Areas

APPENDIX J

CONSTRUCTION HISTORY FOR AIRFIELD OPERATIONAL SURFACES

Item No.	Section from Surface to Subgrade	Date Constructed	Date Strengthened or Sealed
1	**North end of Runway 15-33** **Portion of Taxiway 15-33**		
	10" Reinforced Portland Cement Concrete	1954	
	12" - 14" Crushed Aggregate Base Course		
2	**Portion of Runway 15-33**		
	3" Max. Asphaltic Concrete Overlay		1981
	1" AC Wearing Course		1971
	3/4" Min. Binder/Leveling Course		
	3-1/4" - 4" Asphaltic Concrete	1954	
	13-1/2" - 18-1/2" Crushed Aggregate Base Course		
3	**Portion of Runway 15-33**		
	3" max. Asphaltic Concrete Overlay		1981
	1" AC Overlay (Wearing Course)		1970
	3/4" Min. AC Binder/Leveling Course		
	2" AC Overlay		1955
	2-1/2" - 3" Tar Concrete	1942	
	4" - 6" Crushed Stone Base Course		
	5" - 6" Slag Subbase		
4	**South end of Runway 15-33**		
	10" Reinforced Portland Cement Concrete	1960	
	16" Crushed Aggregate Base Course		
5	**South end of Taxiway 15-33**		
	12" Reinforced Portland Cement Course	1960	
	12" Crushed Aggregate Base Course		

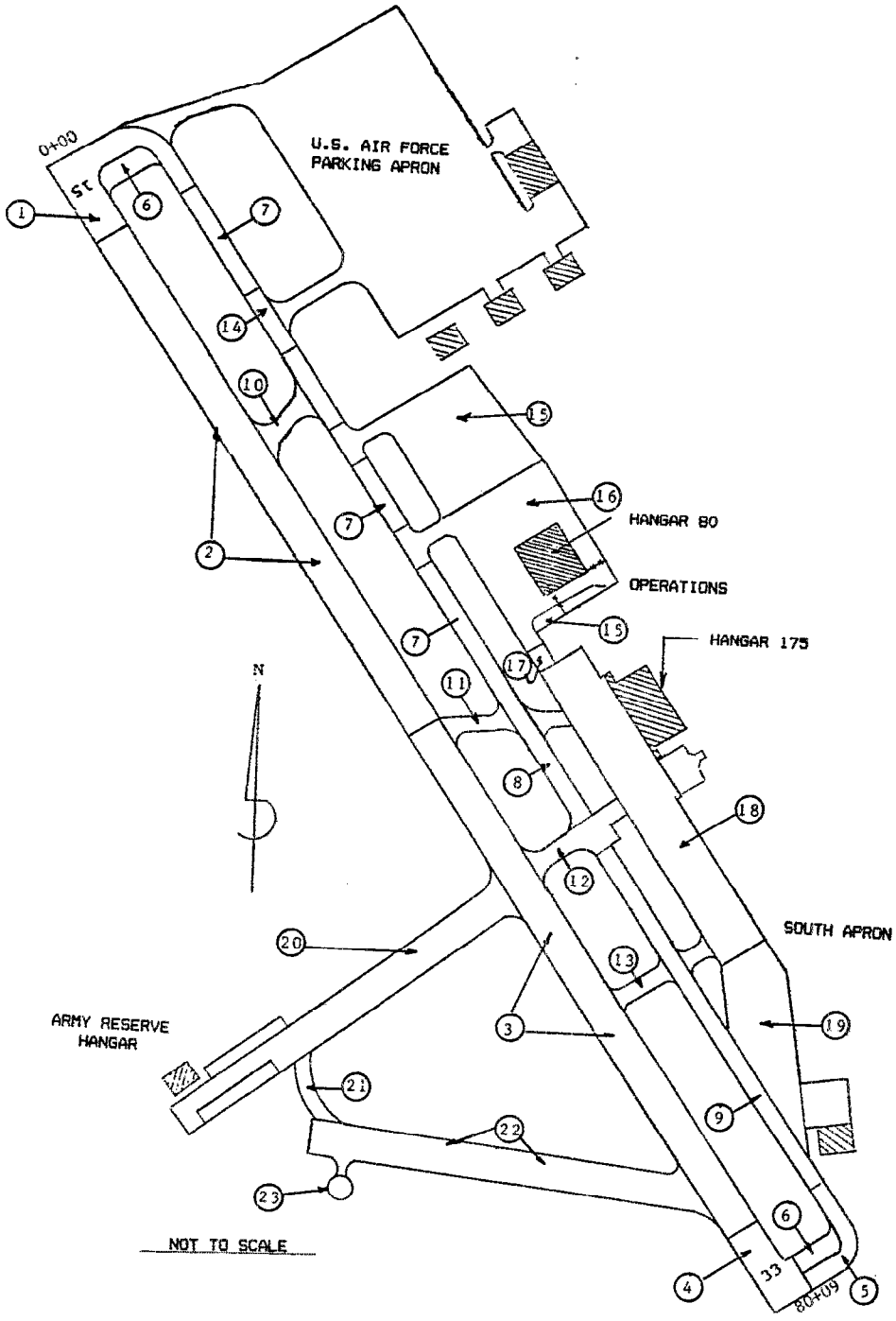
Item No.	Section from Surface to Subgrade	Date Constructed	Date Strengthened or Sealed
6	**Holding Areas**		
	10" Reinforced Portland Cement Concrete 8" Subbase	1968	
7	**Portion of Taxiway 15-33**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	2" Asphaltic Concrete 20" - 22" Crushed Aggregate Base Course	1954	
8	**Portion of Taxiway 15-33**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	2" Asphaltic Concrete Overlay		1969
	2" - 3" Asphaltic Concrete 6" - 7" Crushed Aggregate Base Course 13" - 16" Crushed Aggregate/Clayey Sand	1957	
9	**Portion of Taxiway 15-33**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	1" Asbestos Fiber Asphaltic Concrete Overlay		1967
	2" - 3" Asphaltic Concrete 6" - 7" Crushed Aggregate Base Course 13" - 16" Crushed Aggregate/Clayey Sand	1957	
10	**High Speed Turnoff**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	1-1/2" Asphaltic Concrete Wearing Course 2-1/2" Asphaltic Concrete Binder 8" Base Course 12" Subbase 4" Select Fill	1968	

Item No.	Section from Surface to Subgrade	Date Constructed	Date Strengthened or Sealed
11	**Taxiway 2**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	2" Asphaltic Concrete Overlay		1963
	1-1/2" - 2" Asphaltic Concrete Overlay		1958
	1-1/2" - 2" Asphaltic Concrete	1945	
	2-1/2" - 4" Crushed Stone Base Course		
	8" Slag Subbase		
12	**Taxiway**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	2" Asphaltic Concrete Overlay		1963
	Seal Coat		1955
	3" Tar Concrete	1942	
	2-1/2" - 5" Crushed Stone Base Course		
	5" - 8" Slag Subbase		
13	**Taxiway**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	Asphaltic Concrete	CDNA	
14	**Portion of Taxiway 15-33**		
	14" Portland Cement Concrete	1957	
	9" Crushed Aggregate Base Course		
15	**Portion of Taxiway 15-33**		
	12" Nonreinforced Portland Cement Concrete	1959	
	8" - 13" Crushed Aggregate Base Course		
16	**Portion of Taxiway 15-33**		
	10" Nonreinforced Portland Cement Concrete	1954	
	10" - 13" Crushed Aggregate Base Course		

Item No.	Section from Surface to Subgrade	Date Constructed	Date Strengthened or Sealed
17	**New Taxiway**		
	Removed 3" Asphaltic Concrete and replaced with 1-1/2" Asphaltic Concrete Wearing Course over 1-1/2" Binder and Fabric		1985
	3" Asphaltic Concrete	1954	
	6" Crushed Stone Base Course		
	12" Crushed Aggregate Subbase		
18	**Aircraft Parking Apron**		
	10" Portland Cement Concrete	1976	
	Crushed Aggregate Base Course		
19	**South Parking Apron**		
	2" Asphaltic Concrete Overlay		1967
	Slurry Seal Coat		1960
	2" Tar Concrete	1942	
	7" - 8" Crushed Stone Base Course		
20	**Runway 6-24 (abandoned)**		
	Bituminous Paving		1980
	2" Asphaltic Concrete Overlay		1963
	Seal Coat		1955
	3" Tar Concrete	1942	
	2-1/2" - 5" Crushed Stone Base Course		
21	**Taxiway 1**		
	Asphaltic Concrete	CDNA	
22	**Taxiway 4 (formerly Runway 10-28)**		
	Asphaltic Concrete		CDNA
	2" Asphaltic Concrete Overlay (Center 75')		1963
	2" Tar Concrete	1942	
	3" Crushed Stone Base Course		
	6" Slag Subbase		
23	**Portland Cement Concrete**	**CDNA**	

Note: "CDNA" indicates Construction Date Not Available.

AIRFIELD HISTORY OF CONSTRUCTION



NAS WILLOW GROVE
MASTER PLAN

PLATE IX-J-1

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APPENDIX K

APPROVED BASIC STOCK LEVEL OF AMMUNITION FOR NAS WILLOW GROVE

MAGAZINE DATA REPORT (EXPLOSIVE CAPACITY)

MAG. DESIGNATOR GR - TYPE - NFAC	MAG-TYPE	DIMENSIONS L - W -H	EXPLOSIVE CAPACITY IN 100 LBS/HAZARD CLASS 1.4	1.3	1.2-04	1.2-08	1.2-12	1.2-18	1.1
001-BC - 165	HIGH EXP	50 - 25 - 10	PC	PC	PC	PC	2500	2500	2500
001-BC - 166	HIGH EXP	50 - 25 - 10	PC	PC	PC	PC	2500	2500	2500
001-HC - 173	HIGH EXP	10 - 10 - 8	PC	PC	PC	PC	75	75	75
001-SH - 54	INERT	49 - 14 - 8	0	0	0	0	0	0	0
001-SH - 55	INERT	49 - 14 - 8	0	0	0	0	0	0	0
002-YC - 25	SP AND P	18 - 12 - 7	PC	PC	PC	PC	5000	5000	5000
002-YC - 26	SP AND P	12 - 4 - 7	PC	PC	PC	PC	2000	2000	2000
003-KT - 87	RESERVED	6 - 8 - 8	PC	PC	PC	PC	40	40	40
003-KT - 88	RESERVED	6 - 8 - 8	PC	PC	PC	PC	40	40	40

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X. CAPITAL IMPROVEMENTS PLAN

A. ACTIVITY OVERVIEW

The Naval Air Station, Willow Grove, Pennsylvania is a Commander, Naval Reserve Force (COMNAVRESFOR) facility serving the Middle-Atlantic States and part of New York State. It provides facilities, services, materials, and training in direct support of assigned units to maintain a state of readiness for their antisubmarine warfare mission. The units include two long range antisubmarine warfare (ASW) squadrons, one helicopter ASW squadron, one fleet logistic support squadron, one Marine Air Group including an attack squadron, a heavy helicopter squadron, and numerous other Navy and Marine Reserve Units.

The U.S. Army 79th Army Reserve Command, also located at NAS Willow Grove, is a tenant activity having a mix of helicopter and fixed-wing aircraft.

The U.S. Air Force has a contiguous installation and jointly uses the NAS airfield facilities. Two flying units are assigned: the USAF 913th Tactical Air Group, a heavy airlift squadron, and the Pennsylvania Air National Guard, a light ground attack squadron.

Aircraft loading of all military units totals approximately 100.

Personnel loading of all military active duty and reserve personnel totals approximately 9,830 with an additional 575 civilian employees.

Total Government real estate holdings (including Air Force) is approximately 180 buildings and 1,000 acres. Land holdings are changing due to acquisition of land in the clear zones and flight clearance easements.

B. CIP INTRODUCTION

The Capital Improvements Plan (CIP) provides documentation for the identification of specific projects necessary for the successful implementation of the Master Plan and for the detailed siting of specific projects, including any particular phasing requirements. The CIP provides a complete listing of all planned projects; programmed and unprogrammed Military Construction Naval Reserve Projects (MCNR) Master Plan (MP) Projects , Minor Construction Program Special Projects (R, C, RC, and E), Non-Appropriated Fund Projects (NAF), and Base Exterior Architecture Plan Projects in one source along with the graphics illustrating the location of each project. The Proposed Development Plans illustrates all P-Projects (Plate X-1 and X-2), Master Plan Projects (Plate X-3), and Special Projects (Plate X-4) which occupy new land areas, change building use, or change land use. Special

Projects that do not alter land use patterns or new sites are not illustrated. The CIP may be used as a decision making tool by Station personnel involved in space utilization, facilities planning, and facilities maintenance programs.

The CIP is based upon the Facilities Requirements Plan (FRP) and land use development goals as set forth in this Master Plan. The projects indicated in the CIP have been developed through the Shore Facilities Planning System and other special emphasis programs such as Energy Conservation, Pollution Abatement, and Occupational Safety.

The Capital Improvements Plan establishes the validity of the Master Plan such that all currently planned projects are approximately and adequately sized, a planning scheme has been worked out if necessary, and all supportable improvements can be accomplished. The CIP indicates relative priorities and overall construction phasing by expected implementation year for MCNR projects. Table X-1, P-Projects, identifies all MCNR projects arranged according to program year.

The CIP specifies a six-year construction program (1991-1996), however, only projects the first two years have a strong probability of funding during the specified program year. Although the later year projects have a valid need, they are subject to changes in program year due to variation in MCNR funding levels and changes in priorities.

Master Plan projects have been developed to correct deficiencies and shortfalls identified by the Station's FRP. Master Plan projects fall into three funding categories but are listed separately since they currently lack any project documentation, but have been identified as necessary by the Station. Each Master Plan project is keyed to the category code into which it falls. For example; MP-101 represents the first project in the 100 series, MP-201 represents the first project in the 200 series, and so on. See Table X-2 for all currently envisioned Master Plan Projects.

Special Projects are listed in Table X-3 by funding year.

The CIP is normally updated every two years in a joint effort by the Engineering Field Division, NAS Willow Grove, and major claimant. To remain useful, the CIP must be easily revised to reflect changing priorities, new projects relating to mission changes, and changes in MCNR funding levels. Furthermore, the plan must be in compliance with the proposed land use plan presented in the Master Plan. Implementation of any Master Plan is dependent upon many factors, but perhaps the most important one is phasing. Fortunately, most planned projects are not severely restrained by any particular construction phasing requirements. Any projects that must be constructed before others are appropriately annotated. A Base Exterior Architecture Plan (BEAP) has been developed and projects required to implement the BEAP are listed in Table X-4.

C. PROJECTS IN ADVANCED STAGES OF PLANNING OR DESIGN

Certain projects appear on Plates X-1 and X-2, and may not be described in the text because they are already under construction, or are in advanced stages of planning or design. They are as follows:

P-118; Aircraft Rinse Facility

Project Description: This project will provide for the construction of a rinse facility for the two patrol squadrons to reduce the accelerated corrosion caused by salt deposits.

Status: Project is 100% designed, but is now unprogrammed.

P-167; Air Operations/Passenger Terminal

Project Description: This project will provide an air (security) passenger and operational terminal building with waiting and receiving areas, flight operations support, communications, weather and administration.

Status: Project is in advanced stages of design.

P-213; Ground Support Equipment Shop

Project Description: This project will construct a new Ground Support Equipment Shop located adjacent to AIMD and maintenance hangars.

Status: This project is under design.

RC13-88; Aircraft Fuel Farm Repairs

Project Description: This project proposes four major jobs to be funded in successive phases. The first phase will repair the aging pumphouse, equipment and deteriorated underground pipes beneath it with an aboveground pipe network; truck fill stand with its underground electrical cable network, and electrical distribution system. The second phase would replace the underground fuel tanks with two aboveground tanks including POL distribution pipelines, and demolish the fuel operations building. The third phase will demolish the underground tanks and repair the roads and fences. The fourth phase will construct a new POL operations building and replace bitmuminous with concrete paving.

Status: Phase one is under construction.

D. PROJECTS SUPPORTING MASTER PLAN OBJECTIVES

Nine major objectives were stated at the outset of this Master Plan. They are repeated here along with the identified projects which seek to achieve these objectives. Some projects may directly or indirectly achieve more than one objective.

1. Improve upon the Station's *FUNCTIONAL RELATIONSHIPS.*

   Projects: P-108, P-162, P-167, P-191, P-209, P-213, P-220, P-222, and P-225

2. Provide cost effective solutions to satisfy facilities *DEFICIENCIES* and *SHORTFALLS.*

   Projects: P-108, P-118, P-162, P-167, P-191, P-195, P-205, P-209, P-220, and P-225

3. Improve the *QUALITY OF LIFE* for personnel assigned to the Station.

   Projects: P-044, P-101, P-108, and P-142

4. Identify areas of potential *ENCROACHMENT* and suggest mitigating measures.

   Projects: P-156, P-212, P-214, P-215, P-223, and P-224

5. Maintain *EXPANSION POTENTIAL* for peacetime and mobilization scenarios.

   Projects: P-206, P-213, P-215, and P-222

6. Improve land utilization to achieve *OPERATIONAL* and *ENERGY EFFICIENCY.*

   Projects: P-190, P-195, P-205, P-206, P-209, P-213, and P-222

7. Improve *SAFETY* in operations and support areas.

   Projects: P-195, P-205, P-211, P-213, and P-222

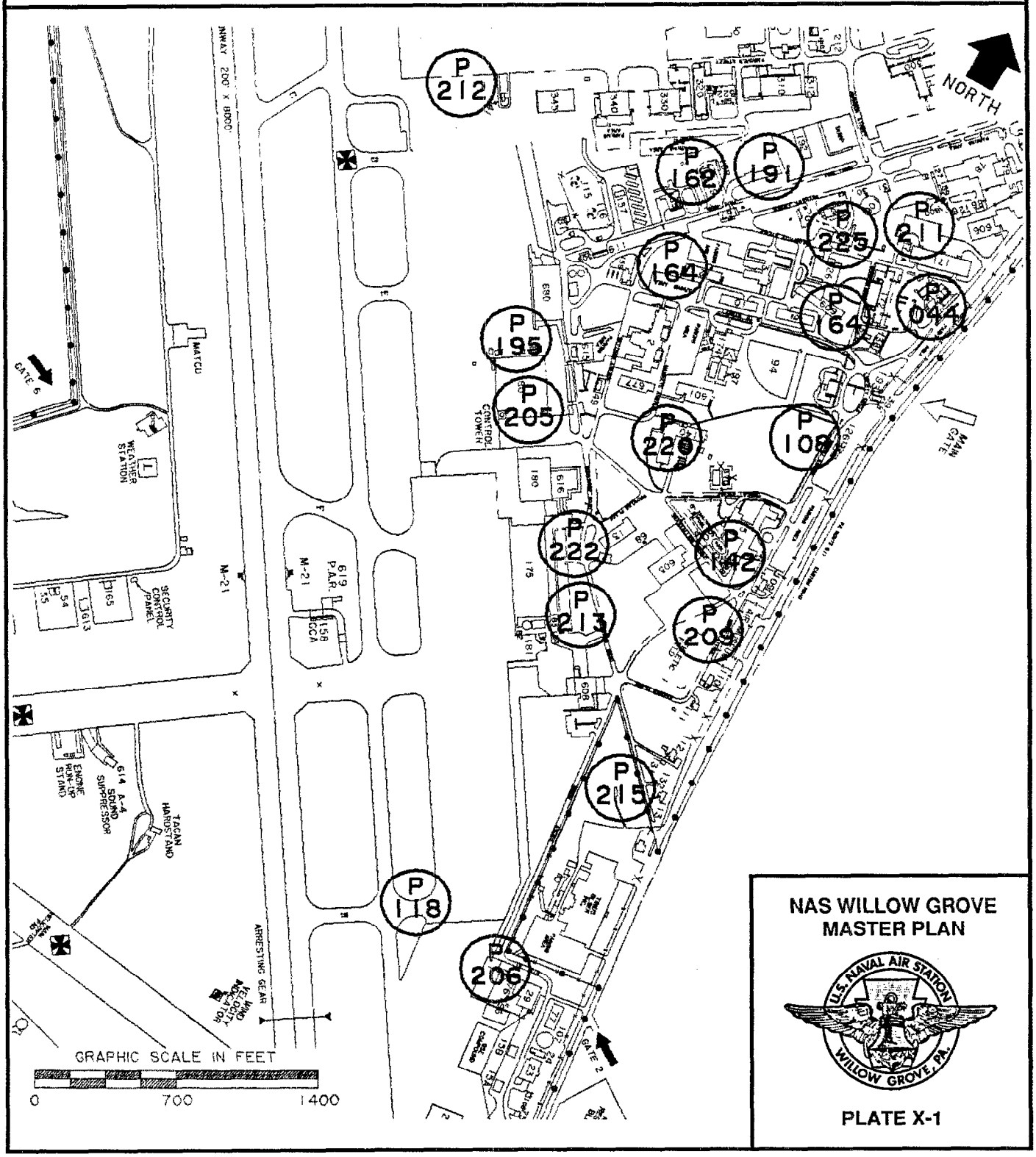
8. Improve *CIRCULATION* and *PARKING.*

   Projects: P-164

9. Review and update *AICUZ.*

   Projects: P-156, P-212, P-214, P-215, P-223, and P-224

P - PROJECTS



NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-1

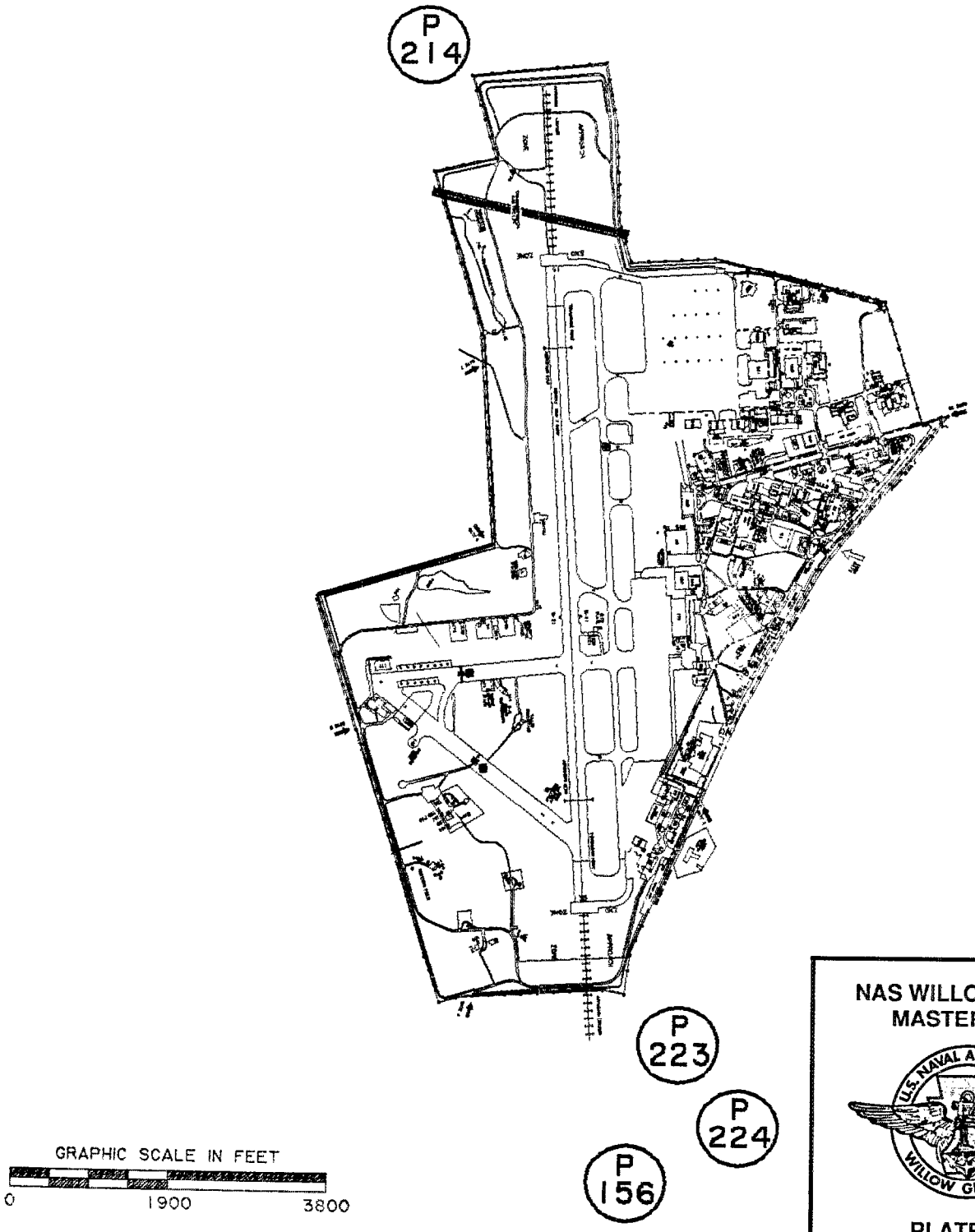
TABLE X-1

P-PROJECTS (MCNR, unless otherwise stated)

Project #	Description	FY	Cost ($000)
P-220	Operational Trainer Facility	90	380
P-213	Ground Support Equipment Building	91	1,390
P-214	Land Acquisition, North Clear Zone	91	300
P-215	Land Acquisition, Tinius Olsen Property	91	200
P-195[1]	North Lean-to, Hangar 80	92	210
P-164[1]	POV Parking, BEQ Area	96	440
P-156	Land Acquisition, South Clear Zone, Phase 1	97	3,000
P-044[2]	Branch Medical Clinic	UP	4,100
P-101	Religious Education Facility	UP	510
P-108	Theater	UP	500
P-118	Aircraft Rinse Facility	UP	320
P-142	Outdoor Swimming Pool	UP	730
P-162	Marine Reserve Training Building	UP	2,200
P-191	Supply Warehouse & Outdoor Storage Shed	UP	2,400
P-205[1]	South Lean-to, Hangar 80	UP	240
P-206	Aircraft Parking Apron	UP	3,300
P-209	Naval Reserve Recruiting Facility	UP	310
P-211[1]	Flammable Outdoor Storage Shed	UP	310
P-212	Aircraft Acoustical Enclosure	UP	5,500
P-222	Ground Support Equipment Shed	UP	540
P-223	Land Acquisition, South Clear Zone, Phase 2	UP	13,000
P-224	Land Acquisition, South Clear Zone, Phase 3	UP	74,000
P-225	Reserve Intelligence Center	UP	620

[1] Minor MCNR Funded
[2] Bureau of Medicine and Surgery (BUMED) Funded

P - PROJECTS



NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-2

E. MASTER PLAN PROJECT DESCRIPTIONS

Master Plan projects are directed toward resolving several major problem areas. Projects supporting the Master Plan are listed in Table X-2 and are illustrated on Plate X-3 to reserve sites for these unprogrammed projects.

TABLE X-2

MASTER PLAN (MP) PROJECTS

Project #	Description	Cost ($000)	Funding
MP-201	Ordnance, Parachute, and Survival Equipment	1,350	MCNR

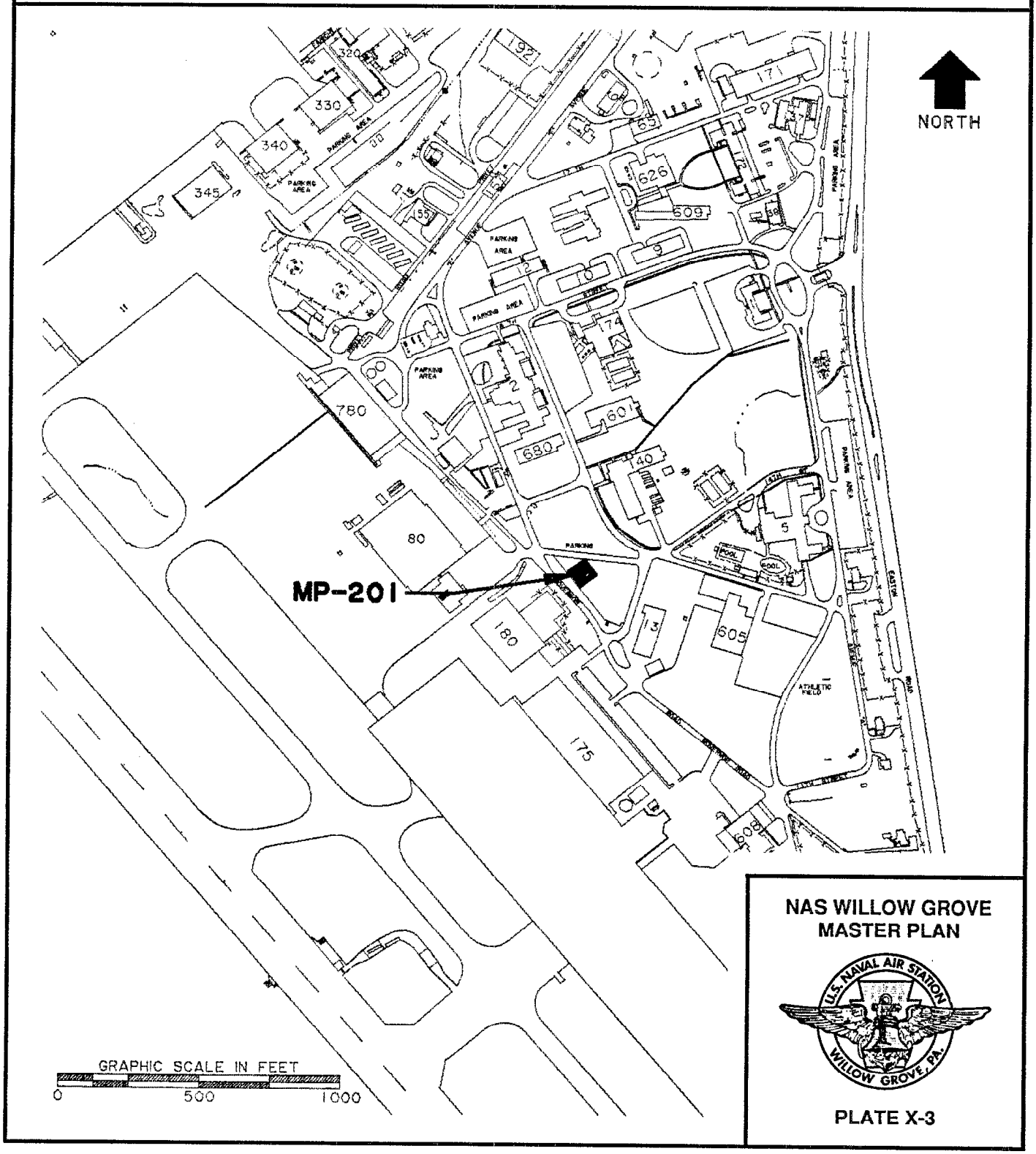
MP-201 ORDNANCE, PARACHUTE, AND SURVIVAL EQUIPMENT

SCOPE: 17,950 SF
COST: $1,350,000
FUNDING: MCNR

PROJECT DESCRIPTION:

This project will provide an addition to the existing AIMD (Bldg 180) to house Parachute Survival Equipment Shop and Aviation Armament Shop. The project will be required when the existing Parachute and Armanent shops are demolished as part of P-213. The project is sited to consolidate the various AIMD functions into one building.

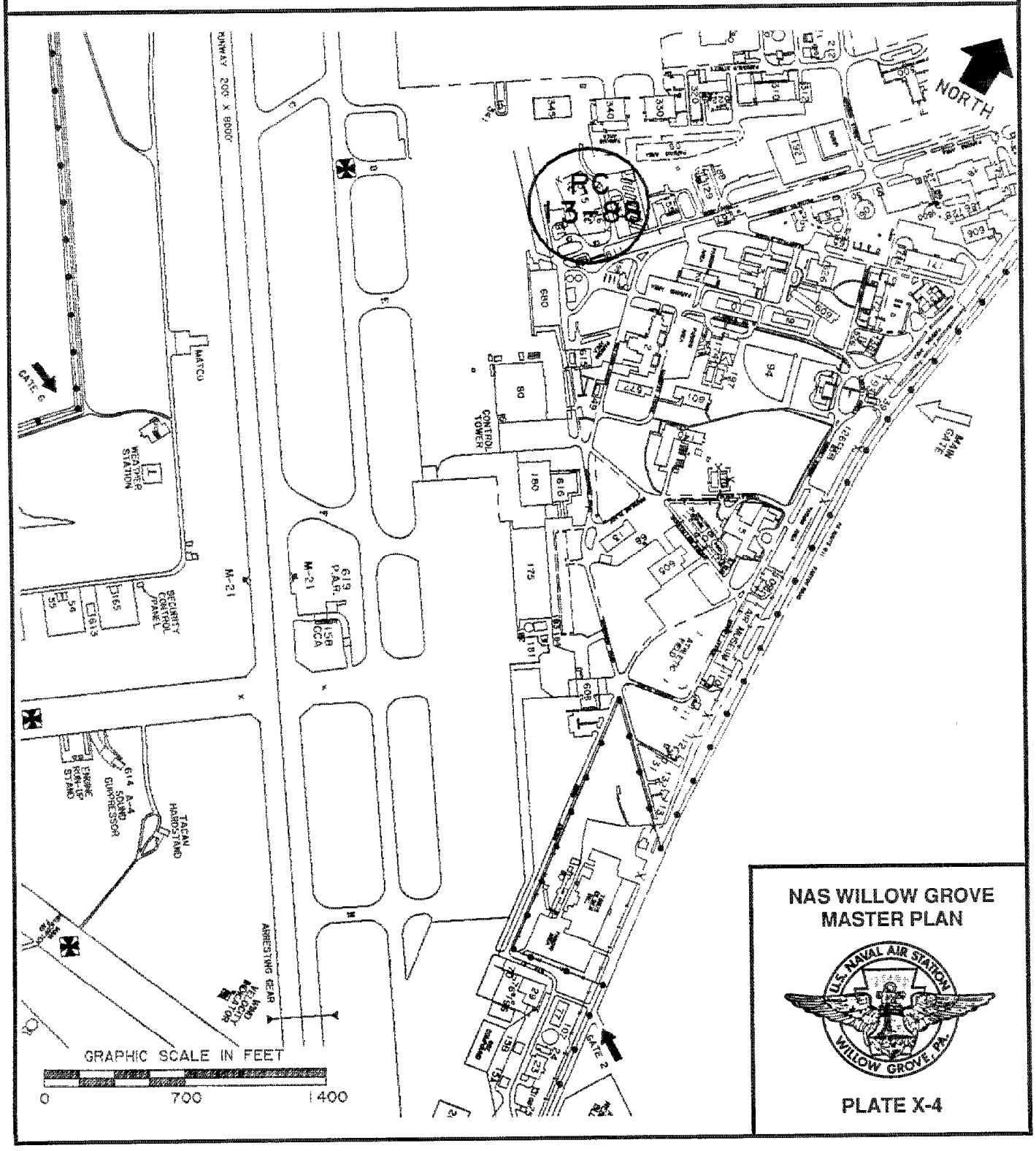
MASTER PLAN PROJECTS



NAS WILLOW GROVE
MASTER PLAN

PLATE X-3

SPECIAL PROJECTS



NAS WILLOW GROVE
MASTER PLAN

PLATE X-4

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F. PROGRAMMED PROJECT DATA SHEETS

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	1990	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	OPERATIONAL TRAINER FACILITY, RESASWTRACEN ADDITION

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	171-35	P-220	380 (esc to 4/90)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	1,920	94.79	182
SUPPORTING FACILITIES	LS	-	-	155
SUBTOTAL	-	-	-	337
CONTINGENCY (5%)	-	-	-	17
TOTAL CONTRACT COST	-	-	-	354
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	21
TOTAL REQUEST	-	-	-	375
TOTAL REQUEST ROUNDED	-	-	-	380
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
The proposed project will provide a second story addition to the existing one story structure Building 140. Masonry unit walls with brick facing, open web roof framing, concrete roof plank, insulated 4 ply built -up roofing, raised flooring, fire protection system and connection to existing utilities are to be provided.

REQUIREMENT:
Reserve ASW Training Center provides aircrew training for the fleet and is in the process of acquiring new training equipment to modernize the ASW Training mission. The simulator is scheduled for delivery in the fall of 1989. Emphasis on realistic training requires computerized simulator facilities to keep the nation's technological edge. A site for this equipment must be available and ready for pre-delivery, preparation, and installation.

PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
171-35	OPERATIONAL TRAINER FACILITY	1,920	SF	4A	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

LOCATION AND SITE PLAN

SEE FACING PAGE

SITING RATIONALE:

The proposed site is an addition to the existing RESASW Training Center located in Building 140. This is the preferred site as it will maintain all ASW trainers in one location.

EFD REVIEW/ANALYSIS:

REQUIRES FURTHER ACTION?	NO	YES	COMMENTS
Explosives Safety	X		
Airfield Safety	X		
Electromagnetic Radiation	X		
AICUZ Violation	X		
Change to Approved Master Plan/CIP	X		
Coastal Zone Management	X		
Natural Resources Plan	X		
Dredging/Filling Permits	X		
Wetland/Floodplain	X		
Hazardous Wastes on Site	X		
Cultural Resources Impact	X		
Other Site Problems	X		
Utilities Support	X		
Roads, Parking	X		
Preliminary Environmental Assessment	X		Complies with NEPA. Project falls under
Preliminary Hazards Analysis	X		Categorical Exclusion #14.

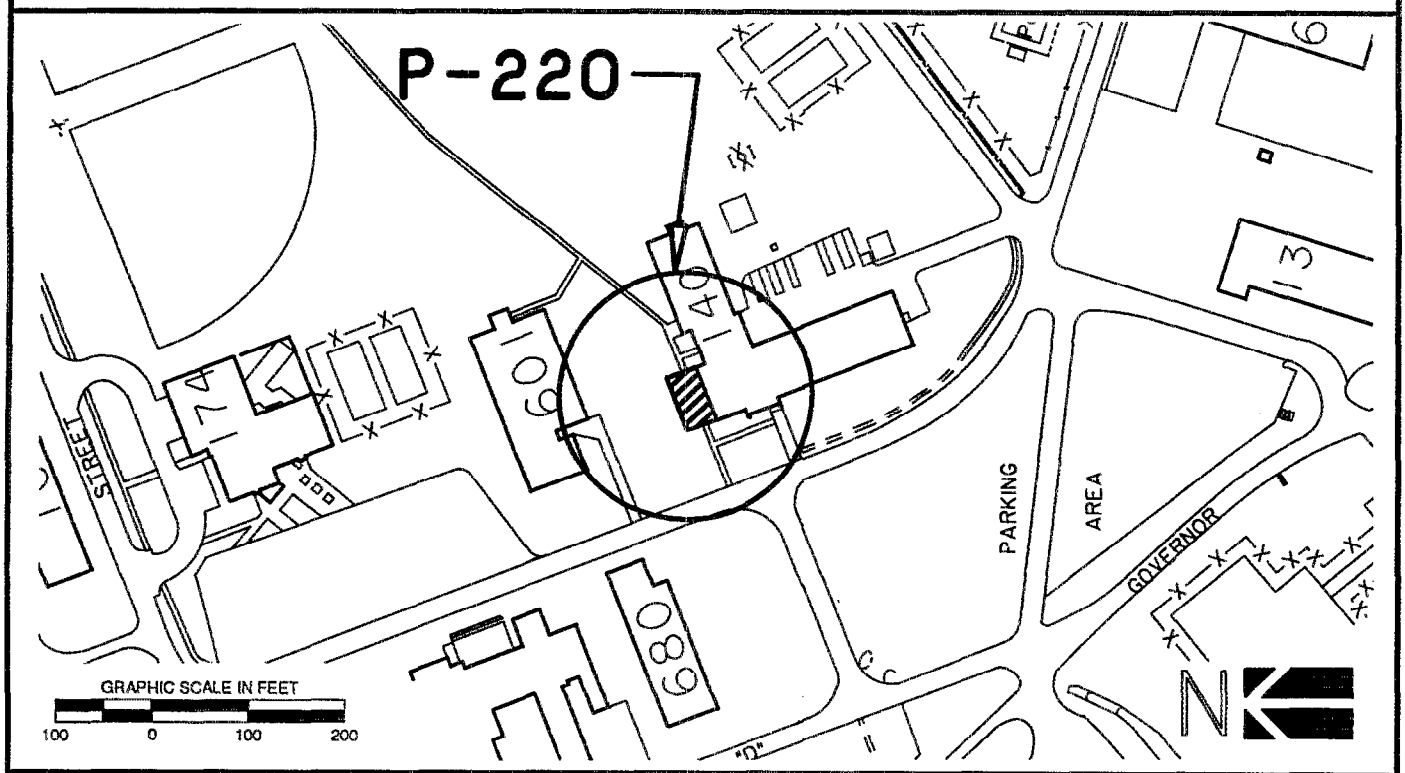
EFD VALIDATION:

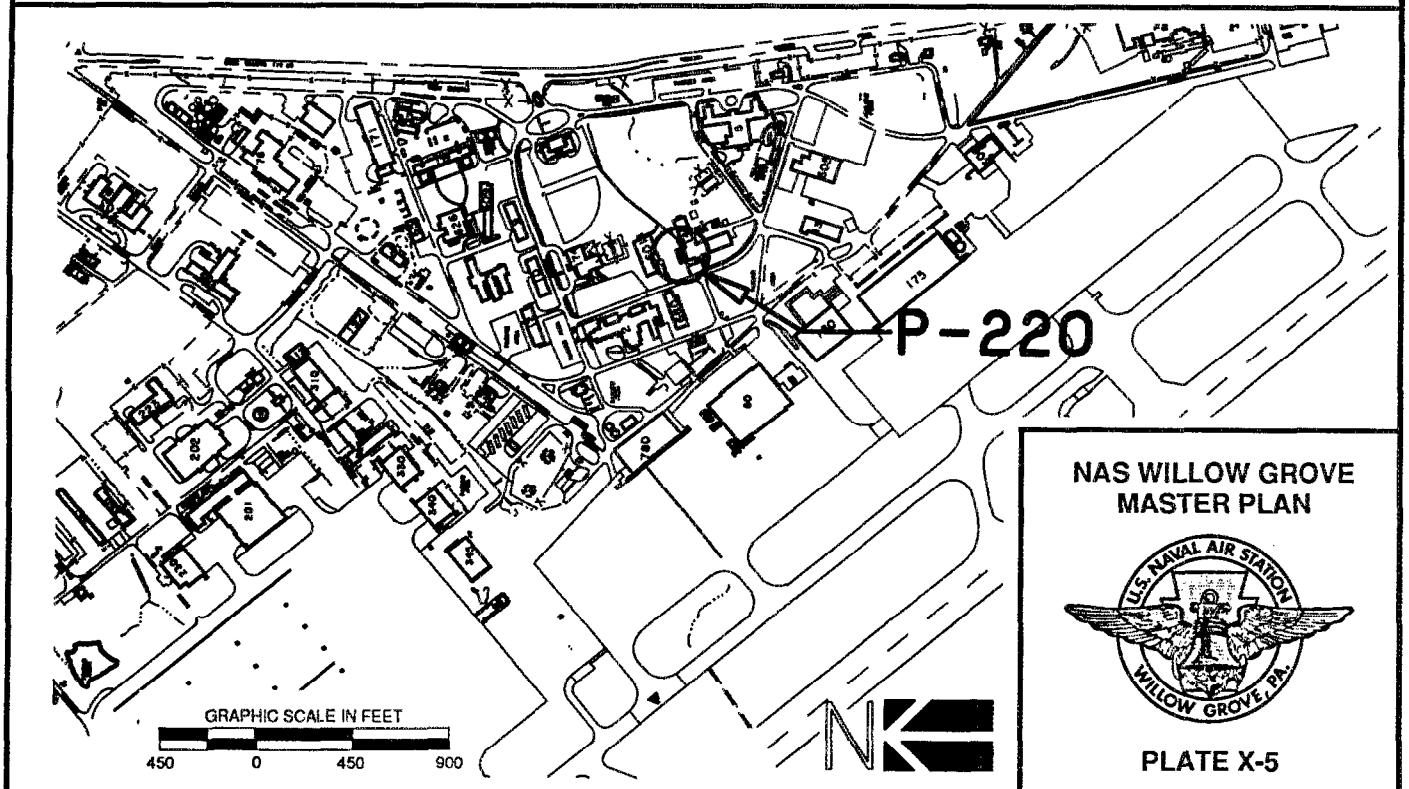
Site Approved: Yes X No ____ Deferred ____ NAVFAC Form 11010/31 approved

Project Supported By SFPS: Yes X No ____ on 27 March 1989.

Name:_____ Date:_____

P-220; OPERATIONAL TRAINER FACILITY





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-5

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PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	1991	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	GROUND SUPPORT EQUIPMENT (GSE) SHOP

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	218-60	P-213	1,390 (esc to 4/91)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	10,000	101.60	1,016
SUPPORTING FACILITIES	LS	-	-	230
SUBTOTAL	-	-	-	1,246
CONTINGENCY (5%)	-	-	-	62
TOTAL CONTRACT COST	-	-	-	1,308
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	79
TOTAL REQUEST	-	-	-	1,387
TOTAL REQUEST ROUNDED	-	-	-	1,390
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

To provide an aircraft Ground Support Equipment (GSE) shop fully equipped to efficiently maintain and repair ground support equipment in support of high performance aircraft assigned to the Naval Air Station. The GSE shop will be a steel-frame, CMU building with spread footing, concrete floors, masonry walls, sloping roof, fire protection system, and utilities. The GSE shed will not be part of this project and will be submitted separately. Building #29, the present (inadequate) GSE shop will be demolished upon completion of this project. This project will include a gravel base parking lot for POV parking of GSE and Hangar 175 personnel. OMSI cost = $4,000 (included in primary facility cost).

REQUIREMENT:

Intermediate level maintenance of ground support equipment is performed in this shop on all "yellow gear" items such as aircraft tow tractors, trucks, fork lifts, compressors, electrical power generators, aircraft ground starters, hydraulic power carts, and repair stands. The GSE shop supports the maintenance of all jet aircraft assigned to the Air Station, including transient aircraft.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
218-60	GROUND SUPPORT EQUIPMENT SHOP	10,000	SF	3B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

LOCATION AND SITE PLAN

SEE FACING PAGE

SITING RATIONALE:

The proposed site will be in close proximity to the parent AIMD building and central to the squadron users. The site is sufficient to provide approximately 60,000 SF of area needed by this function. Utilities are readily available. In addition, this location reserves the area south of Hangar 175 for future expansion of an additional aircraft hangar or parking apron.

EFD REVIEW/ANALYSIS:

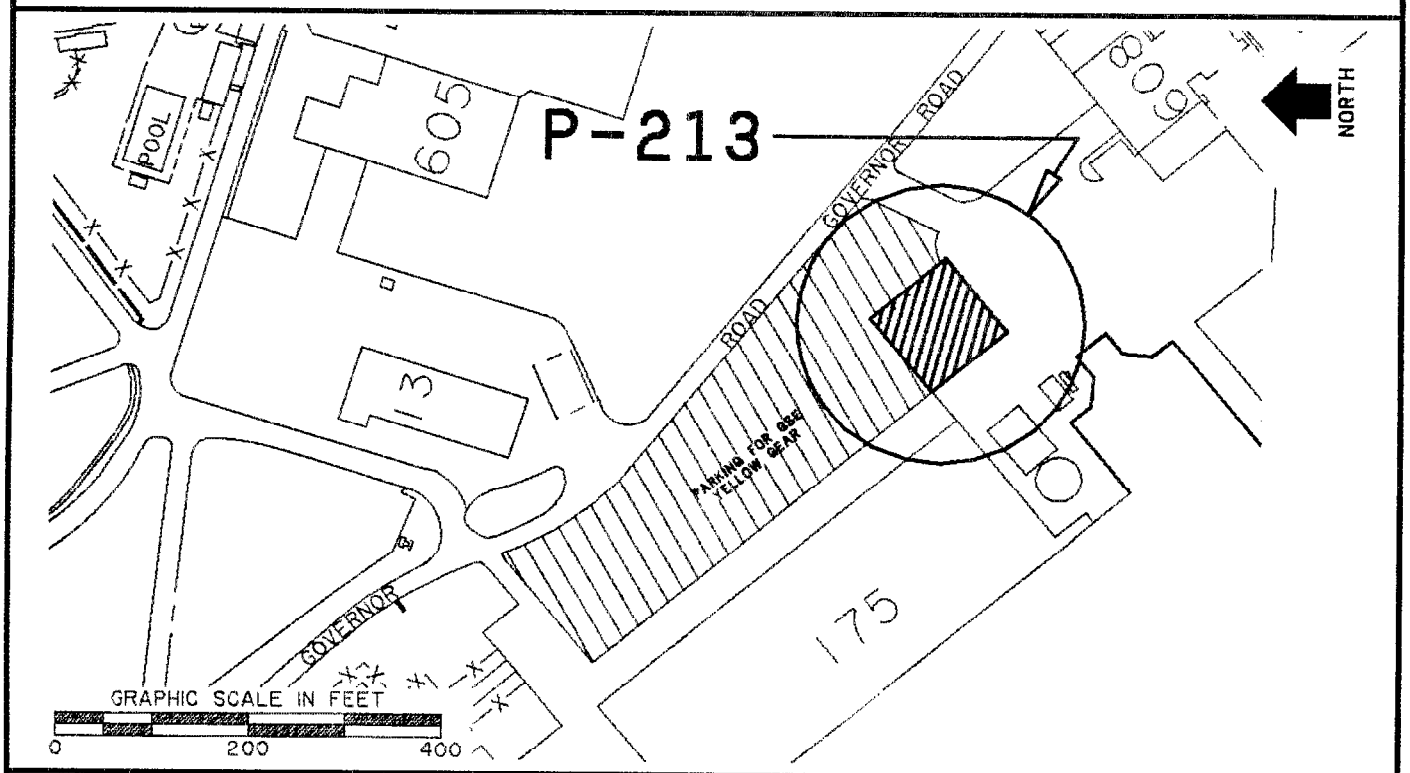
REQUIRES FURTHER ACTION?	NO	YES	COMMENTS
Explosives Safety	X		
Airfield Safety	X		
Electromagnetic Radiation	X		
AICUZ Violation	X		
Change to Approved Master Plan/CIP	X		
Coastal Zone Management	X		
Natural Resources Plan	X		
Dredging/Filling Permits	X		
Wetland/Floodplain	X		
Hazardous Wastes on Site	X		
Cultural Resources Impact	X		
Other Site Problems	X		
Utilities Support	X		
Roads, Parking	X		
Preliminary Environmental Assessment	X		
Preliminary Hazards Analysis	X		

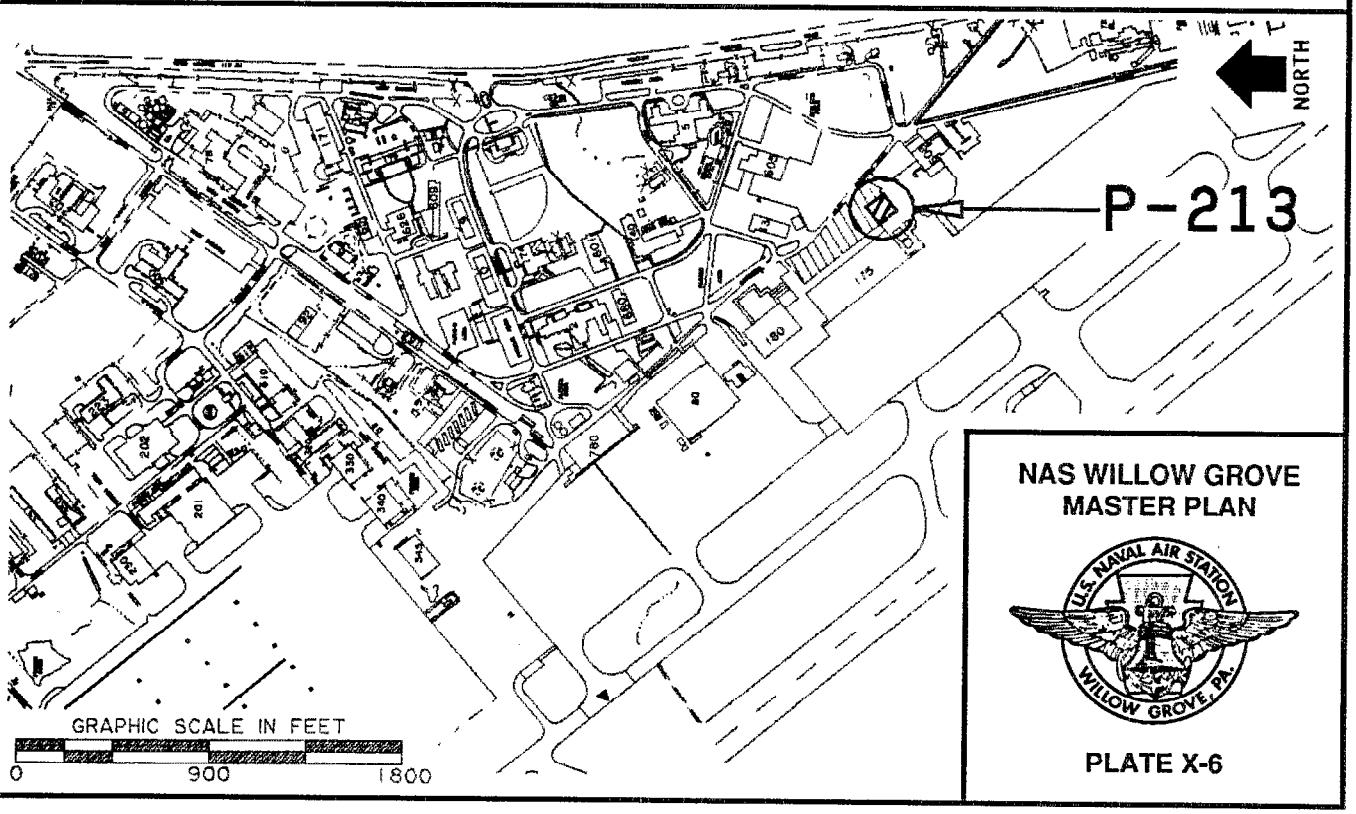
EFD VALIDATION:

Site Approved: Yes X No ____ Deferred ____ NAVFAC Form 11010/31 approved
Project Supported By SFPS: Yes X No ____ on 28 February 1990.

Name:_____ Date:_____

P-213; GROUND SUPPORT EQUIPMENT BUILDING





NAS WILLOW GROVE
MASTER PLAN

PLATE X-6

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PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	1991	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	LAND ACQUISITION, NORTH CLEAR ZONE

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	911-10	P-214	300 (esc to 4/91)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	AC	25.27	10,836	273.8
SUPPORTING FACILITIES	-	-	-	0.0
SUBTOTAL	-	-	-	273.8
CONTINGENCY (5%)	-	-	-	13.7
TOTAL CONTRACT COST	-	-	-	287.5
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	15.8
TOTAL REQUEST	-	-	-	303.3
TOTAL REQUEST ROUNDED	-	-	-	300
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

Provide for the purchase in fee simple and restrictive easement of 25.27 acres of land in the north Clear Zone (Runway 15-33) of NAS Willow Grove.

REQUIREMENT:

The Navy's Air Installation Compatibility Use Zone (AICUZ) Program has identified both runway Clear Zones at NAS Willow Grove as (high potential) aircraft accidents zones. It is DoD policy to acquire these Clear Zones in fee simple or restrictive easement to protect the public and the Station from high potential of an aircraft accident.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
911-10	LAND - PURCHASE	25.27	AC	6B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

LOCATION AND SITE PLAN

SEE FACING PAGE

SITING RATIONALE:

The Navy's Air Installation Compatibility Use Zone (AICUZ) Program has identified both runway Clear Zones at NAS Willow Grove as (high potential) aircraft accidents zones. It is DoD policy to acquire these Clear Zones in fee simple or restrictive easement to protect the public and the Station from high potential of an aircraft accident.

EFD REVIEW/ANALYSIS:

REQUIRES FURTHER ACTION?	NO	YES	COMMENTS
Explosives Safety	X		
Airfield Safety	X		
Electromagnetic Radiation	X		
AICUZ Violation	X		
Change to Approved Master Plan/CIP	X		
Coastal Zone Management	X		
Natural Resources Plan	X		
Dredging/Filling Permits	X		
Wetland/Floodplain	X		
Hazardous Wastes on Site	X		
Cultural Resources Impact	X		
Other Site Problems	X		
Utilities Support	X		
Roads, Parking	X		
Preliminary Environmental Assessment	X		
Preliminary Hazards Analysis	X		

EFD VALIDATION:

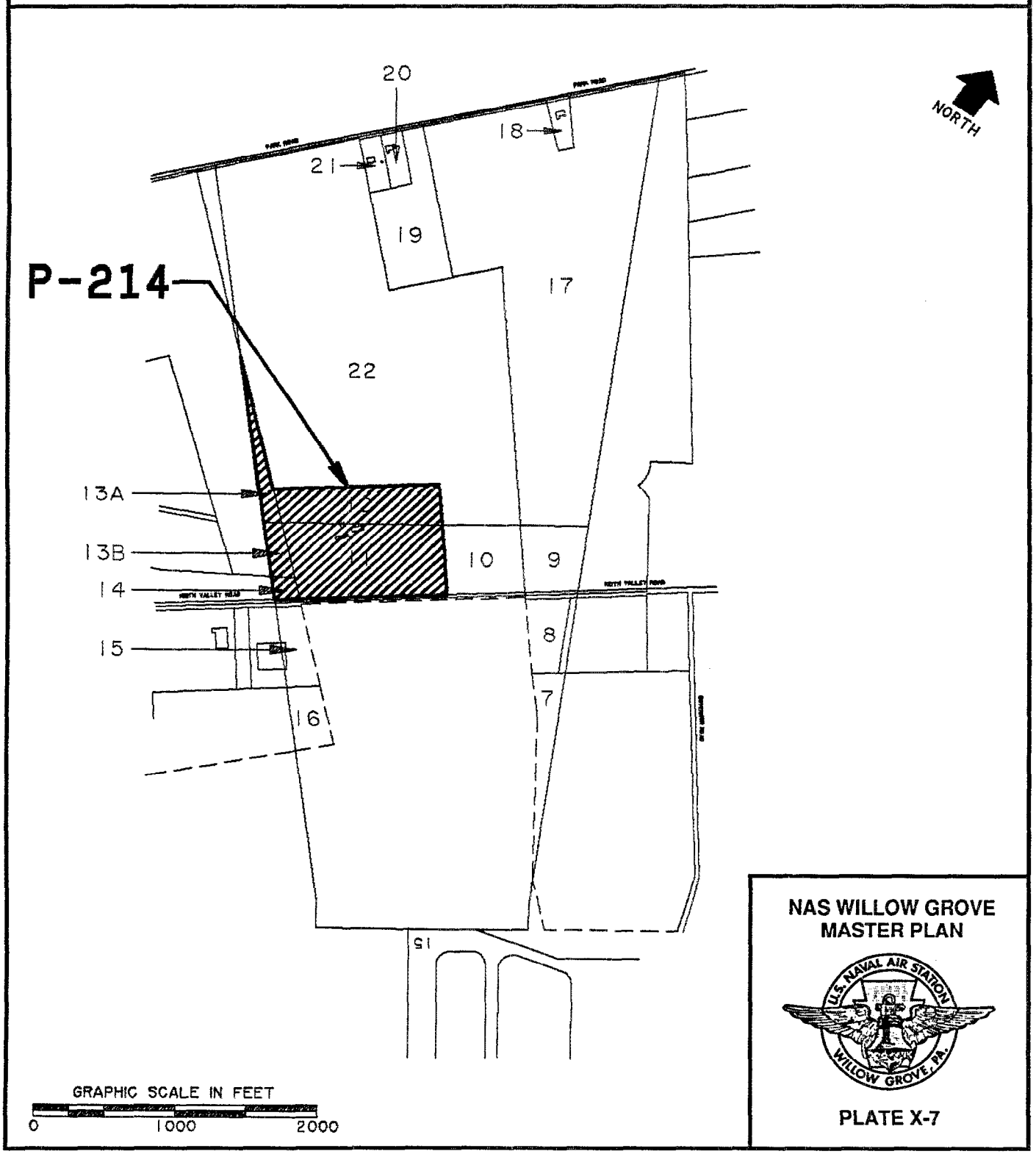
Site Approved: Yes X No ____ Deferred ____

Project Supported By SFPS: Yes X No ____

NAVFAC Form 11010/31 approved on 23 March 1989.

Name:_____ Date:_____

P-214; LAND ACQUISITION, NORTH CLEAR ZONE



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PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	1991	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	LAND ACQUISITION, TINIUS OLSEN PROPERTY

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	911-10	P-215	200 (esc to 4/91)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	AC	4.4	40,910	180.0
SUPPORTING FACILITIES	-	-	-	0.0
SUBTOTAL	-	-	-	180.0
CONTINGENCY (5%)	-	-	-	9.0
TOTAL CONTRACT COST	-	-	-	189.0
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	11.3
TOTAL REQUEST	-	-	-	200.3
TOTAL REQUEST ROUNDED	-	-	-	200
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
Purchase in fee simple 4.4 acres of Tinius Olsen Property.

REQUIREMENT:
Recent security intrusions on the flight line through this area, causing $400,000 damage might have been prevented had more clear area existed between the Navy flight line and the Tinius Olsen land. Addditionallly, a privately funded museum being constructed just northwest and adjacent to this site, will require the relocation of one playing field and two married quarters. This land will enable all three objectives to be achieved. This acquisition also complements the future expansion of the aircraft parking apron (P-206).

PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
911-10	LAND - PURCHASE	4.4	AC	6B	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

LOCATION AND SITE PLAN

SEE FACING PAGE

SITING RATIONALE:

Acquisition of the 4.4 acres is necessary to limit incompatible development adjacent to the Station and to provide adequate clearance between the proposed aircraft parking apron (P-206) and the Station's perimeter fence.

EFD REVIEW/ANALYSIS:

REQUIRES FURTHER ACTION?	NO	YES	COMMENTS
Explosives Safety	X		
Airfield Safety	X		
Electromagnetic Radiation	X		
AICUZ Violation	X		
Change to Approved Master Plan/CIP	X		
Coastal Zone Management	X		
Natural Resources Plan	X		
Dredging/Filling Permits	X		
Wetland/Floodplain	X		
Hazardous Wastes on Site	X		
Cultural Resources Impact	X		
Other Site Problems	X		
Utilities Support	X		
Roads, Parking	X		
Preliminary Environmental Assessment	X		
Preliminary Hazards Analysis	X		

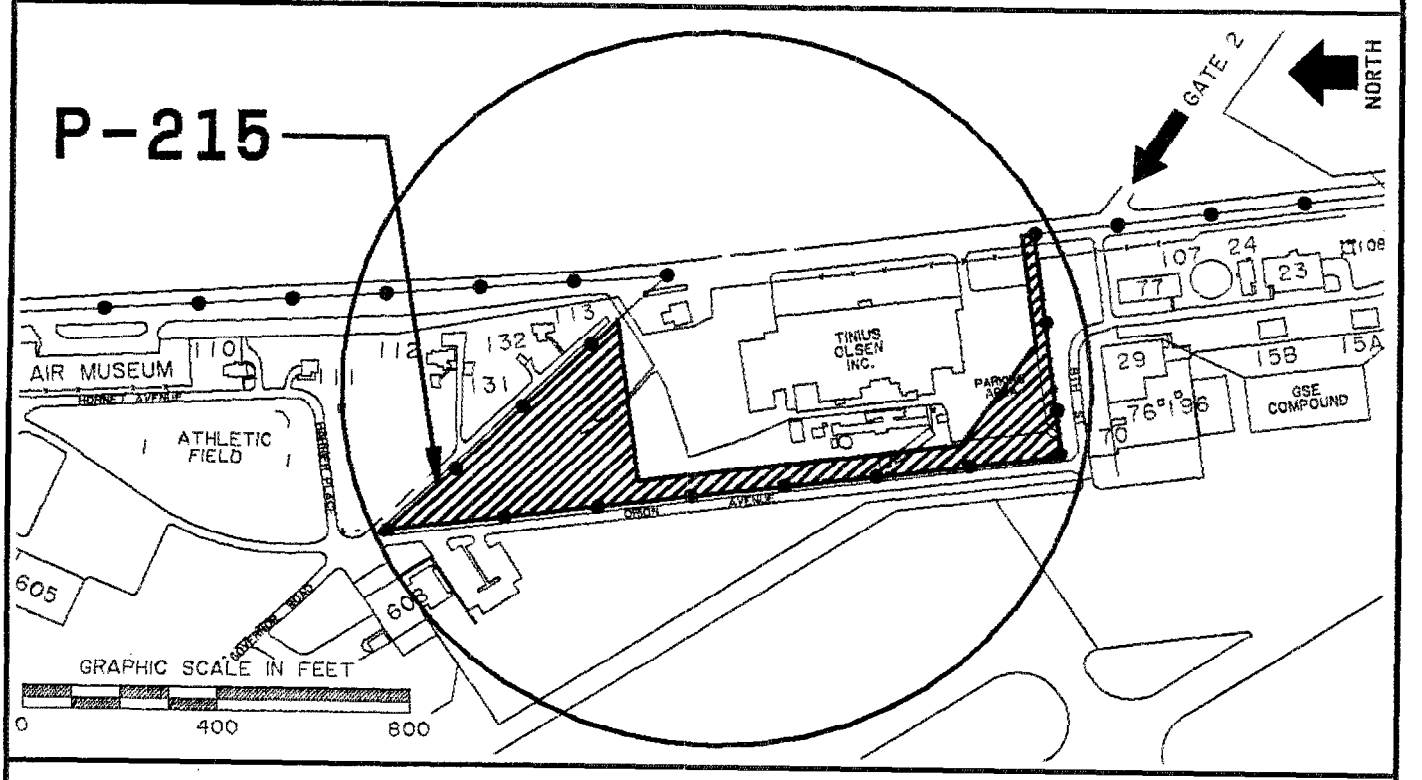
EFD VALIDATION:

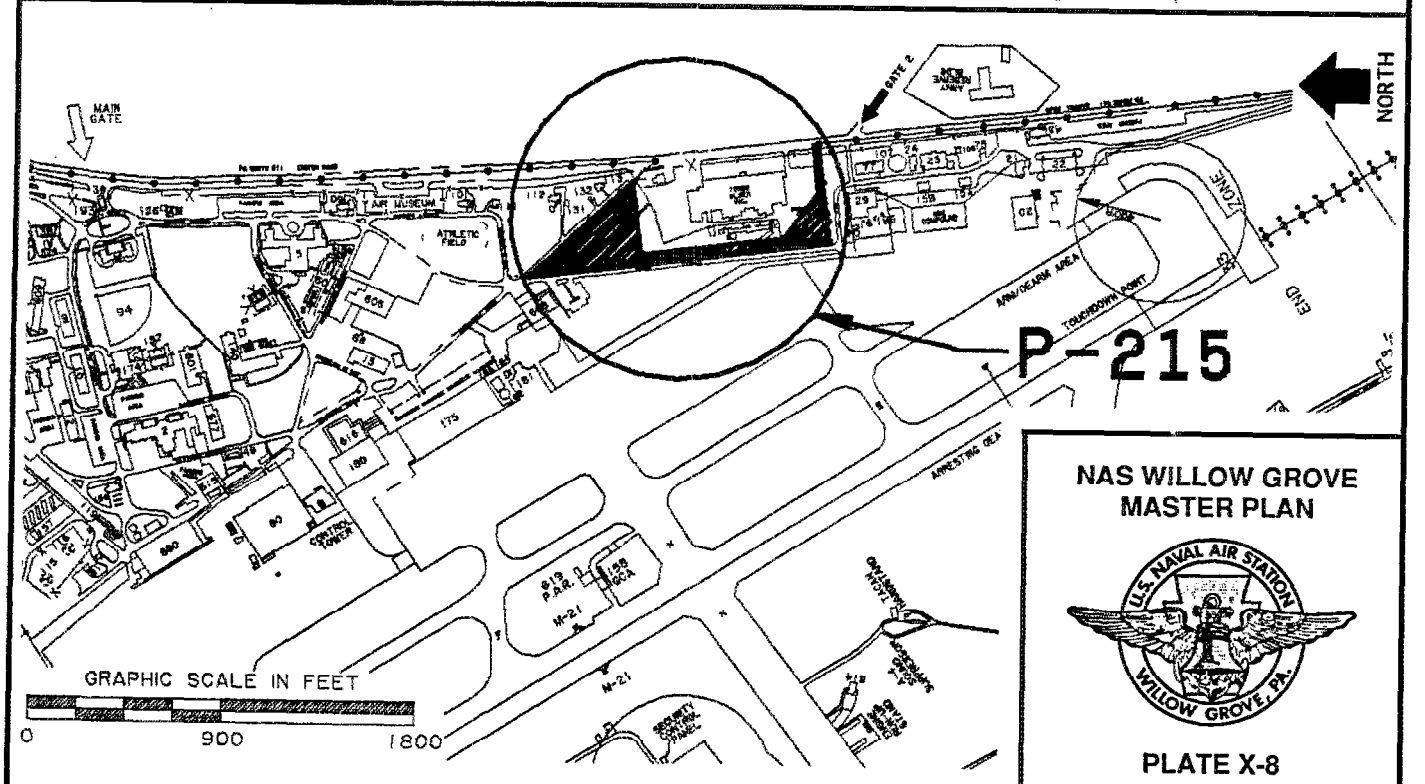
Site Approved: Yes ____ No X Deferred ____

Project Supported By SFPS: Yes X No ____

Name:_____ Date:_____

P-215; LAND ACQUISITION, TINIUS OLSEN PROPERTY





NAS WILLOW GROVE
MASTER PLAN

PLATE X-8

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PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	1992	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	HVAC AND CONSTRUCTION, HS-75 AND VR-52 NORTH LEAN-TO, HANGAR 80

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	211-07	P-195	210 (esc to 4/92)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	LS	-	-	191
SUPPORTING FACILITIES	-	-	-	0
SUBTOTAL	-	-	-	191
CONTINGENCY (5%)	-	-	-	10
TOTAL CONTRACT COST	-	-	-	201
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	12
TOTAL REQUEST	-	-	-	213
TOTAL REQUEST ROUNDED	-	-	-	210
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION: Heating and air conditioning in the north lean-to of Hangar 80 was designed to support AIMD. Upon completion of Bldg. 180, AIMD functions were moved out of this area. Assignment of two C-9 leased aircraft and assignment of HS-75 as a supported unit has generated the requirement for additional heat distribution in these spaces and to provide additional air conditioning in other spaces on the 1st deck, north lean-to, Hangar 80. This new mission support has also generated the requirement for construction to support C-9 and HS-75 operational functions. Proposed solution is to expand utility systems to provide minimum comfort and provide proper administrative space to support the required missions.

REQUIREMENT: HS-75 with seven aircraft has been assigned to NAS Willow Grove as a mission requirement. VR-52 has two C-9 leased aircraft assigned. The new construction necessary to provide proper administrative and maintenance space in support of the operation of HS-75. Changes in the interior space configuration on the 1st deck, north lean-to, Hangar 80 has uncovered deficiencies in the heating and air conditioning distribution systems. HS-75 spaces are deficient in heating, with only perimeter units available and leaving some spaces without heat. Extension of the heat and air handling system will provide required heating for these spaces. Spaces proposed to support the leased aircraft and station aircraft are deficient in ventilation and air conditioning, especially for summer operations. Expanded utility systems to provide minimum comfort levels will be provided under this project.

PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
211-07	MAINTENANCE HANGAR - 02 SPACE		LS	2A	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

LOCATION AND SITE PLAN

SEE FACING PAGE

SITING RATIONALE:

This project is located in the north lean-to of Hangar 80.

EFD REVIEW/ANALYSIS:

REQUIRES FURTHER ACTION?	NO	YES	COMMENTS
Explosives Safety	X		
Airfield Safety	X		
Electromagnetic Radiation	X		
AICUZ Violation	X		
Change to Approved Master Plan/CIP	X		
Coastal Zone Management	X		
Natural Resources Plan	X		
Dredging/Filling Permits	X		
Wetland/Floodplain	X		
Hazardous Wastes on Site	X		
Cultural Resources Impact	X		
Other Site Problems	X		
Utilities Support	X		
Roads, Parking	X		
Preliminary Environmental Assessment	X		
Preliminary Hazards Analysis	X		

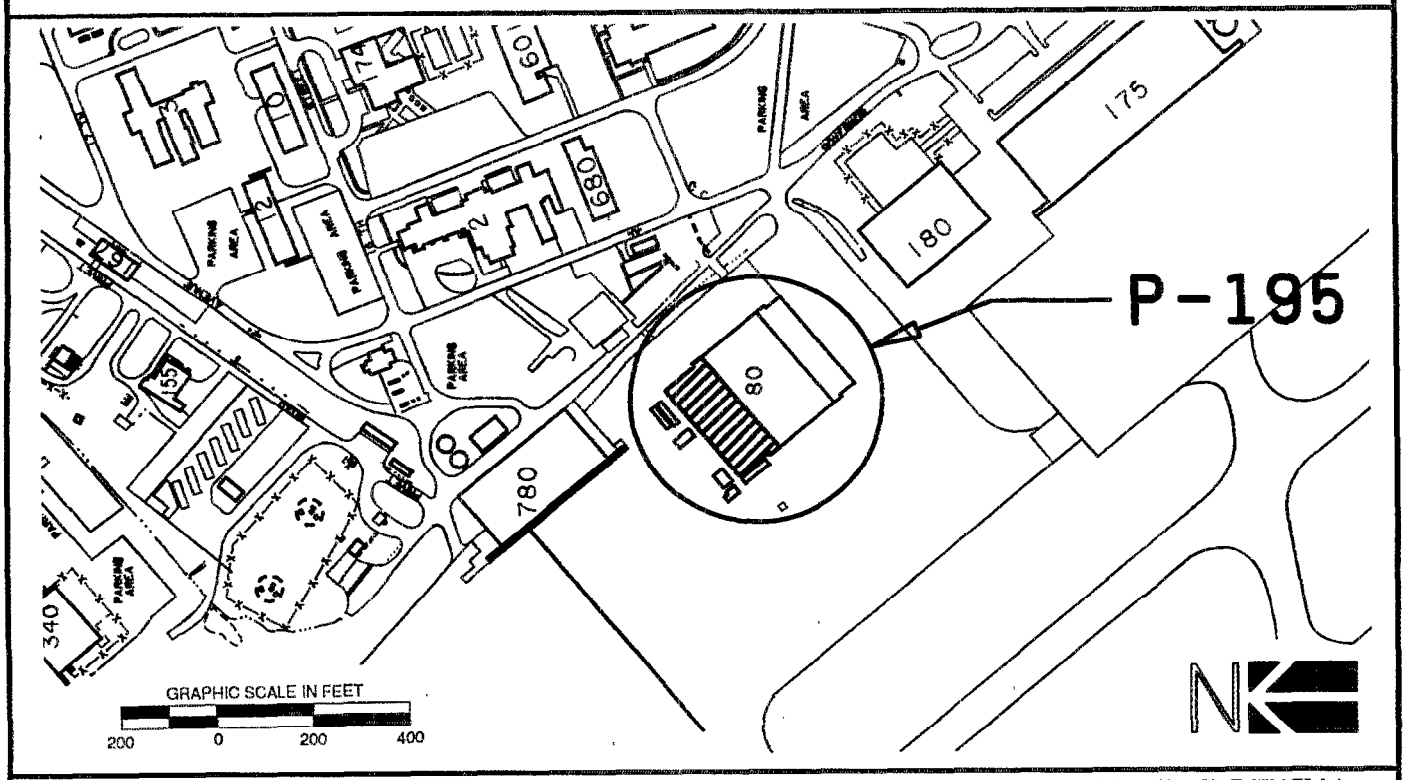
EFD VALIDATION:

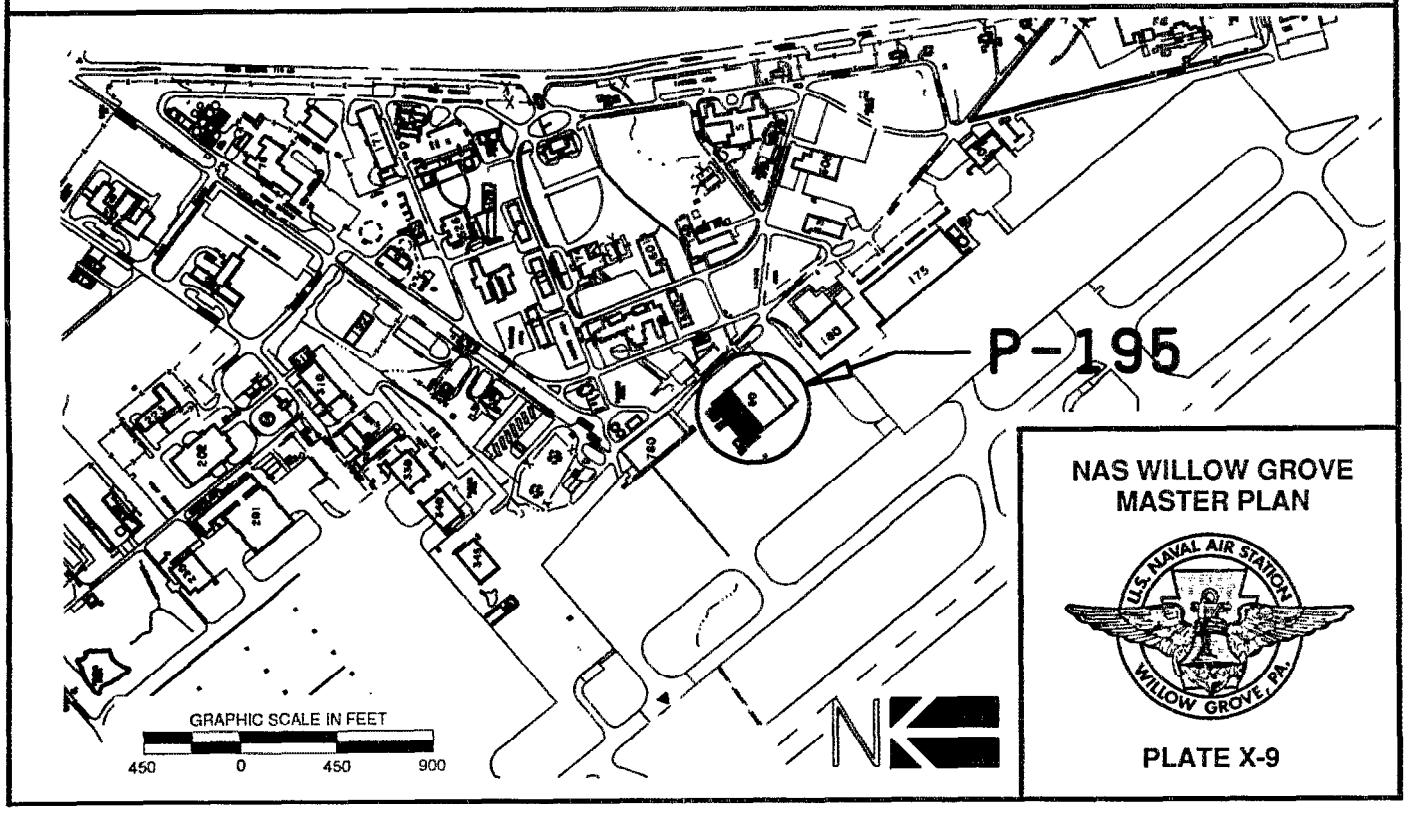
Site Approved: Yes ____ No _X_ Deferred ____

Project Supported By SFPS: Yes X__ No ____

Name:_____ Date:_____

P-195; NORTH LEAN-TO, HANGAR 80





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION
WILLOW GROVE, PA.

PLATE X-9

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PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	1996	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	POV PARKING, BEQ AREA

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	852-10	P-164	440 (esc to 4/96)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SY	10,500	32.57	342
SUPPORTING FACILITIES	-	-	-	51
SUBTOTAL	-	-	-	393
CONTINGENCY (5%)	-	-	-	20
TOTAL CONTRACT COST	-	-	-	413
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	25
TOTAL REQUEST	-	-	-	438
TOTAL REQUEST ROUNDED	-	-	-	440
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

This project invloves construction of two (2) parking lots to handle the present and projected vehicular volumes for the BEQ, Galley, and hangar industrial complex. Areas will be excavated, graded, top soil removed, and paved to facilitate better pedestrian and vehicular traffic flow. Improvements involve the installation of new curbs, drainage, lighting, and screen plantings to improve the appearance of the area.

REQUIREMENT:

A shortage of vehicular parking exists at the newly constructed BEQ and dining facility. Additionally, parking is a premium and is badly needed to support the weekend reserve units performing training at the two main hangars and AIMD. Construction of a Passenger Terminal has reduced the available 300 parking spaces to the busiest main hub of the Station, which has the greatest weekday and largest concentration of personnel.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
852-10	POV PARKING, BEQ AREA	10,500	SY	1B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

LOCATION AND SITE PLAN

SEE FACING PAGE

SITING RATIONALE:

The site supports the hangar industrial complex which has the largest employee concentration on the Station. This project will support other nearby facilities besides the BEQ and Galley, for example, the Mini Mart, Child Care Center, and Community Services Building. This will reduce congestion in the aforementioned areas. The location is convenient to a large concentration of workforce, which should reduce unnecessary vehicular circulation in search of a parking space. Drainage is readily available at the site.

EFD REVIEW/ANALYSIS:

REQUIRES FURTHER ACTION?	NO	YES	COMMENTS
Explosives Safety	X		
Airfield Safety	X		
Electromagnetic Radiation	X		
AICUZ Violation	X		
Change to Approved Master Plan/CIP		X	Project was originally submitted to provide parking around Hangars 80 and 175.
Coastal Zone Management	X		
Natural Resources Plan	X		
Dredging/Filling Permits	X		
Wetland/Floodplain	X		
Hazardous Wastes on Site	X		
Cultural Resources Impact	X		
Other Site Problems	X		
Utilities Support	X		
Roads, Parking	X		This project will eliminate deficiency of parking in the BEQ/Galley area and around Hangar 680.
Preliminary Environmental Assessment	X		
Preliminary Hazards Analysis	X		

EFD VALIDATION:

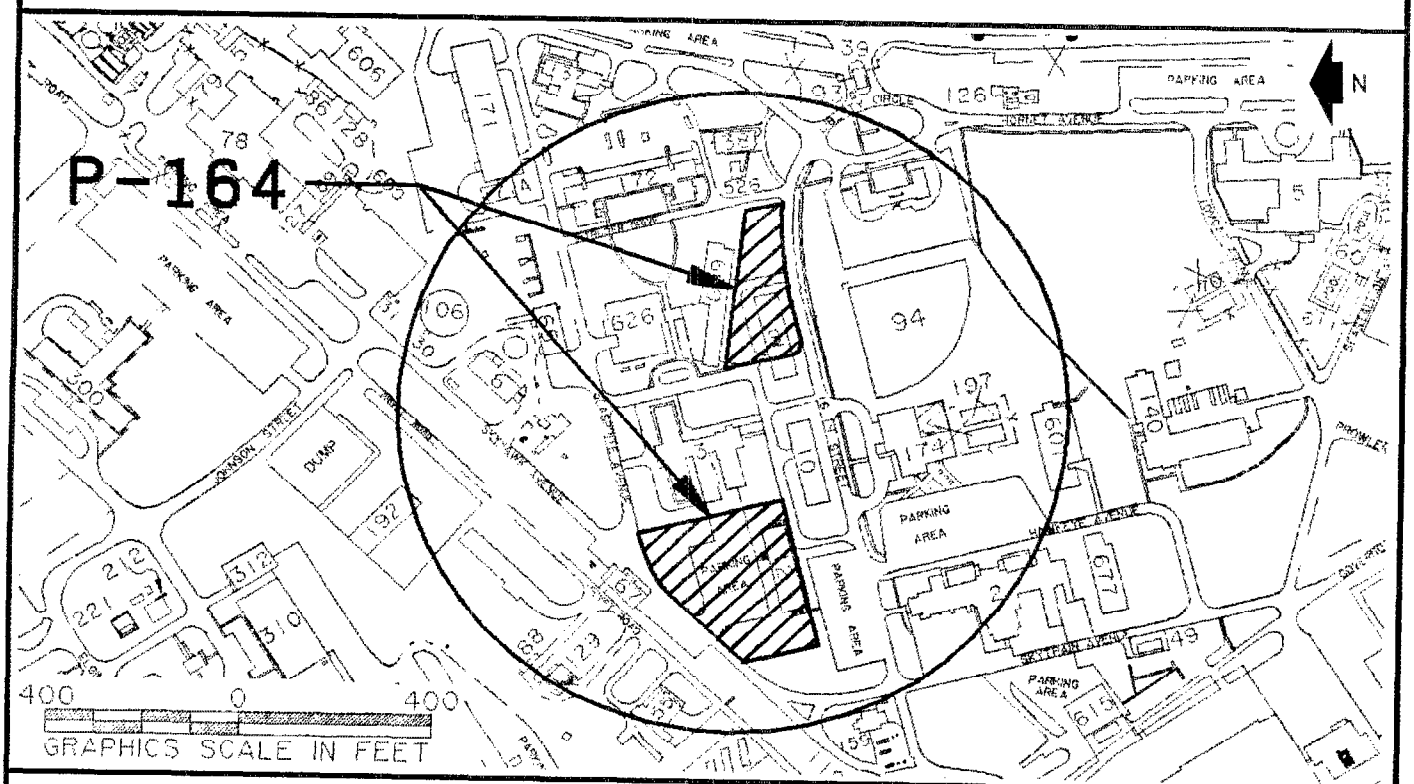
Site Approved: Yes X No ____ Deferred ____

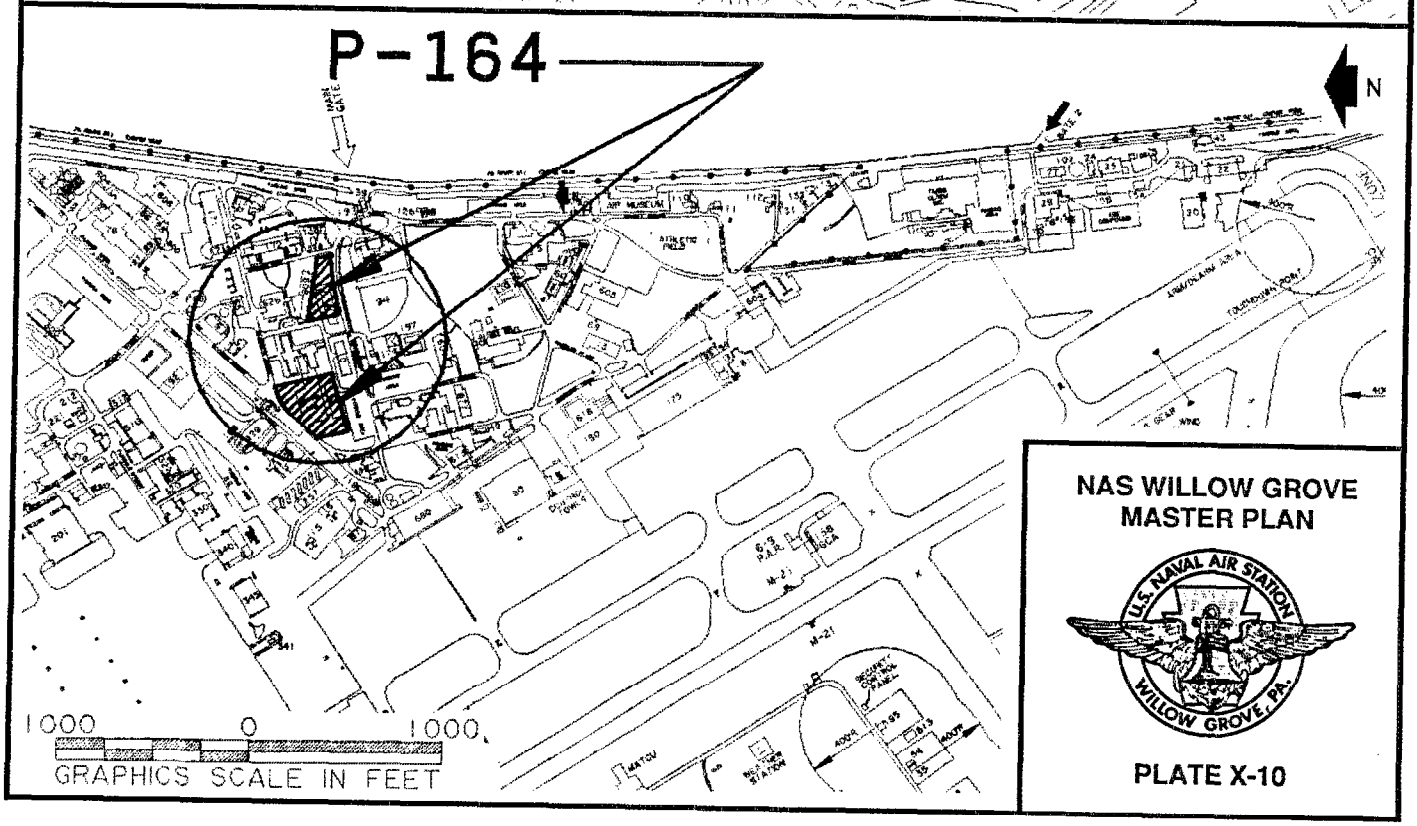
Project Supported By SFPS: Yes X No ____

NAVFAC 11010/31 (REV. 4-87) was approved on 10 April 1990.

Name:_____ Date:_____

P-164; POV PARKING, BEQ AREA





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-10

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PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	1997	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	LAND ACQUISITION, SOUTH CLEAR ZONE, PHASE 1

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	911-10	P-156	3,000 (esc to 4/97)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	AC	3.71	630,000	2,337.3
SUPPORTING FACILITIES	-	-	-	0.0
SUBTOTAL	-	-	-	2,337.3
CONTINGENCY (5%) (15%)	-	-	-	350.6
TOTAL CONTRACT COST	-	-	-	2,687.9
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	161.3
TOTAL REQUEST	-	-	-	2,849.2
TOTAL REQUEST ROUNDED	-	-	-	3,000
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

Negotiate a fair and reasonable price for the purchase of 3.7 acres of prime real estate located within the South Clear Zone of NAS Willow Grove.

REQUIREMENT:

Acquisition in fee simple of 3.7 acres of land which lies at the approach path of Runway 15-33 considered high risk should an aircraft accident occur. Acquisition is needed to limit development and ensure mission viability for this Air Station. The requirement to acquire the Clear Zone properties is stronger than ever because of increasing efforts by local developers to change zoning and facilitate incompatible development within the South Clear Zone properties. This action represents an unacceptable risk to public safety and will severely impact on flight operations of the Air Station.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
911-10	LAND - PURCHASE	3.71	AC	6B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

LOCATION AND SITE PLAN

SEE FACING PAGE

SITING RATIONALE:

The proposed acquisition lies under the approach path to the NAS runway in what is referred to as "Accident Potential Zone". In an attempt to minimize potential problem for a pilot flying over it and to reduce the risk to the public, it has been the Navy's policy to buy these properties in fee simple.

EFD REVIEW/ANALYSIS:

REQUIRES FURTHER ACTION?	NO	YES	COMMENTS
Explosives Safety	X		
Airfield Safety	X		
Electromagnetic Radiation	X		
AICUZ Violation	X		
Change to Approved Master Plan/CIP	X		
Coastal Zone Management	X		
Natural Resources Plan	X		
Dredging/Filling Permits	X		
Wetland/Floodplain	X		
Hazardous Wastes on Site	X		
Cultural Resources Impact	X		
Other Site Problems	X		
Utilities Support	X		
Roads, Parking	X		
Preliminary Environmental Assessment	X		
Preliminary Hazards Analysis	X		

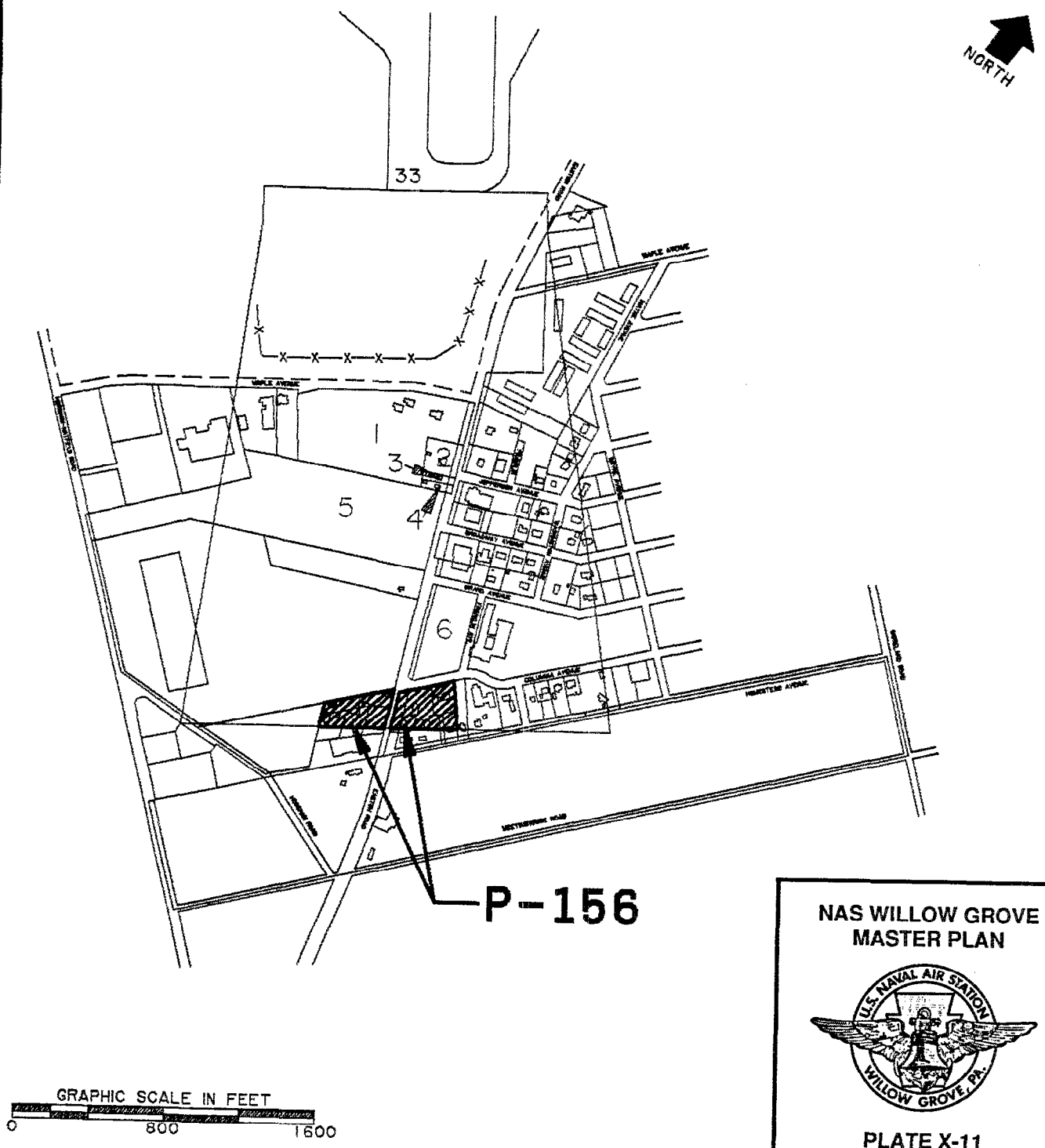
EFD VALIDATION:

Site Approved: Yes ____ No X Deferred ____

Project Supported By SFPS: Yes X No ____

Name:_____ Date:_____

P-156; LAND ACQUISITION, SOUTH CLEAR ZONE, Phase 1



NAS WILLOW GROVE
MASTER PLAN

PLATE X-11

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G. UNPROGRAMMED PROJECT DATA SHEETS

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	BRANCH MEDICAL CLINIC

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	550-10	P-044	4,100 (esc to 4/90)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	LS	23,200	150.25	3,486
SUPPORTING FACILITIES	LS	-	-	226
SUBTOTAL	-	-	-	3,712
CONTINGENCY (5%)	-	-	-	186
TOTAL CONTRACT COST	-	-	-	3,898
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	234
TOTAL REQUEST	-	-	-	4,132
TOTAL REQUEST ROUNDED	-	-	-	4,100
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

This project will renovate existing substandard medical and dental clinic and provide additional health service facilities for reserve and active duty forces. Renovation of existing facility will involve modification and upgrading of lighting, electrical, plumbing and heating and ventilating systems as needed. Interior wall partitions will be rebuilt as needed. Surface areas will be refinished to match new construction interior. New construction will consist of a one-story building add-on, with exterior walls of brick-faced and concrete masonry. Open web steel joist roof system, air conditioning and solar panel system for domestic hot water included. Ambulance garage will consist of a 2 bay structure with exterior walls of concrete masonry unit.

REQUIREMENT:

Adequate medical and dental facilities are required to support the increase in patient visits due to expanding reserve training program and increase in active duty military and dependant population. A new 3 bay garage for 1 field and 2 light ambulances is required to replace damaged existing garage.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

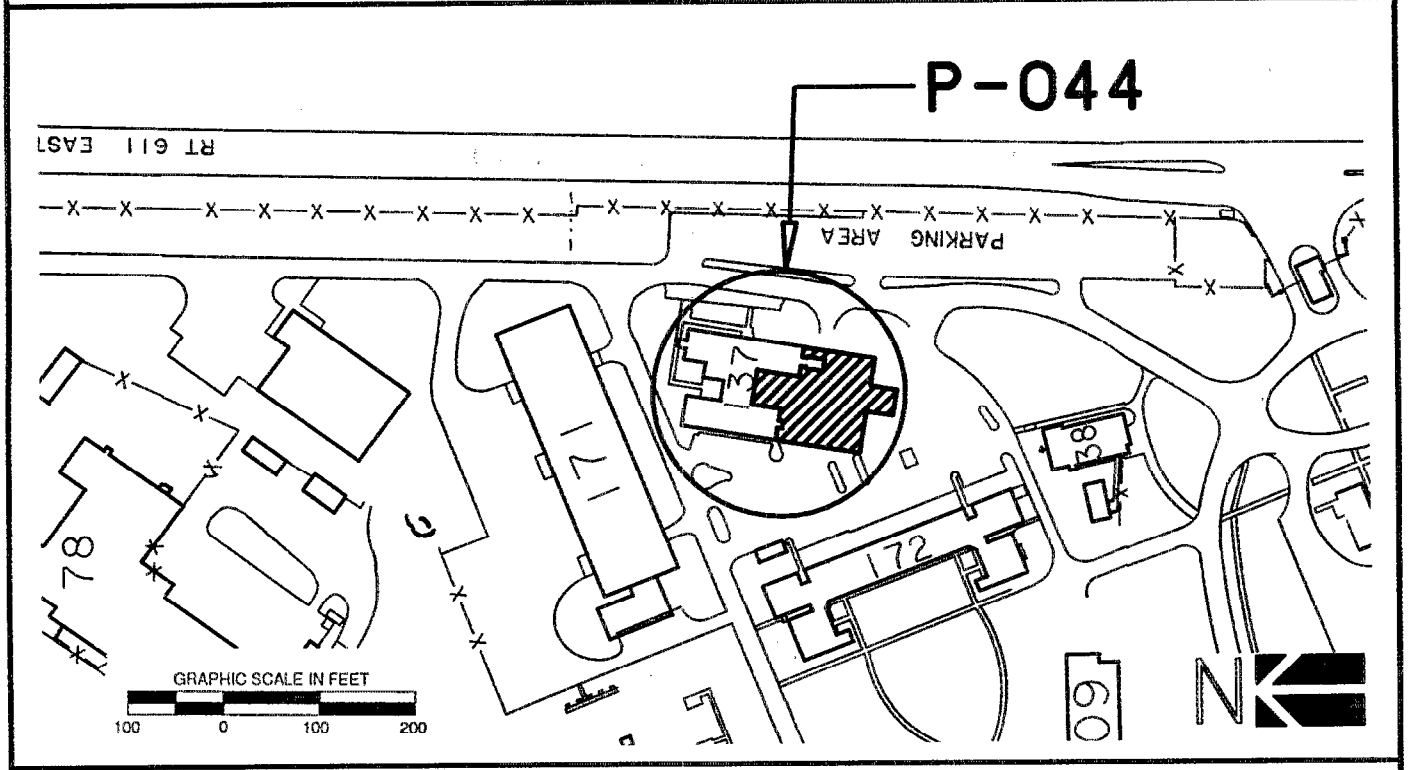
PROJECT DETAIL DATA:

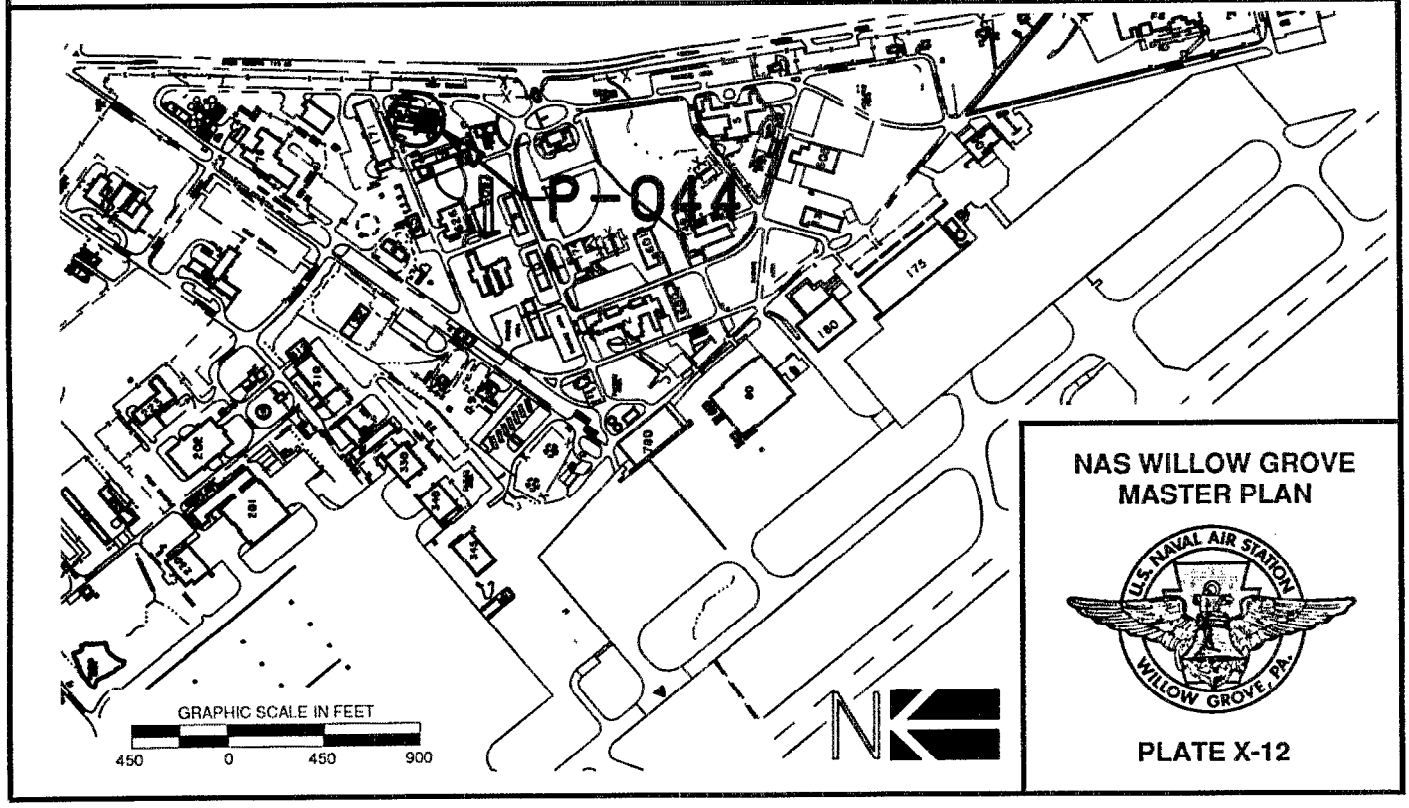
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
550-10	MEDICAL CLINIC	18,700	SF	4B	
540-10	DENTAL CLINIC	3,800	SF	4B	
143-10	OPERATIONAL VEHICLE GARAGE	700	SF	4B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-044; BRANCH MEDICAL CLINIC





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-12

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	RELIGIOUS EDUCATION BUILDING

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	730-84	P-101	510 (esc to 4/90)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	3,885	97.75	380
SUPPORTING FACILITIES	LS	-	-	75
SUBTOTAL	-	-	-	455
CONTINGENCY (5%)	-	-	-	23
TOTAL CONTRACT COST	-	-	-	478
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	29
TOTAL REQUEST	-	-	-	507
TOTAL REQUEST ROUNDED	-	-	-	510
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

This project will provide for a Religious Education Building. It shall be concrete foundation, concrete slab on grade, concrete masonry units with brick facing, open web roof trusses, precast gypsum plank roof sheathing, and insulated 4-ply built-up roofing. Building shall be complete with proper lighting, power, fire reporting and sprinkler system, and sanitary facilities for both male and female personnel. Provide connections to all utility services, access pavement, parking areas, sidewalk, and curbs.

REQUIREMENT:

This Station has the requirement to support the assigned permanent party personnel, reserve units on weekday duty or two week drill assignments, transients, students, and the dependent population of NAS Willow Grove and NADC Warminister.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

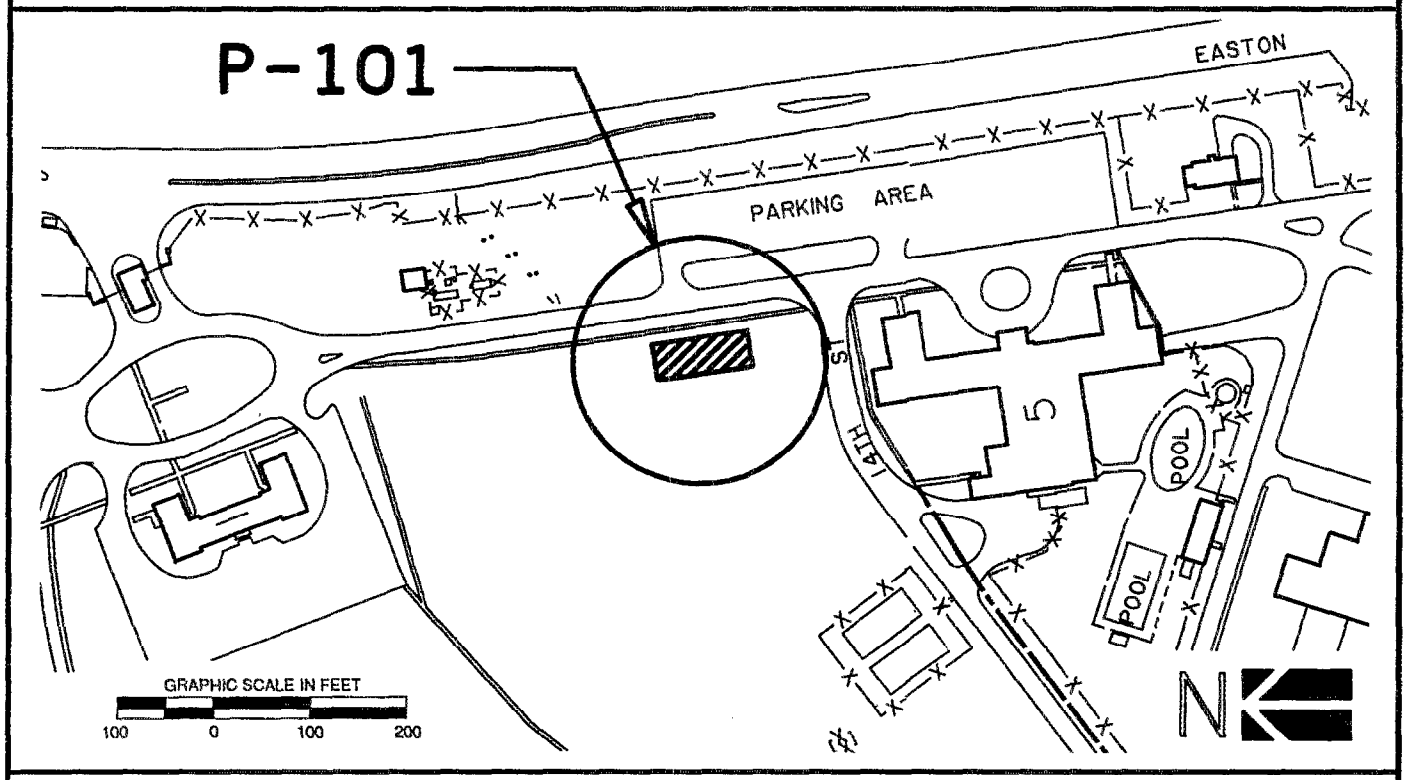
PROJECT DETAIL DATA:

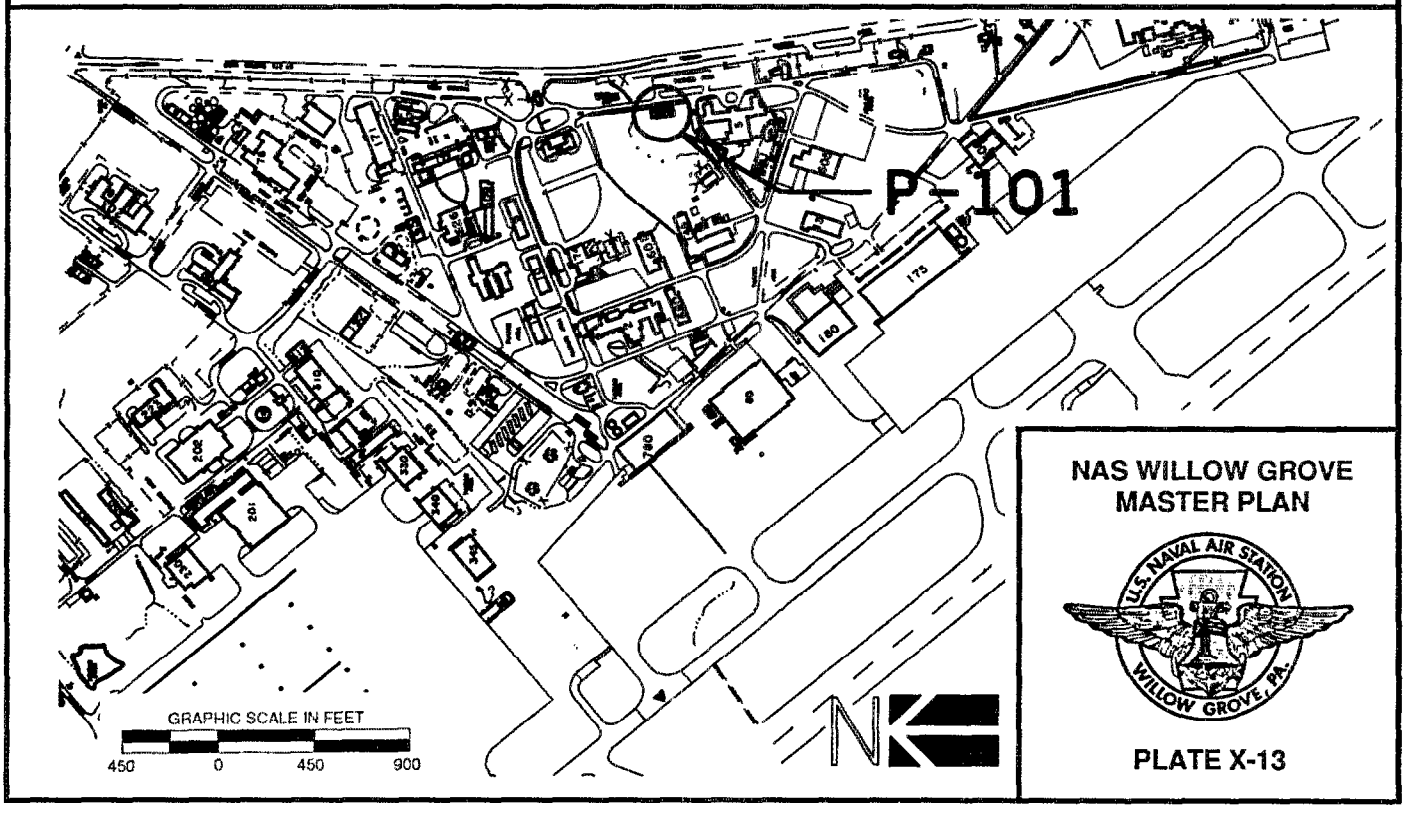
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
730-40	RELIGIOUS EDUCATION BUILDING	3,885	SF	1B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-101; RELIGIOUS EDUCATION FACILITY





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-13

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	THEATER

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	740-56	P-108	500 (esc to 4/92)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	3,500	100.00	350
SUPPORTING FACILITIES	LS	-	-	98
SUBTOTAL	-	-	-	448
CONTINGENCY (5%)	-	-	-	22
TOTAL CONTRACT COST	-	-	-	470
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	28
TOTAL REQUEST	-	-	-	598
TOTAL REQUEST ROUNDED	-	-	-	500
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
This project provides a Station theater.

REQUIREMENT:
NAS Willow Grove supports the training mission of the Reserve Units assigned for the Navy, Marine Corps, Air Force, PA Air National Guard, and the U.S. Army. Permanent party of over 1,000 personnel and with weekend and two (2) week drill periods for Reserve units. On-Station recreational facilities are required to support the assigned personnel and their dependents. Such on-base facilities would lend to the retention of skilled personnel.

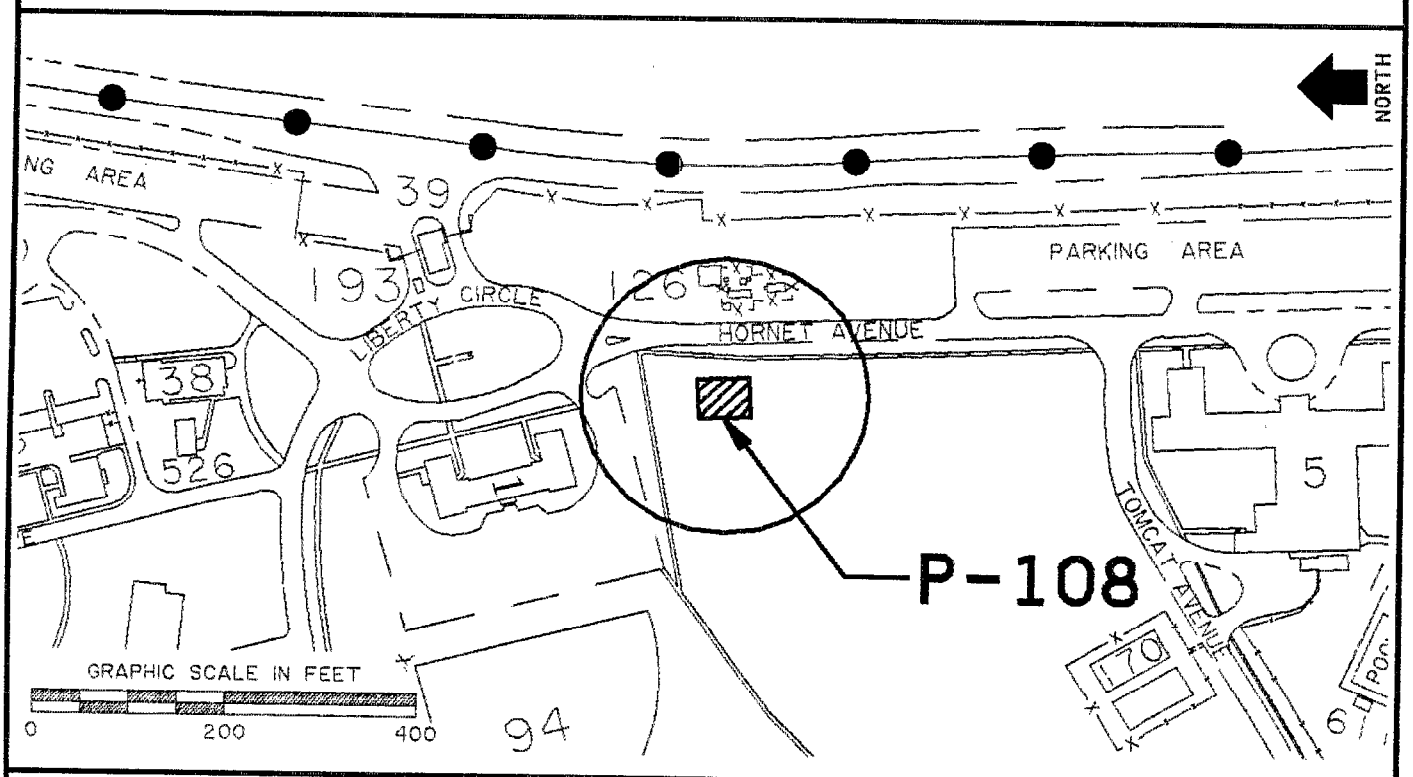
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

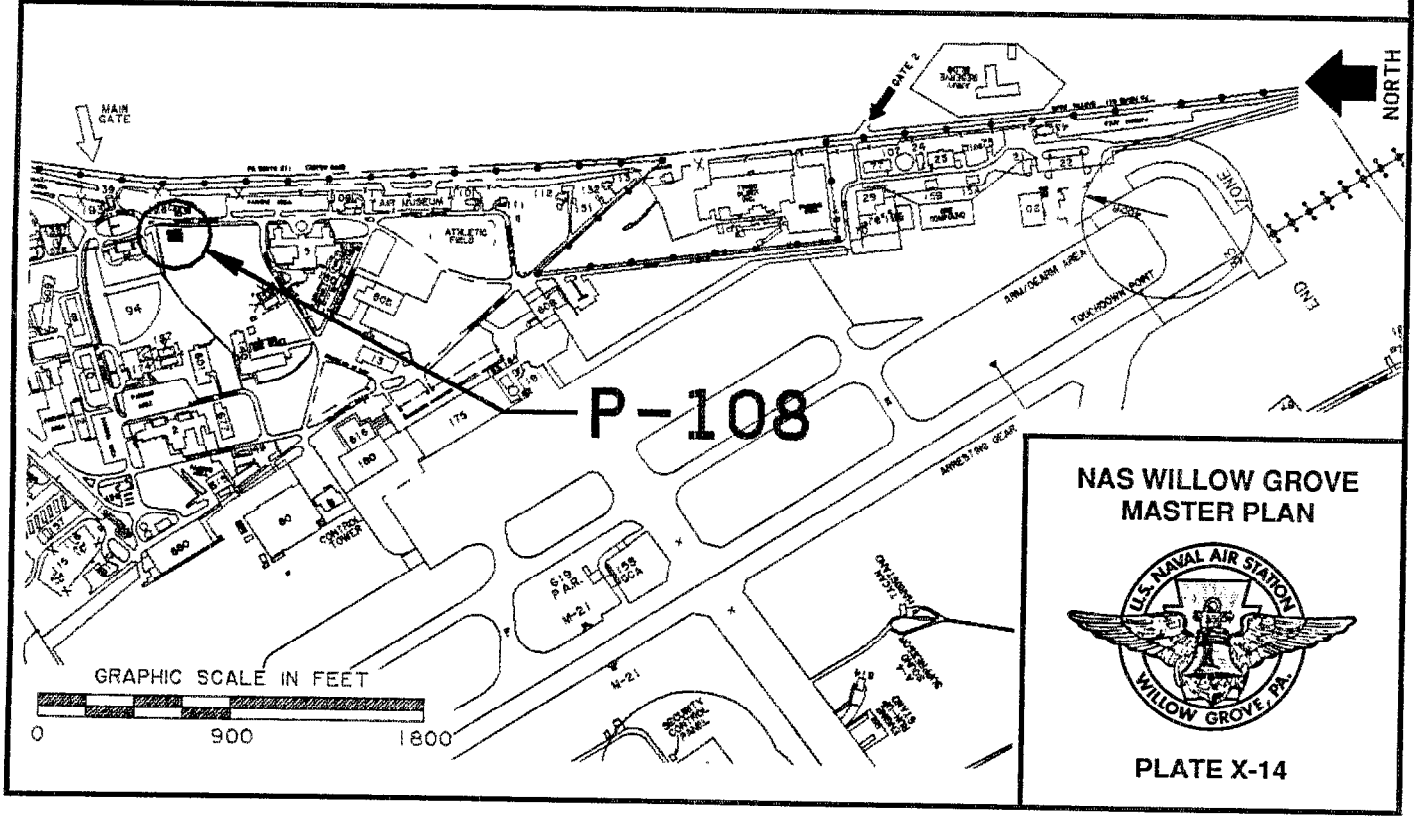
PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
740-56	THEATER	3,500	SF	1B	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-108; THEATER





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-14

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	AIRCRAFT RINSE FACILITY

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	116-15	P-118	320 (esc to 4/92)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	1,710	117.27	201
SUPPORTING FACILITIES	LS	-	-	85
SUBTOTAL	-	-	-	286
CONTINGENCY (5%)	-	-	-	14
TOTAL CONTRACT COST	-	-	-	300
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	18
TOTAL REQUEST	-	-	-	318
TOTAL REQUEST ROUNDED	-	-	-	320
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
Construct a taxi-through, sensor-operated fresh water deluge system to wash anti-submarine patrol helicopters and aircraft after flight operations at sea.

REQUIREMENT:
A Type 2 Aircraft Rinse Facility is desperately needed to support the large VP and VR aircraft and helicopters assigned at this Station. Its useage will not be limited to P-3A/B "Orions". Other carrier-based planes including transient aircraft from other activities will find the rinse rack concept beneficial.

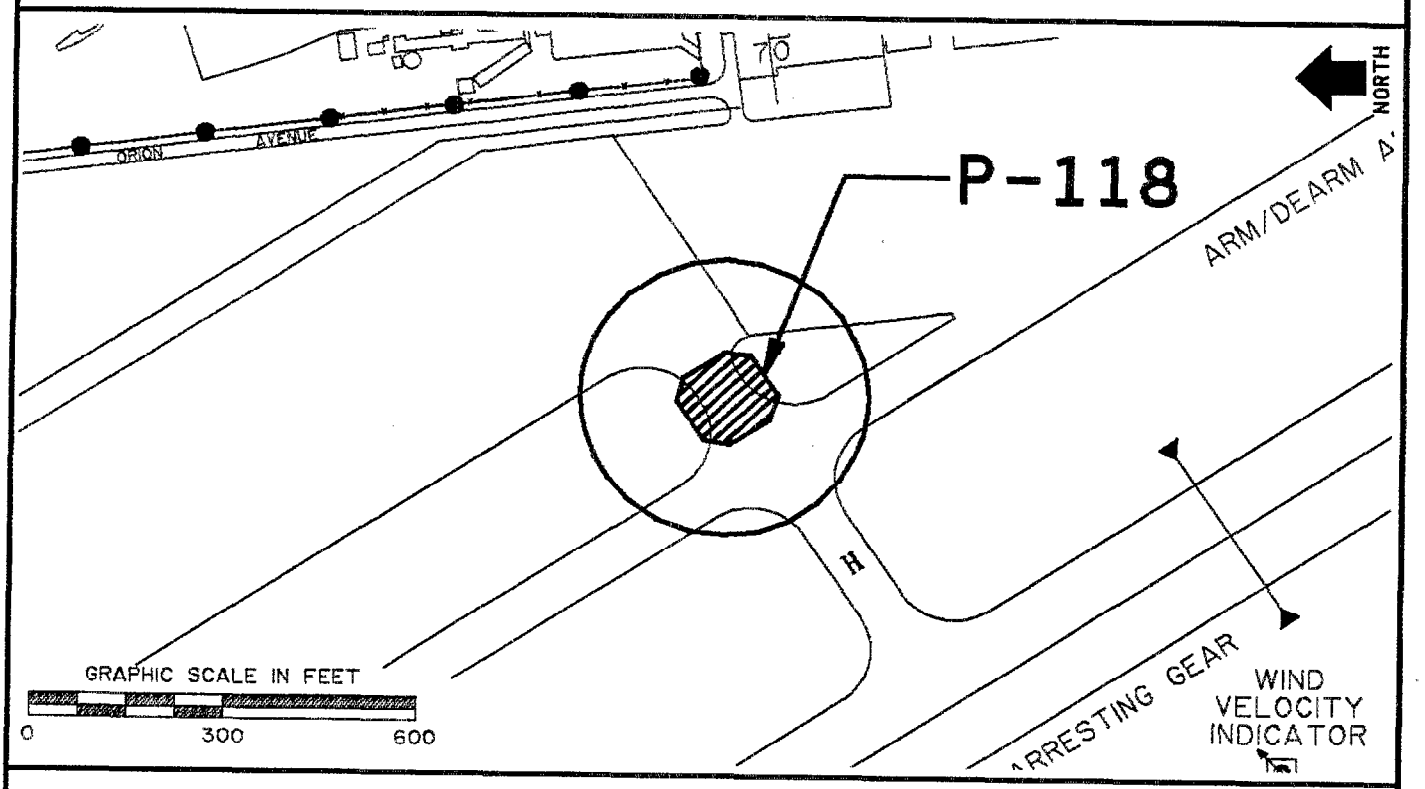
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

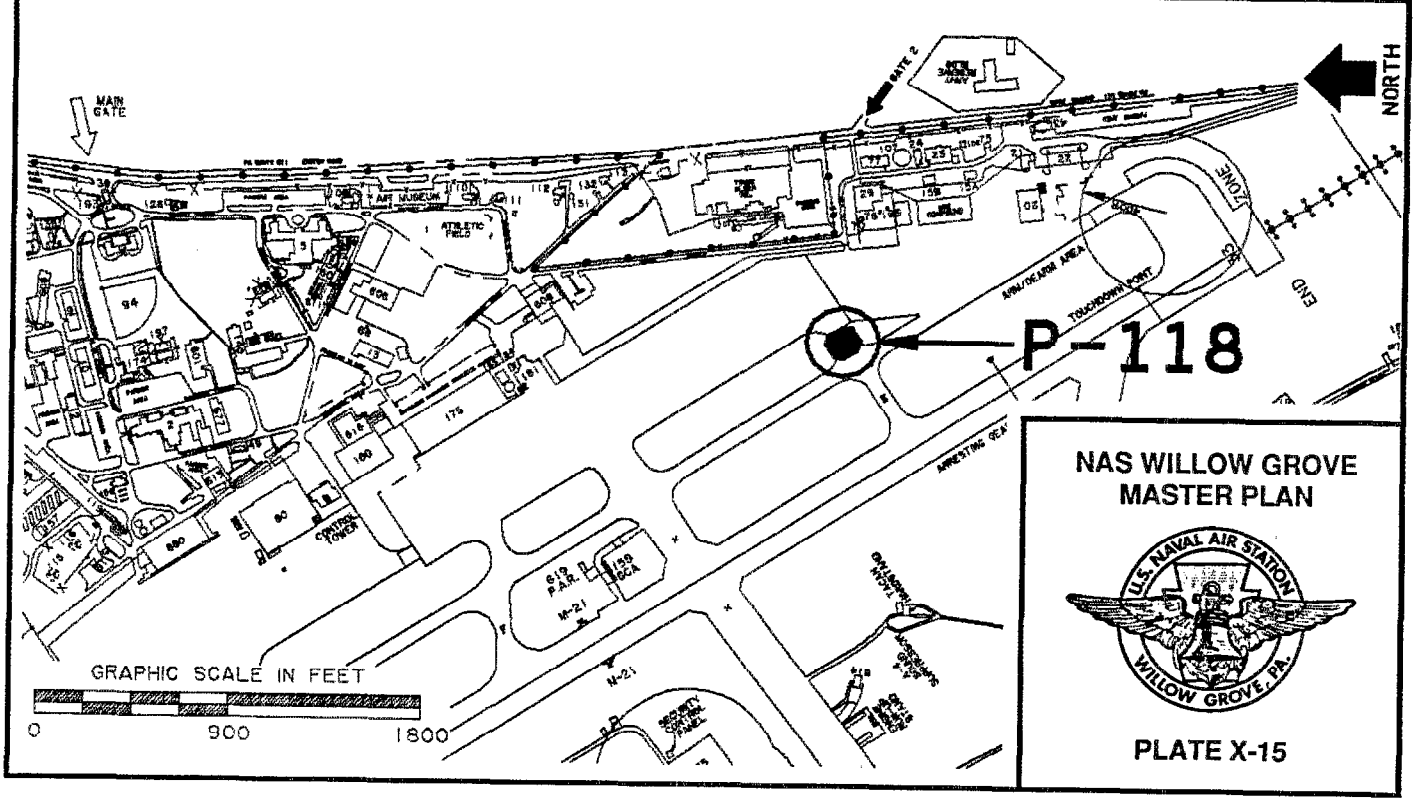
PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
116-15	AIRCRAFT RINSE FACILITY	1,710	SF	1B	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-118; AIRCRAFT RINSE FACILITY





NAS WILLOW GROVE
MASTER PLAN

PLATE X-15

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	OUTDOOR SWIMMING POOL

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	750-30	P-142	730 (esc to 4/89)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	ME	25	-	584
SUPPORTING FACILITIES	-	-	-	75
SUBTOTAL	-	-	-	659
CONTINGENCY (5%)	-	-	-	33
TOTAL CONTRACT COST	-	-	-	692
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	42
TOTAL REQUEST	-	-	-	734
TOTAL REQUEST ROUNDED	-	-	-	730
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

This project will replace an existing substandard 30 meter outdoor swimming pool with a 25 meter outdoor swimming pool. Project will provide a suitable facility for swim qualification and training of air crew personnel. The demolition of the 30 meter pool, Facility 90, will be included in the project. The proposed 25 meter outdoor pool will be located adjacent to the existing 50 meter outdoor pool and bathhouse. This location is next to the BOQ and in the vicinity of the BEQ and other recreational facilities. This site will also make use of the existing bathhouse, thereby eliminating the need of an additional bathhouse.

REQUIREMENT:

NAS Willow Grove requires an outdoor swimming pool facility to provide adequate training, athletic, and recreational facilities for the active and reserve military component. The existing 30 meter pool continuously loses water, requires excessive concrete repairs, and does not satisfy current construction and sanitation regulations for pool facilities. The safety and health of personnel utilizing a modern facility will be more adequately assured. Also, operation and maintenance costs will be reduced with a modern facility.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

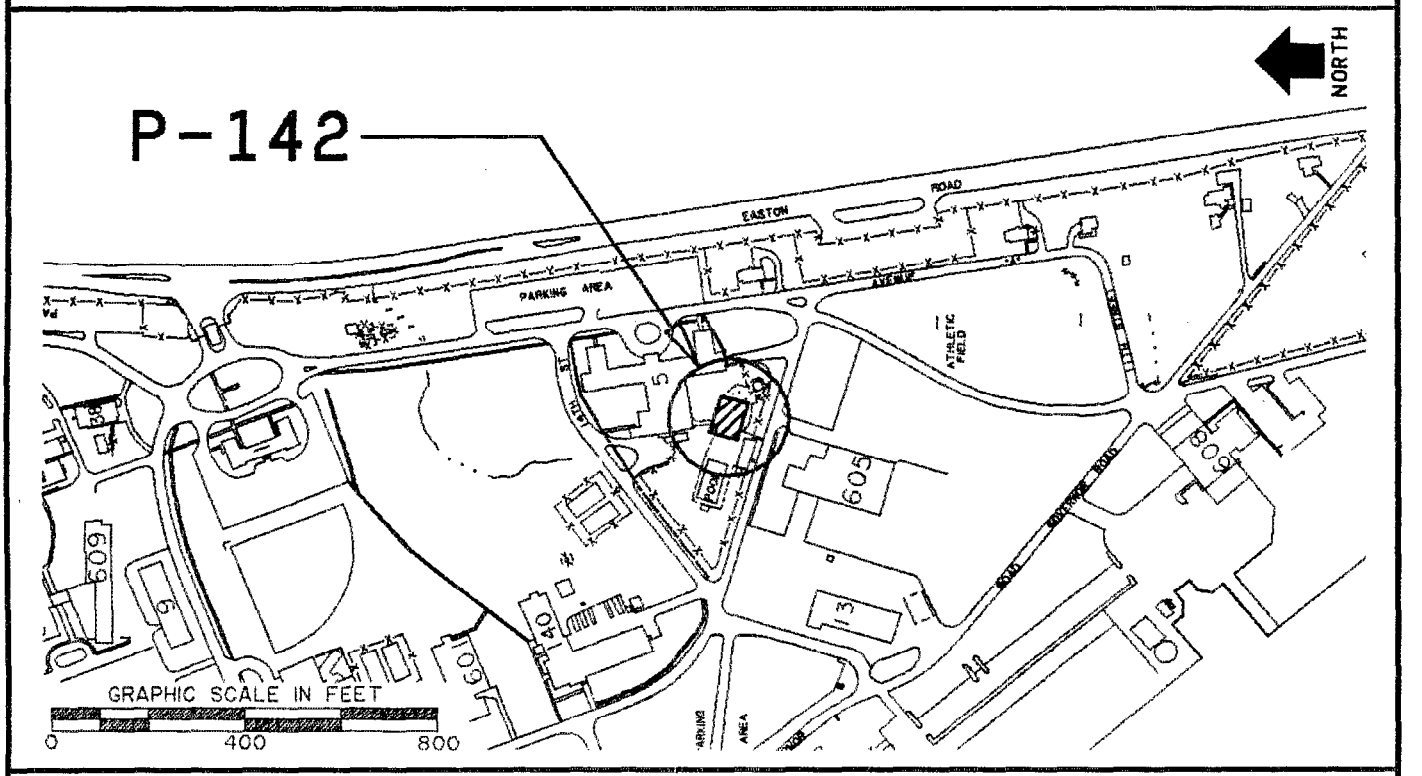
PROJECT DETAIL DATA:

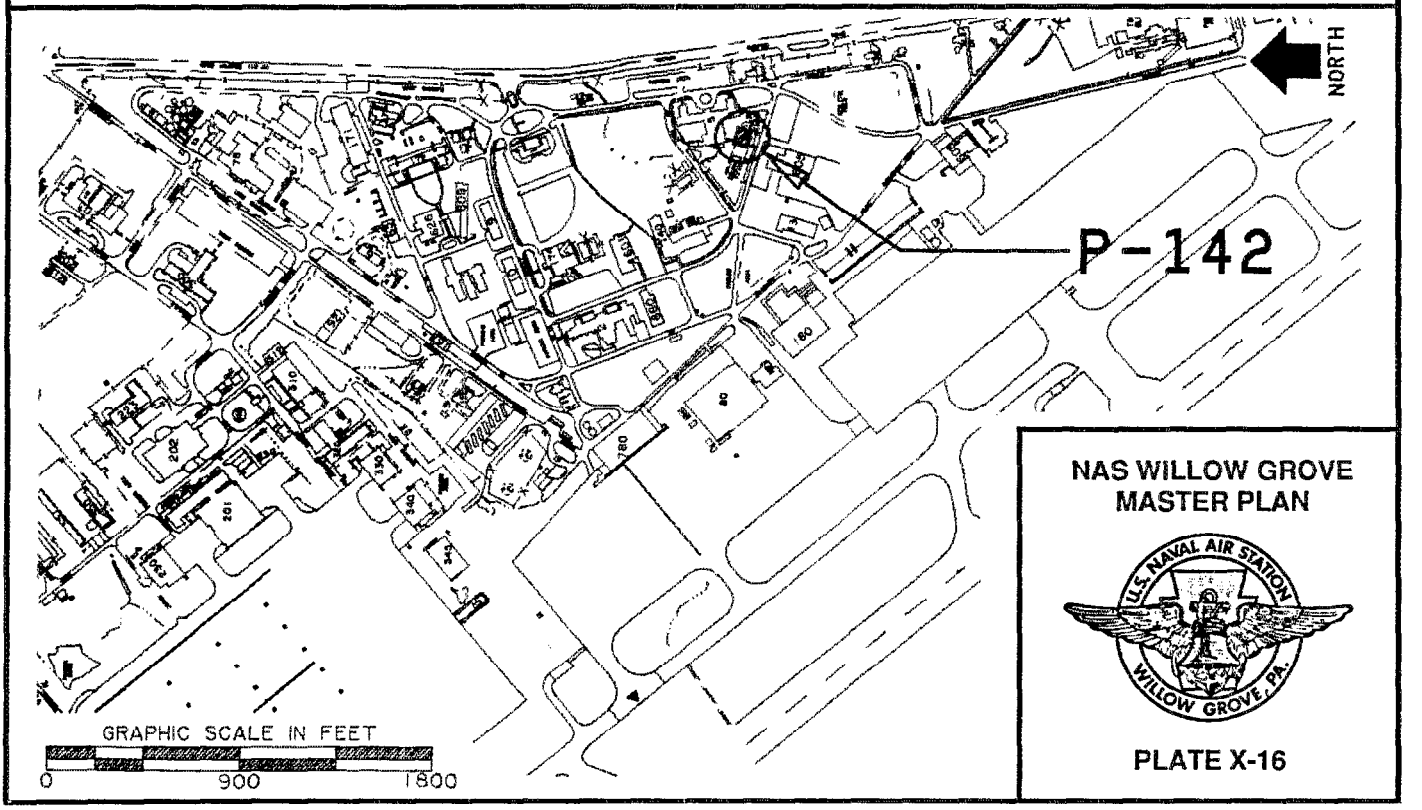
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
750-30	OUTDOOR SWIMMING POOL	25	ME	1B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-142; OUTDOOR SWIMMING POOL





NAS WILLOW GROVE
MASTER PLAN

PLATE X-16

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	MARINE RESERVE TRAINING BUILDING

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	171-15	P-162	2,200 (esc to 4/97)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	16,300	102.00	1,663
SUPPORTING FACILITIES	-	-	-	330
SUBTOTAL	-	-	-	1,993
CONTINGENCY (5%)	-	-	-	100
TOTAL CONTRACT COST	-	-	-	2,093
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	126
TOTAL REQUEST	-	-	-	2,219
TOTAL REQUEST ROUNDED	-	-	-	2,200
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

The proposed facility will be a two story, insulated masonry bearing wall structure with brick facing, single ply insulated sloping roof on a metal deck, and open webb framing. Incoming utilities shall be connected via a new underground ductbank and pipes extended from existing underground distribution system. A fire protection system will be provided. The facility shall include an armory for storage of small arms and ammunition.

REQUIREMENT:

A consolidated training facility for Marine Corps Reserve units of MAG 49 is required to support the mission of maintaining fleet readiness.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ___
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

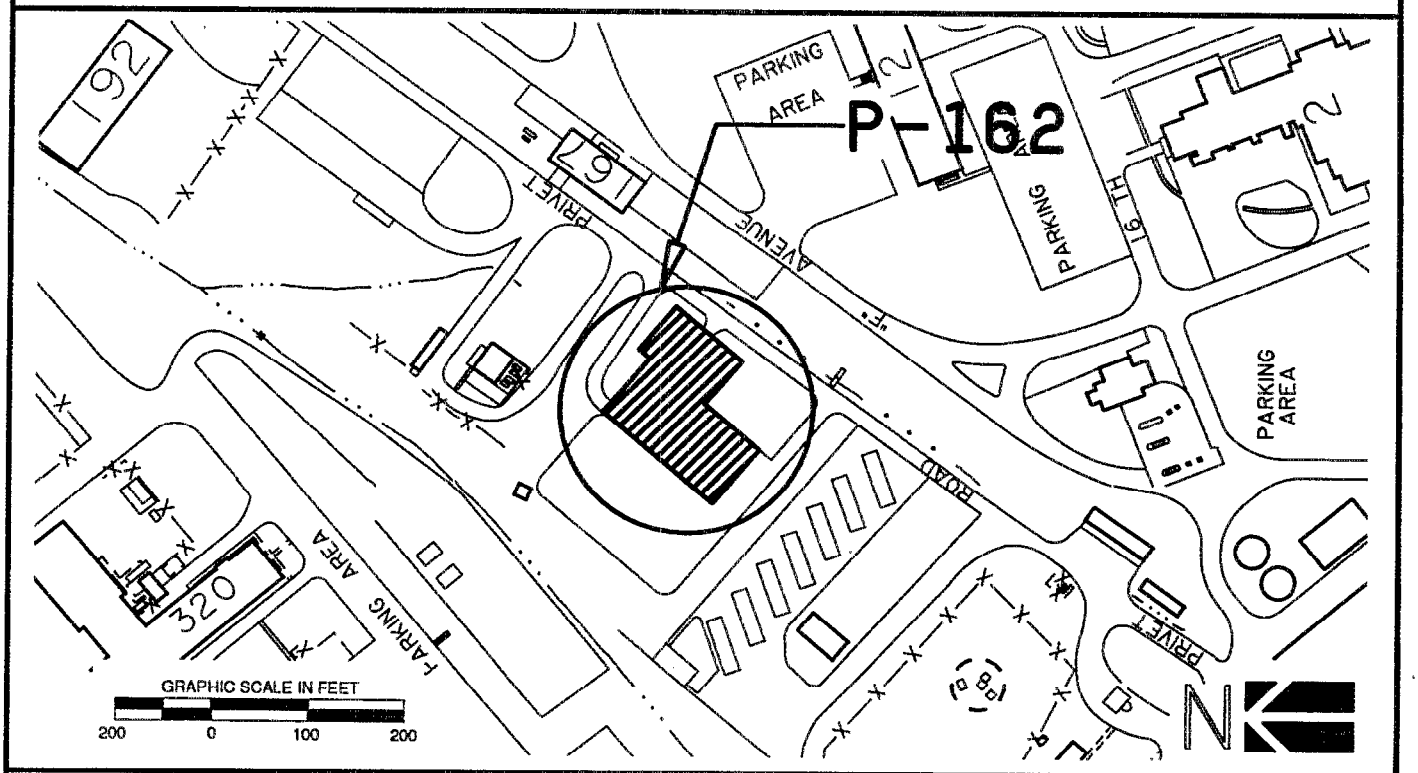
PROJECT DETAIL DATA:

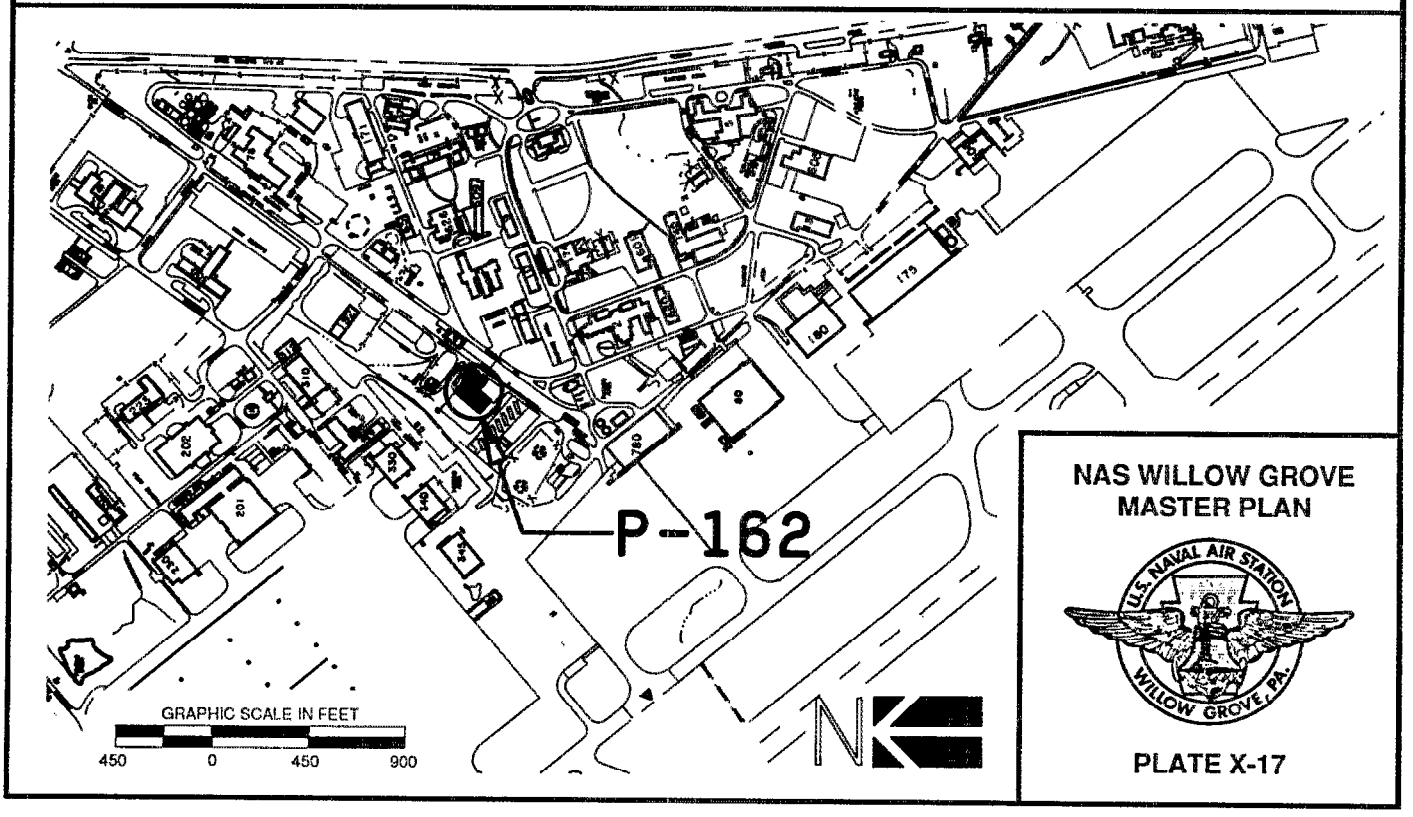
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
171-15	RESERVE TRAINING BUILDING	16,300	SF	1B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-162; MARINE RESERVE TRAINING BUILDING





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-17

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	SUPPLY WAREHOUSE AND OUTDOOR STORAGE SHED

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	441-10	P-191	2,400 (esc to 4/93)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	33,358	50.75	1,693
SUPPORTING FACILITIES	-	-	-	475
SUBTOTAL	-	-	-	2,168
CONTINGENCY (5%)	-	-	-	108
TOTAL CONTRACT COST	-	-	-	2,276
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	137
TOTAL REQUEST	-	-	-	2,413
TOTAL REQUEST ROUNDED	-	-	-	2,400
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

Project proposes the construction of a General Warehouse with General Storage Shed having spread footings, concrete foundation walls, steel structural framing, concrete masonry unit curtain exterior walls, metal doors, concrete floor slab on grade, precast plank roof sheating on bar joists, with a 4 ply built-up roofing. Approximately 15 ton partial air conditioning of 4,500 SF. Complete sprinkler system and a fire reporting system, with detectors in the administrative areas. Connection to the water and sewage systems, communications, electrical, having site improvements, storm drainage, pavements, sidewalks, parking, etc.

REQUIREMENT:

New warehouse space is required to support the expanded mission of HS-75 aircraft and personnel, and in support of the C-9 leased aircraft program.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

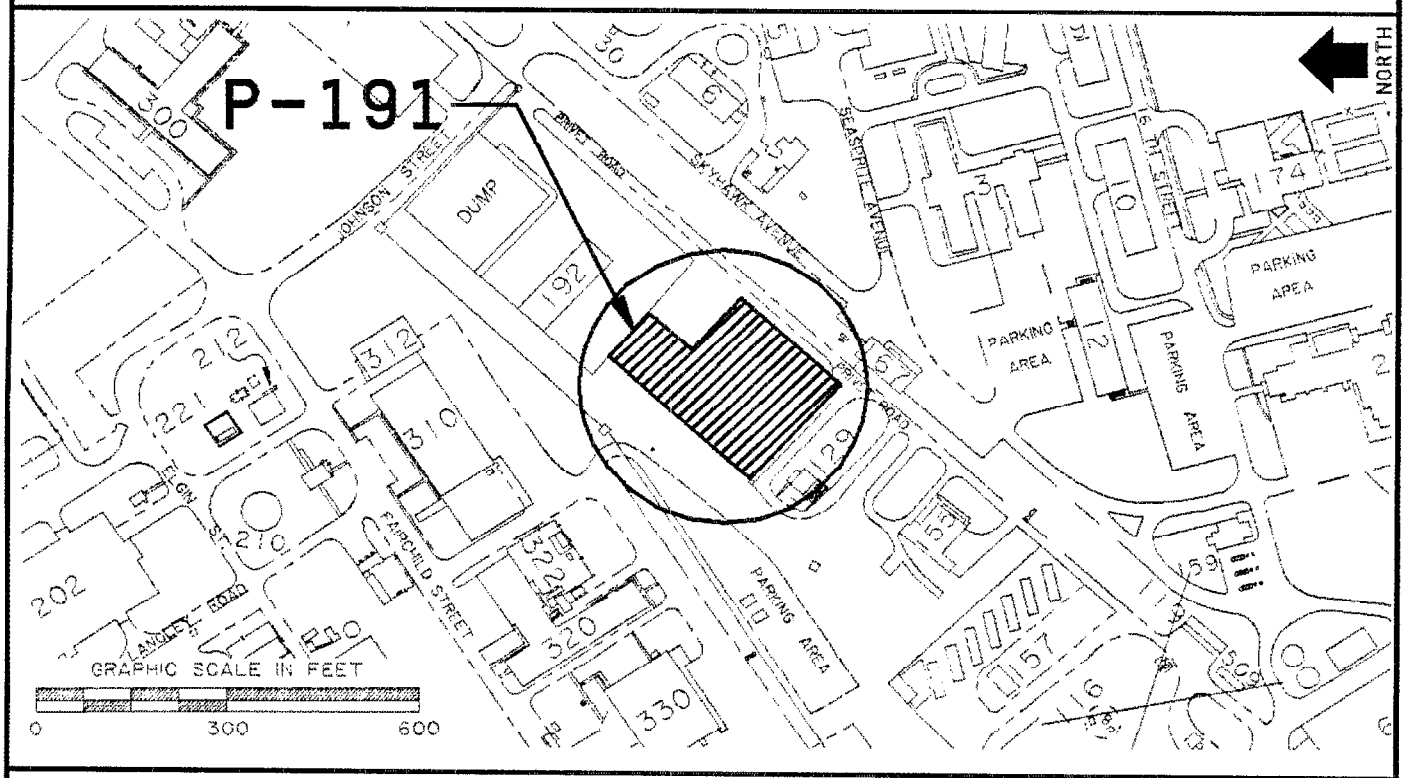
PROJECT DETAIL DATA:

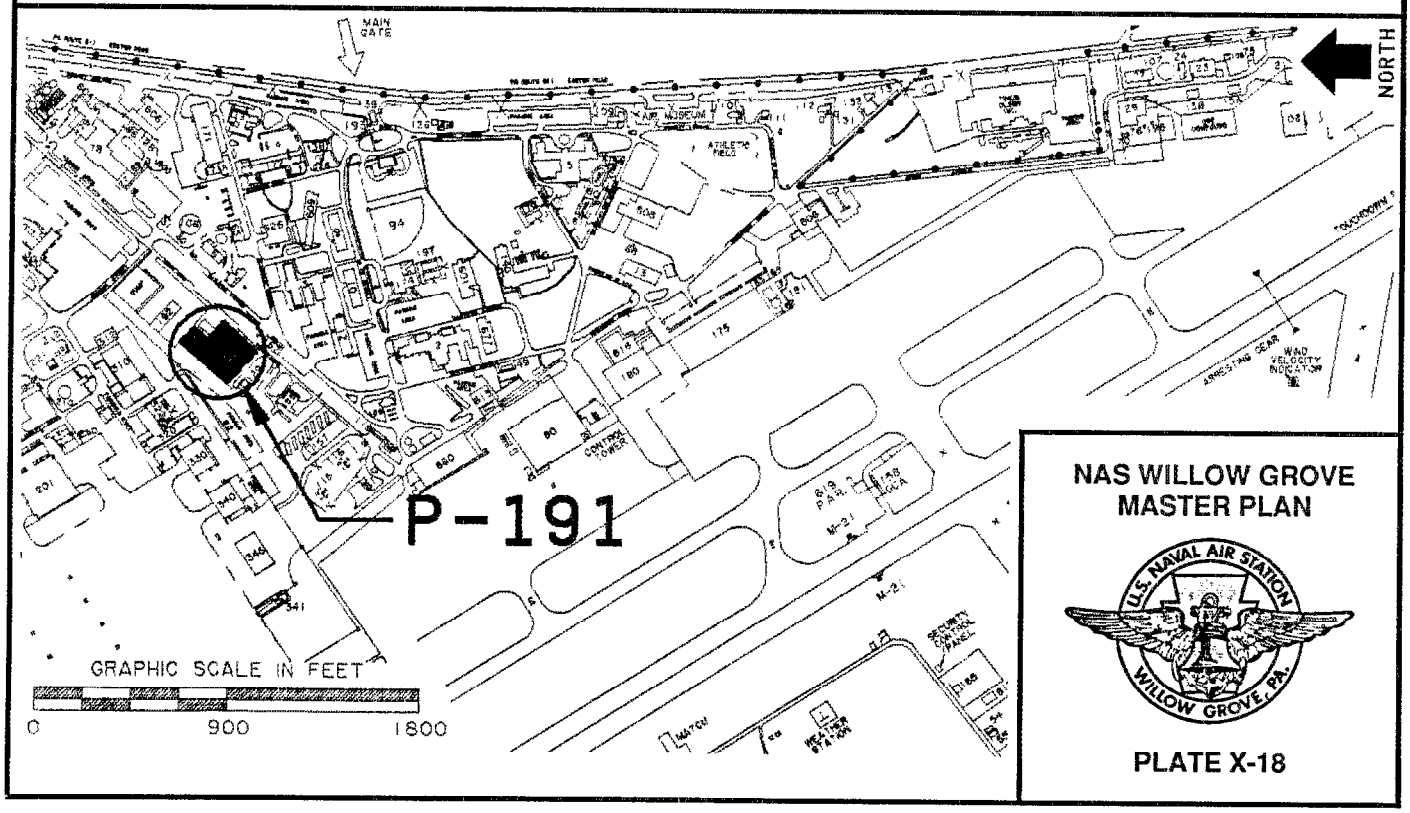
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
441-10	GENERAL WAREHOUSE NAVY	26,358	SF		
441-35	GENERAL STORAGE SHED	7,000	SF		

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-191; SUPPLY WAREHOUSE & STORAGE SHED





NAS WILLOW GROVE
MASTER PLAN

PLATE X-18

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	REPAIR/ALTERATIONS TO SOUTH LEAN-TO, HANGAR 80

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	211-07	P-205	240 (esc to 4/91)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	LS	-	-	216
SUPPORTING FACILITIES	-	-	-	0
SUBTOTAL	-	-	-	216
CONTINGENCY (5%)	-	-	-	11
TOTAL CONTRACT COST	-	-	-	227
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	14
TOTAL REQUEST	-	-	-	241
TOTAL REQUEST ROUNDED	-	-	-	240
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
Make necessary repairs and alterations needed for the vacated spaces in Hangar 80 to meet new mission requirements.

REQUIREMENT:
With the construction of the Air Operations and Passenger Terminal, the Air Operations Department will be vacating Hangar 80 spaces. These spaces will have to be reconfigured to meet squadron BFR requirements for 01 and 02 spaces.

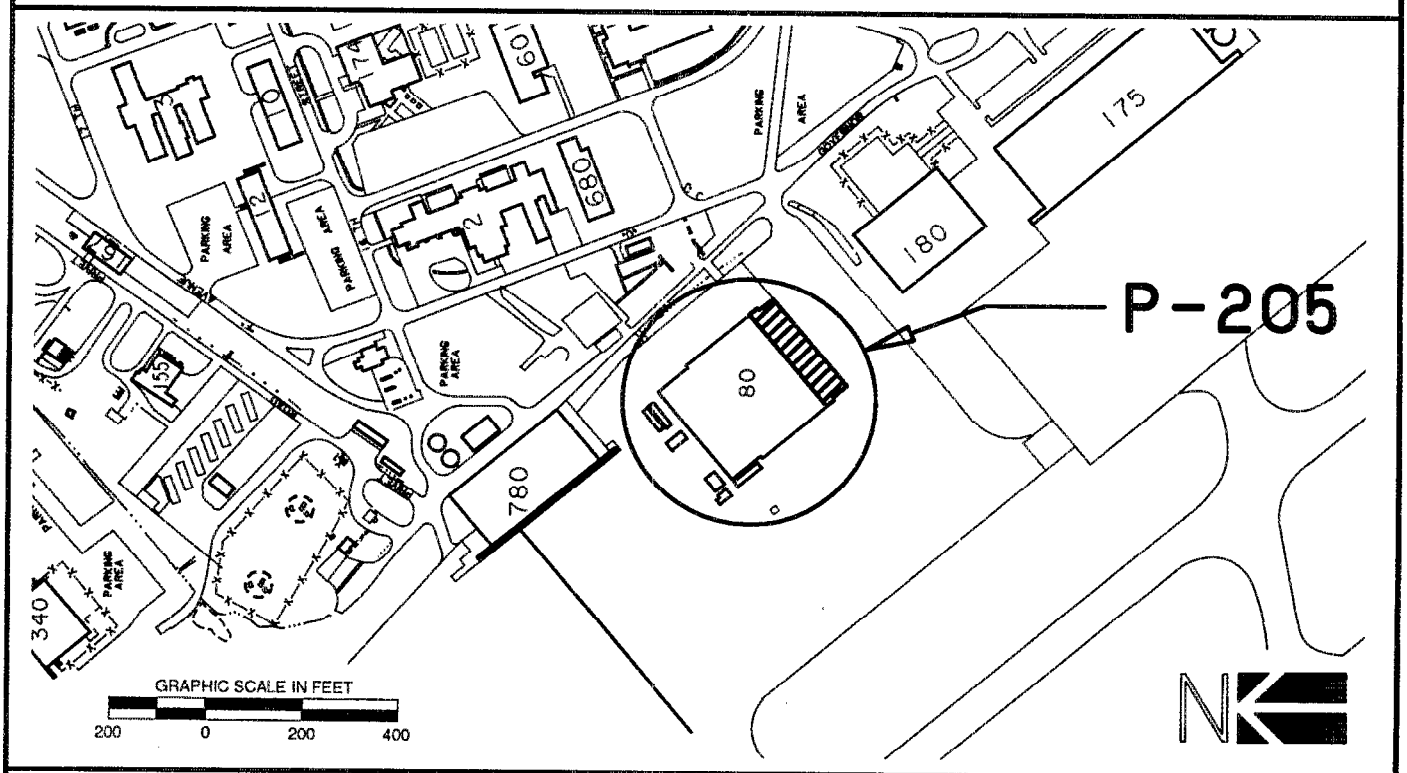
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

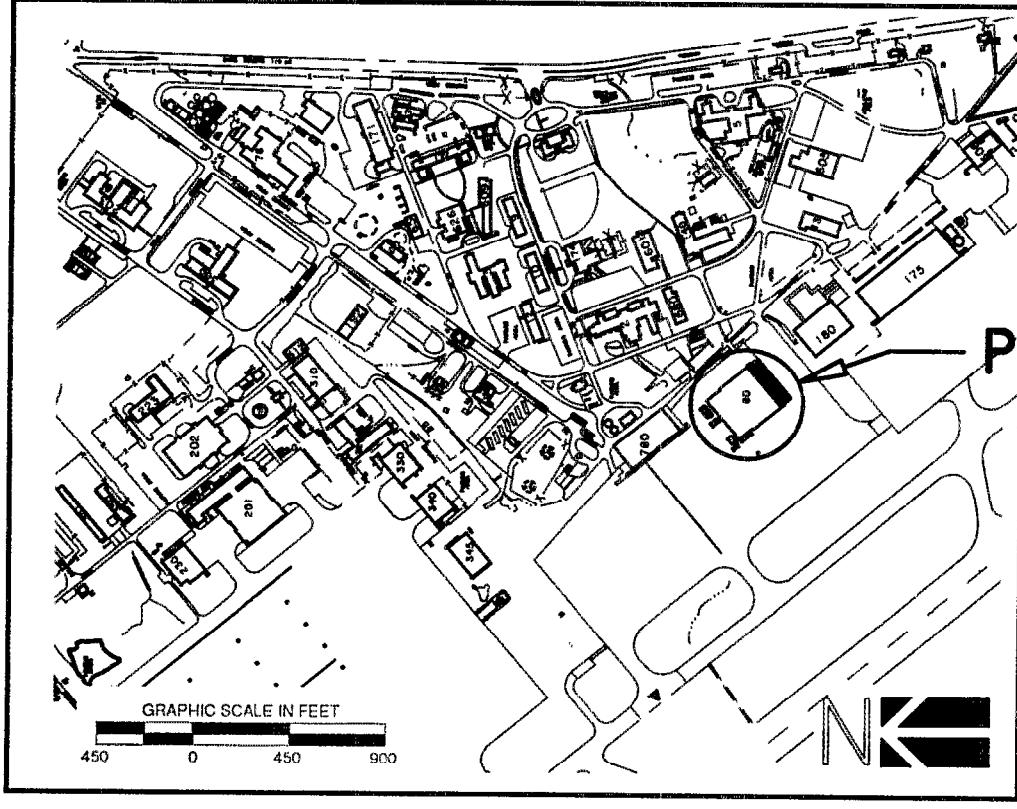
PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
211-07	AIRCRAFT MAINT. HANGAR - 02 SPACE	28,000	SF	2A	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-205; SOUTH LEAN-TO, HANGAR 80





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-19

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	AIRCRAFT PARKING APRON

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	113-20	P-206	3,300 (esc to 4/95)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SY	45,602	43.80	1,997
SUPPORTING FACILITIES	LS	-	-	1,007
SUBTOTAL	-	-	-	3,004
CONTINGENCY (5%)	-	-	-	150
TOTAL CONTRACT COST	-	-	-	3,154
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	189
TOTAL REQUEST	-	-	-	3,343
TOTAL REQUEST ROUNDED	-	-	-	3,300
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

Aircraft parking apron pavement designed based on the loading requirement for P-3C antisubmarine aircraft having dual tricycle gear load of 63,000 pounds and a tire pressure requirement of 170 psi. All necessary excavation, cut, and grading in addition to base and surface materials. All necessary appurtenances such as tie downs, static ground connections, and pavement lighting will be provided. Demolition of Buildings #77, #23, #24, #15, and #107 is included in this project. Road relocation and drainage will also be provided.

REQUIREMENT:

A shortage of parking aprons exist at this Station. The activity makes the best of a bad situation by using every available space, including the closed Runway 10-28 to park aircraft. However, the efforts are still deficient because the majority of the aircraft are parked in violation of the 7:1 transitional slope, requiring a waiver from appropriate authority. Other aircraft are parked overhanging the apron edge, and often encroach upon the required 150 foot peripheral taxiway lane. The only option is to provide the additional space.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

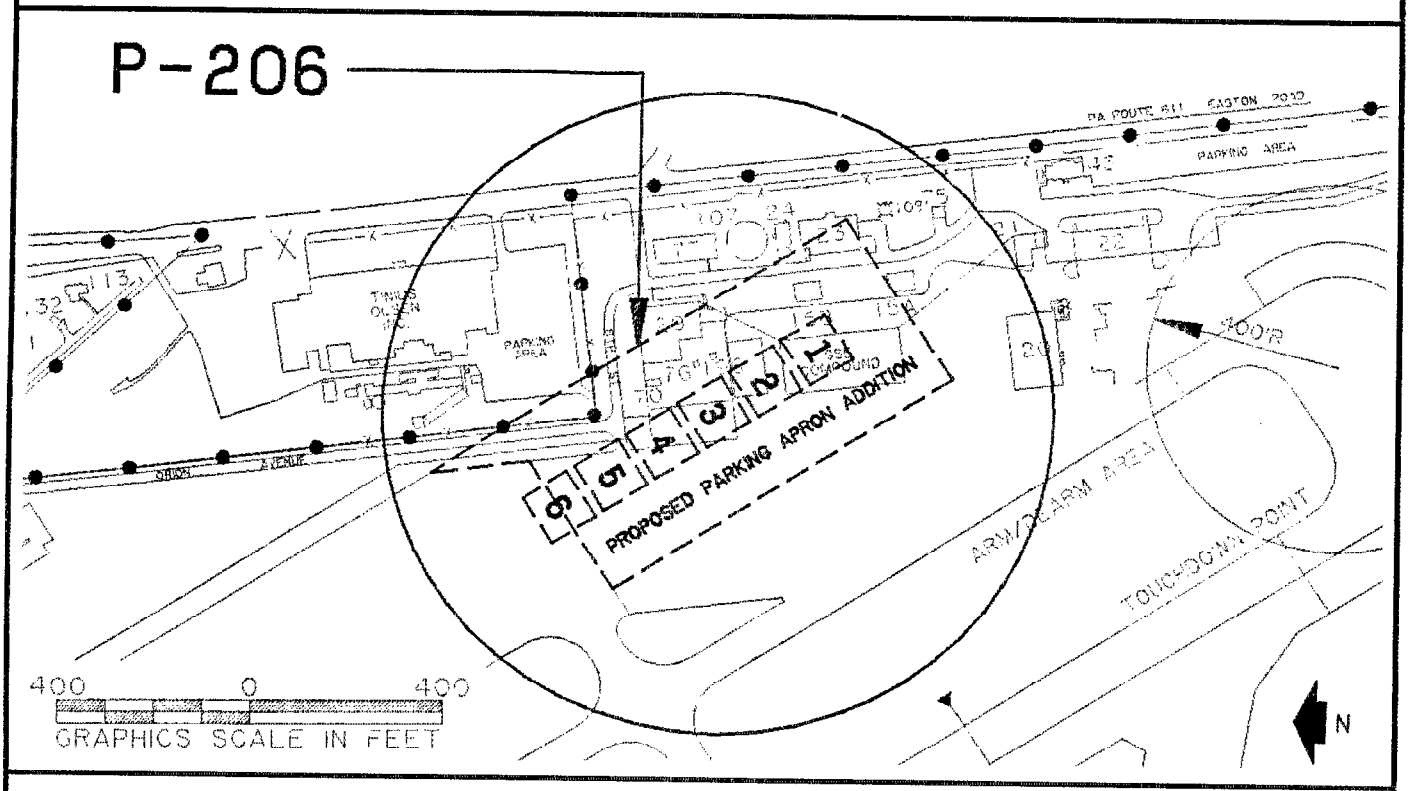
PROJECT DETAIL DATA:

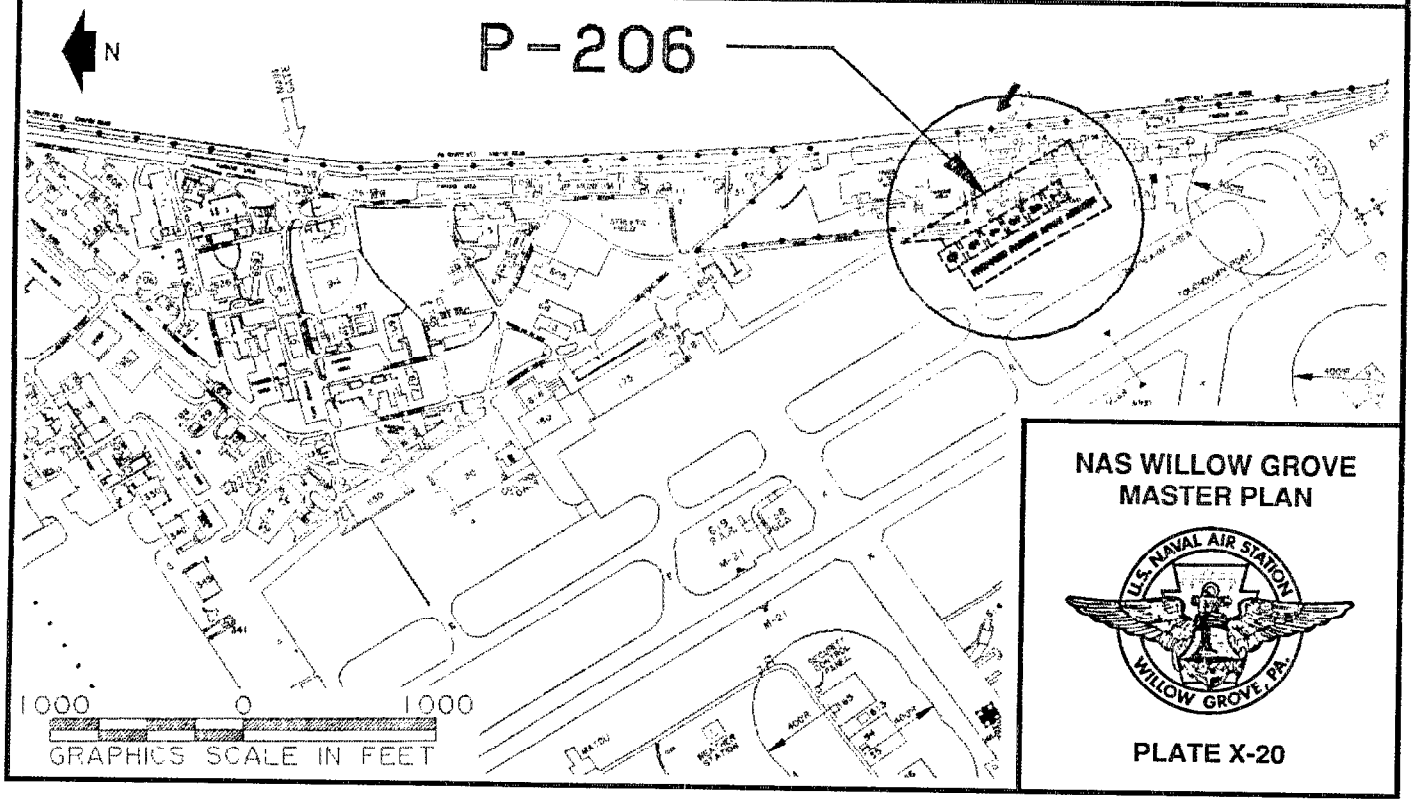
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
113-20	AIRCRAFT PARKING APRON	45,602	SY	1A	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-206; AIRCRAFT PARKING APRON





NAS WILLOW GROVE
MASTER PLAN

PLATE X-20

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	NAVAL RESERVE RECRUITING FACILITY

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	610-10	P-209	310 (esc to 4/93)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	2,623	92.00	241
SUPPORTING FACILITIES	-	-	-	40
SUBTOTAL	-	-	-	281
CONTINGENCY (5%)	-	-	-	14
TOTAL CONTRACT COST	-	-	-	295
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	18
TOTAL REQUEST	-	-	-	313
TOTAL REQUEST ROUNDED	-	-	-	310
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

Construct a new Naval Reserve Recruiting Facility to replace an inadequate facility. The facility will be a one-story with concrete foundation, concrete masonry units with brick facing, open web roof trusses, precast gypsum plank roof sheathing. Insulated 4-ply built-up roofing, building shall be complete with proper lighting, power, fire reporting, and sprinkler system. Provide connections to all utility services, access pavement, parking areas, sidewalks, and curbs.

REQUIREMENT:

The existing recruiting office is located in an inadequate facilitiy and is located in the southern part of the Station. With the construction of P-206, Aircraft Parking Apron, all facilities south of the Station are to be demolished and relocated.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

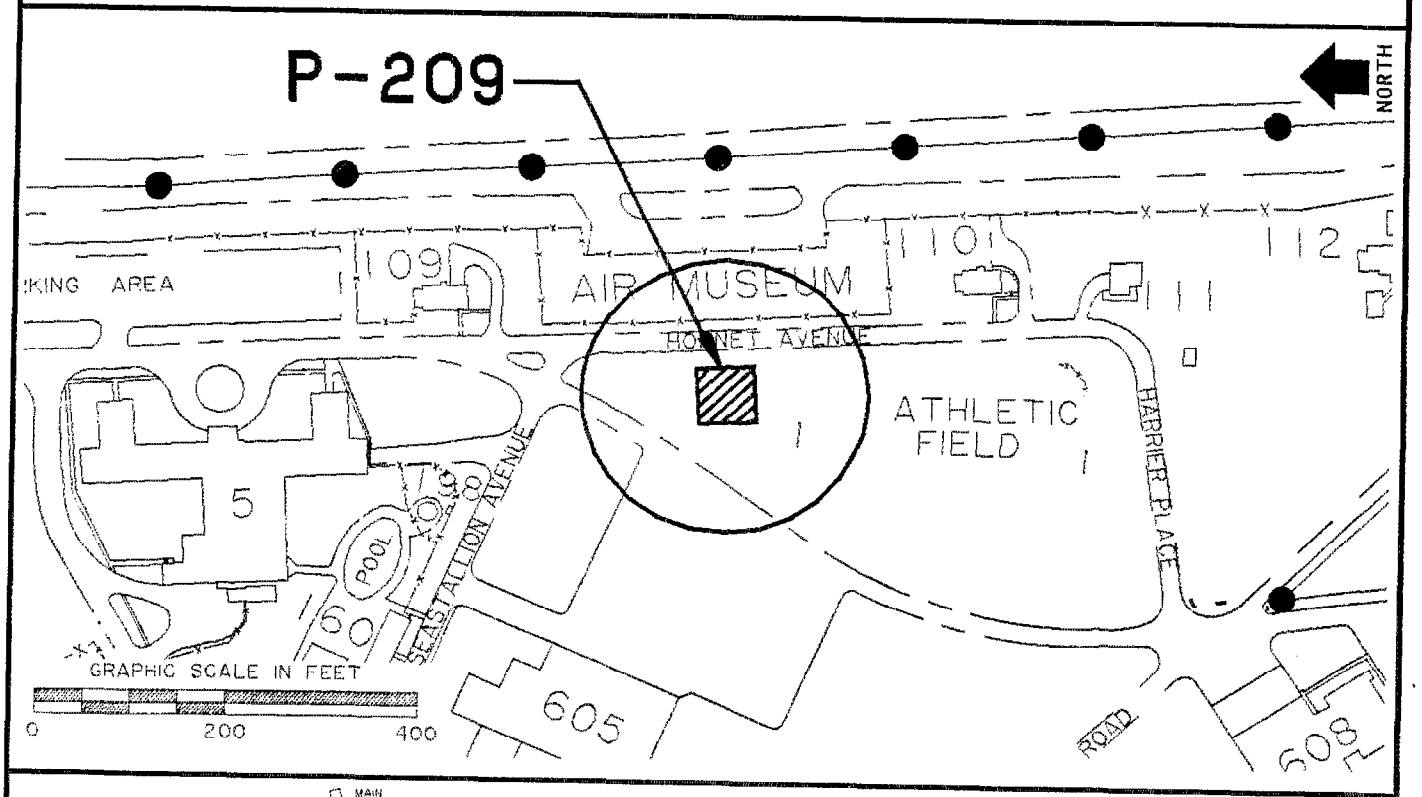
PROJECT DETAIL DATA:

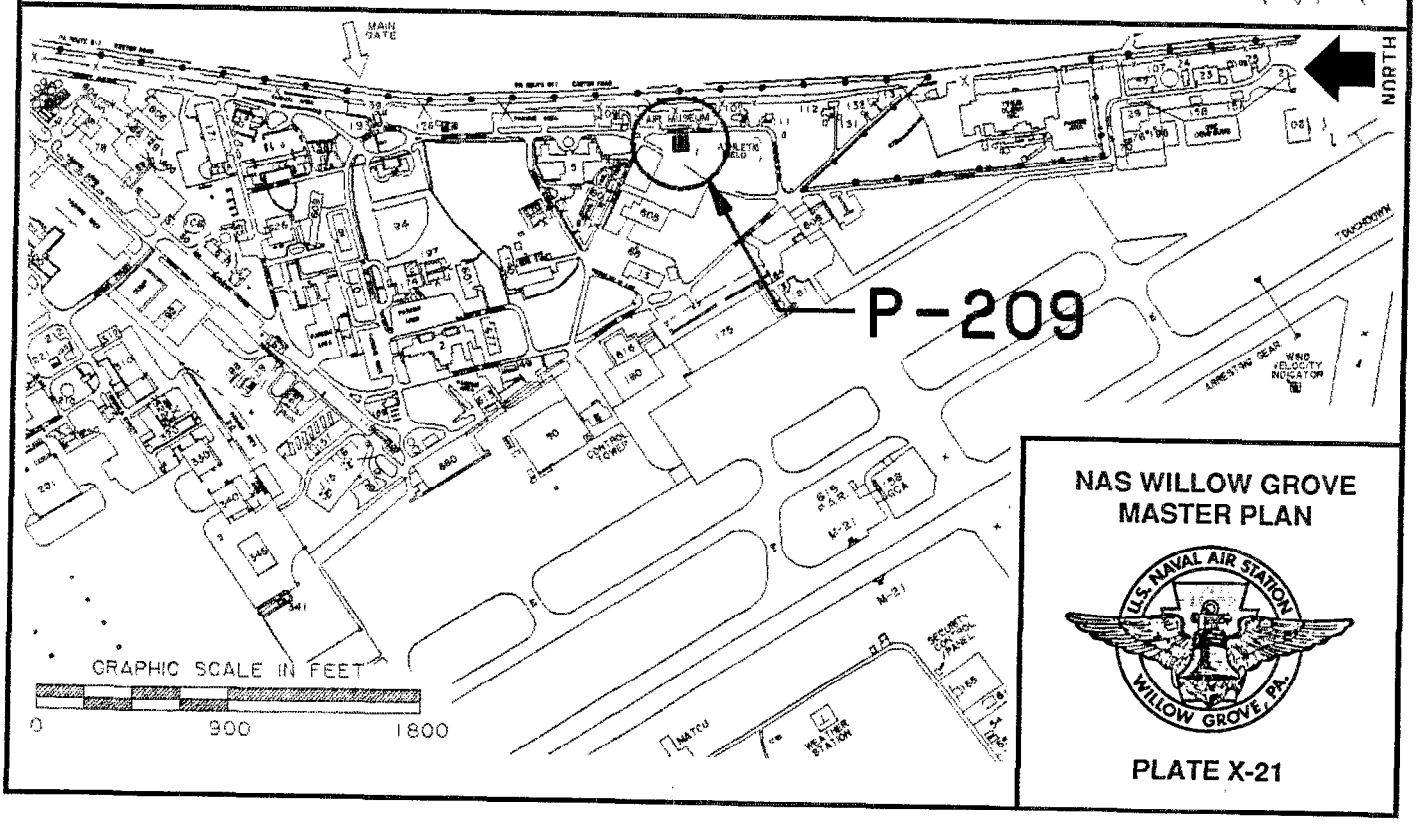
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
610-10	RECRUITING OFFICE	2,623	SF	2A	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-209; NAVAL RESERVE RECRUITING FACILITY





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-21

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	FLAMMABLE OUTDOOR STORAGE SHED

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	441-30	P-211	310 (esc to 4/93)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	LS	2,725	102.00	278
SUPPORTING FACILITIES	-	-	-	0
SUBTOTAL	-	-	-	278
CONTINGENCY (5%)	-	-	-	14
TOTAL CONTRACT COST	-	-	-	292
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	18
TOTAL REQUEST	-	-	-	310
TOTAL REQUEST ROUNDED	-	-	-	310
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
Provide a code conforming flammable outdoor storage facility . The project will most likely require a Preliminary Haxard Analysis (PHA) prior to commencement of design.

REQUIREMENT:
NAS Willow Grove supports Naval and Marine Reserve Aviation activities. Adequate storage facilities for flammable materials must be provided for aircraft intermediate maintenance division and primary aircraft hangars for the various aircraft assigned to this Station.

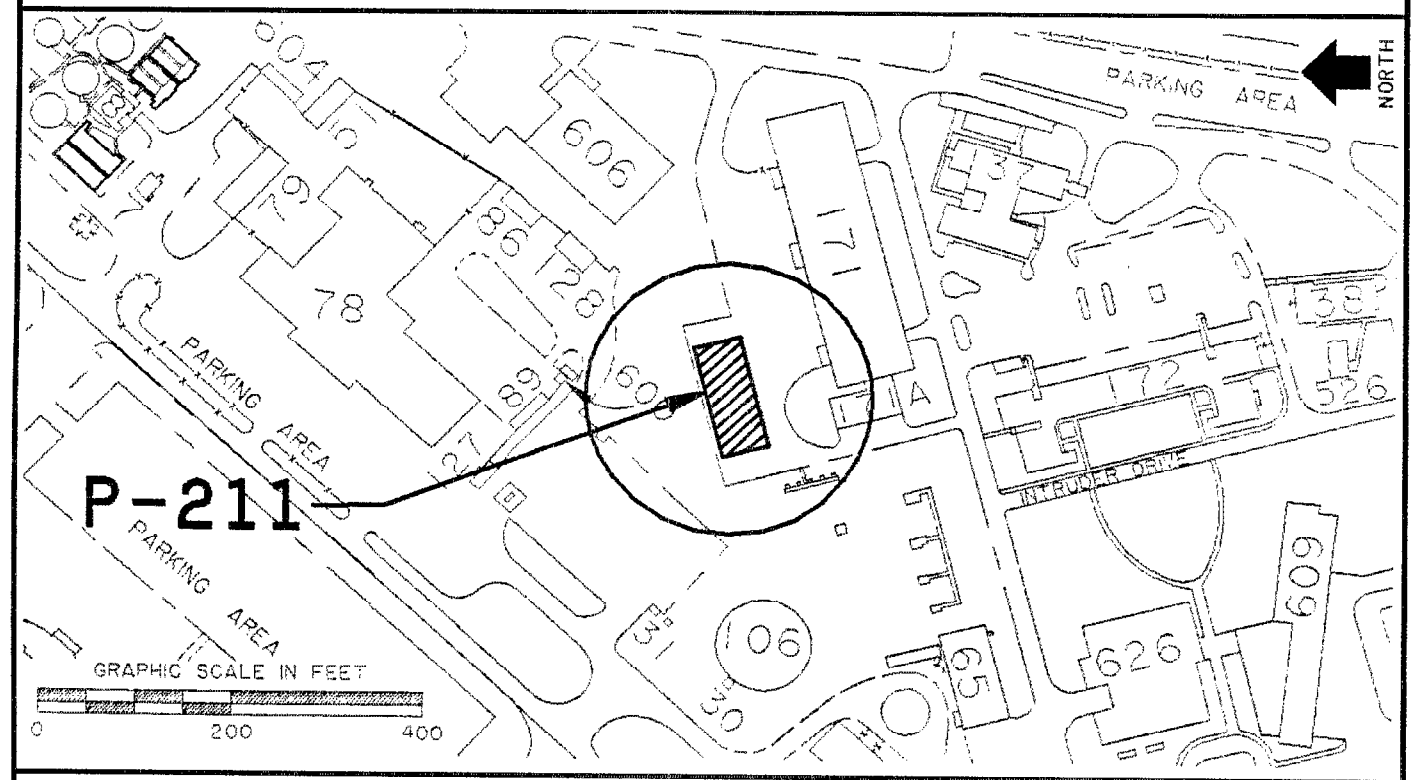
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

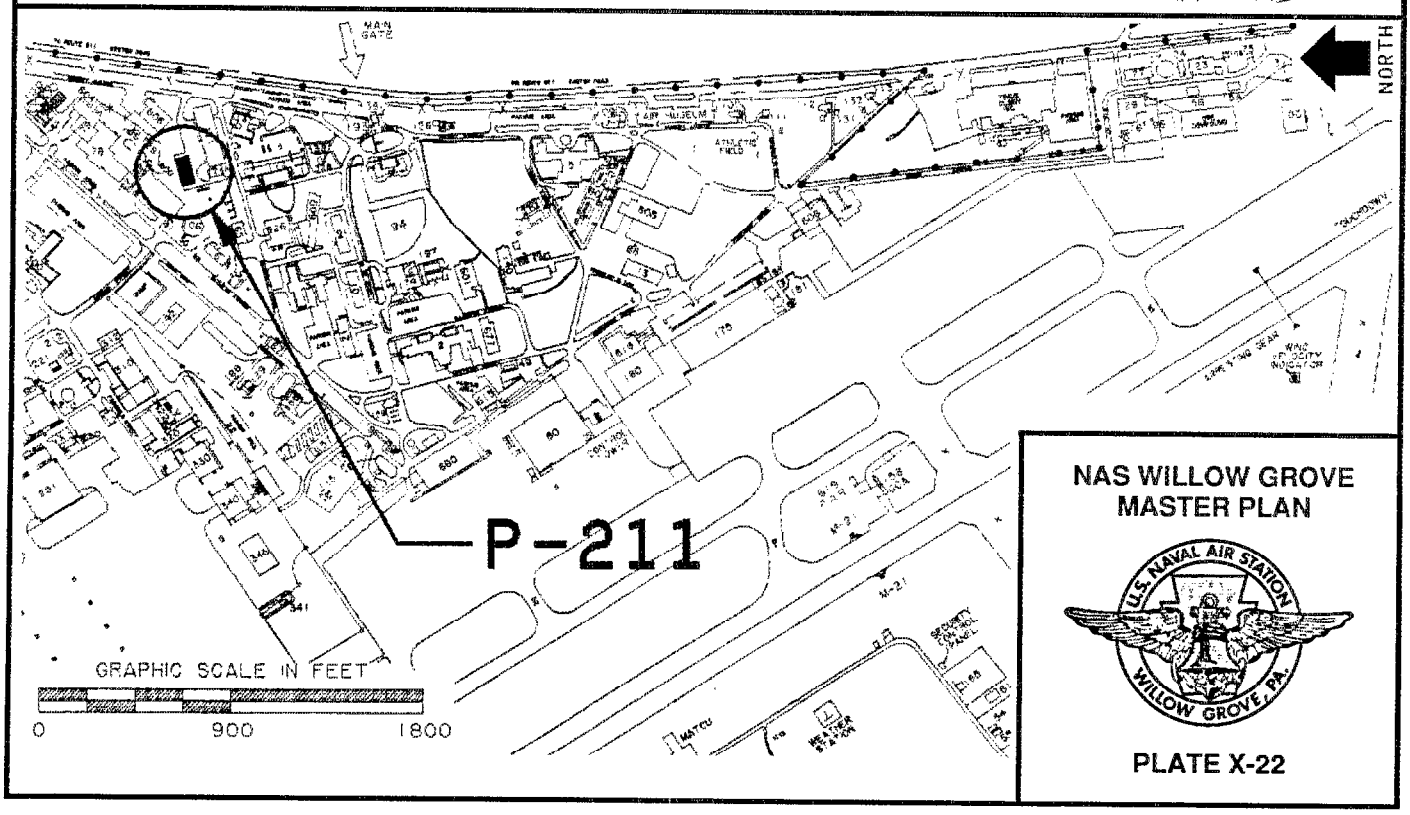
PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
441-30	FLAMMABLE OUTDOOR STORAGE SHED	2,725	SF	2A	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-211; FLAMMABLE OUTDOOR STORAGE SHED





NAS WILLOW GROVE
MASTER PLAN

PLATE X-22

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	AIRCRAFT ACOUSTICAL ENCLOSURE

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	211-01	P-212	5,500 (esc to 4/89)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	10,480	142.27	1,491
SUPPORTING FACILITIES	LS	-	-	3,485
SUBTOTAL	-	-	-	4,976
CONTINGENCY (5%)	-	-	-	249
TOTAL CONTRACT COST	-	-	-	5,225
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	314
TOTAL REQUEST	-	-	-	5,539
TOTAL REQUEST ROUNDED	-	-	-	5,500
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
This project will provide an acoustical attenuated hangar enclosure for testing aircraft power plants following intermediate maintenance repair work. It will be a steel frame hangar enclosure on concrete foundation and slab floor with concrete footings, masonry walls and sloping metal roof. Structure will include aircraft mounting tie downs, special run-up pads, blast deflectors, and provisions for observance and control.

REQUIREMENT:
The Air Station performs intermediate maintenance on a variety of high performance jet aircraft engines from aircraft based at this Activity. Upon completion of repair, ground-up testing is performed on the engines to determine its integrity. During this procedure, excessive high pitch noise is generated and this condition is not well received by the surrounding community. Unwanted noise from run-up and fly overs has in recent years caused widespread complaints from the community. The problem has become more serious since residential development continues to flourish around the Air Station.

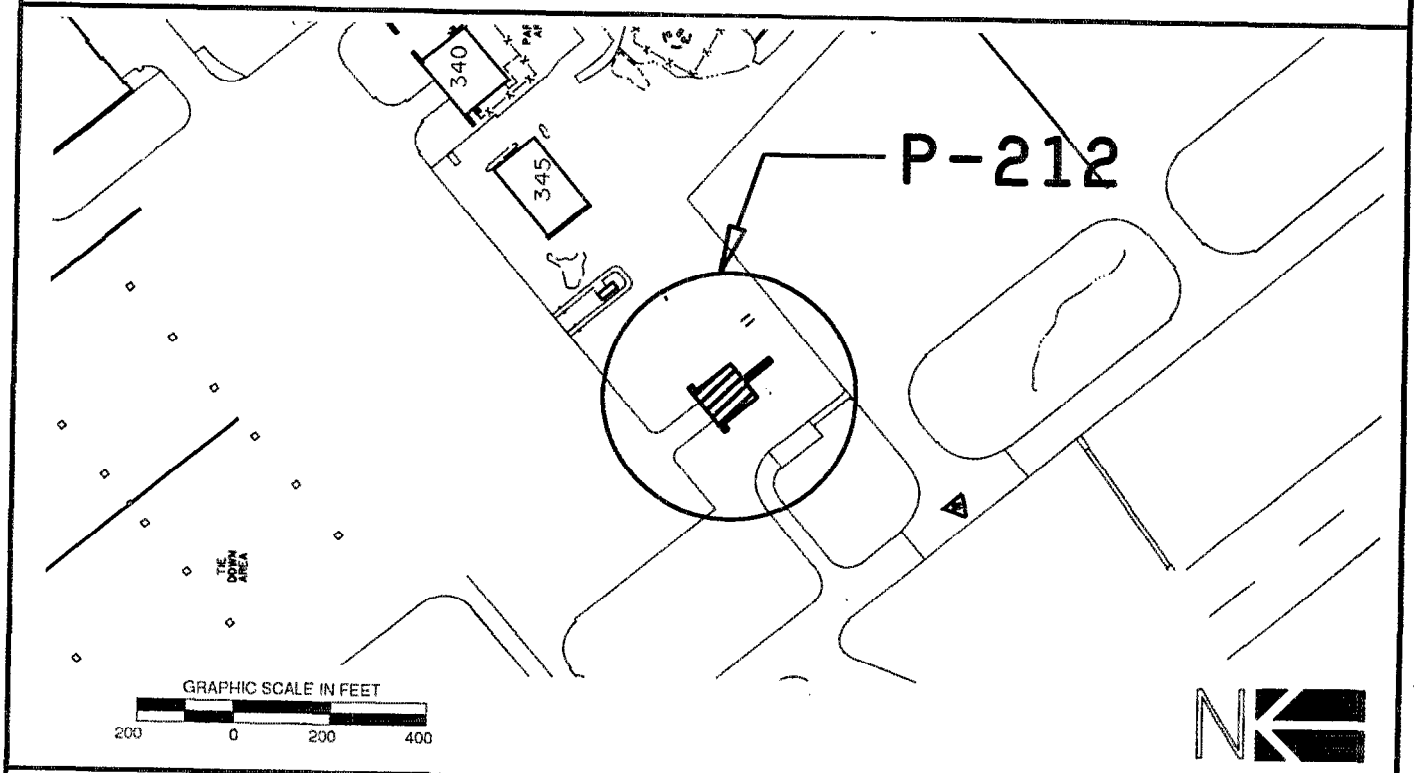
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

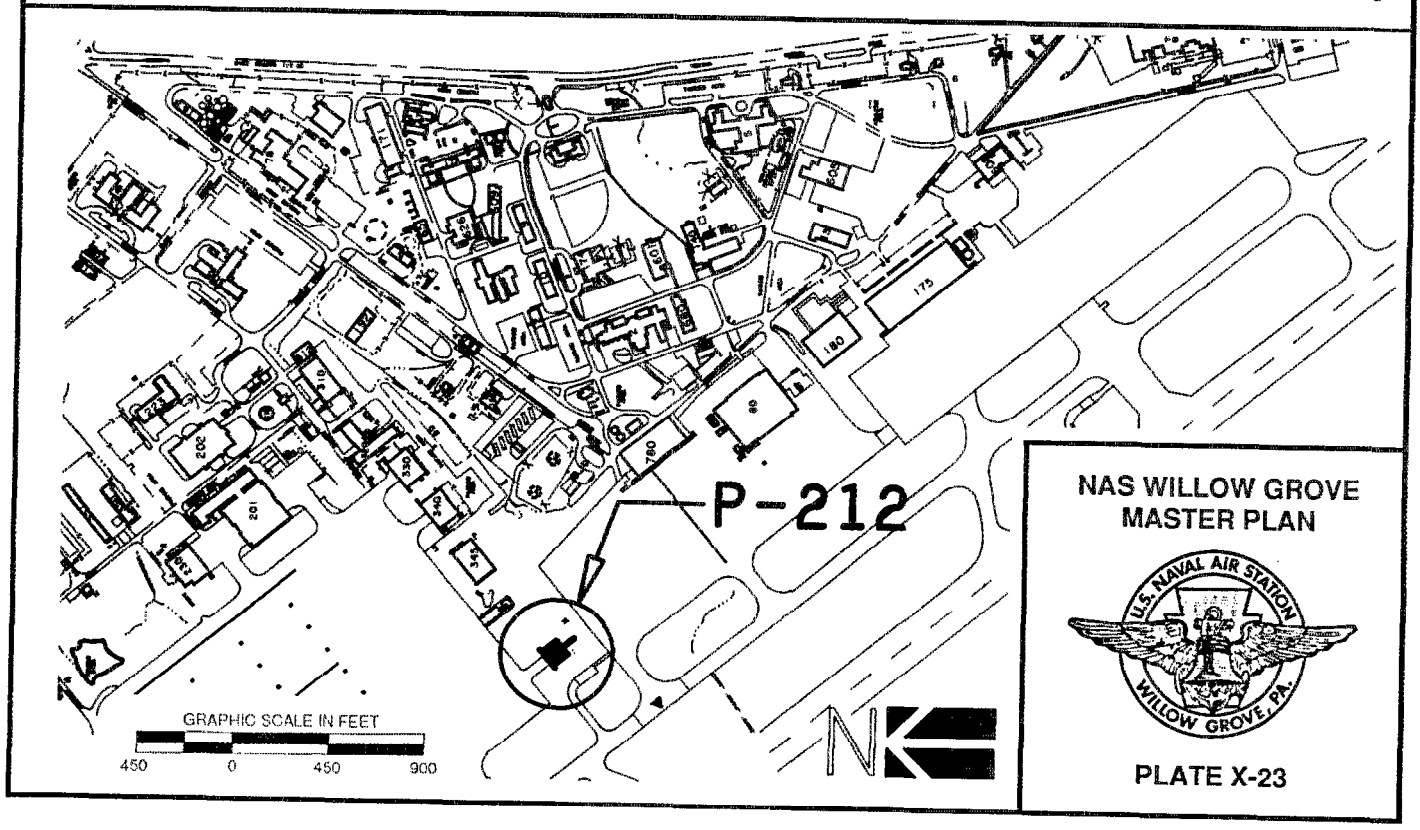
PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
211-01	AIRCRAFT ACOUSTICAL ENCLOSURE	10,480	SF	2B	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-212; AIRCRAFT ACOUSTICAL ENCLOSURE





NAS WILLOW GROVE
MASTER PLAN

U.S. NAVAL AIR STATION
WILLOW GROVE, PA.

PLATE X-23

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	GROUND SUPPORT EQUIPMENT SHED

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	218-61	P-222	540 (esc to 4/92)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	14,581	30.00	437
SUPPORTING FACILITIES	LS	-	-	50
SUBTOTAL	-	-	-	487
CONTINGENCY (5%)	-	-	-	24
TOTAL CONTRACT COST	-	-	-	511
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	31
TOTAL REQUEST	-	-	-	542
TOTAL REQUEST ROUNDED	-	-	-	540
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
This project will construct a 14,581 SF ground support equipment (GSE) holding shed. The shed will provide protective cover for GSE gear awaiting maintenance or ready for issue, and is an integral part of the GSE division compound. The location of this facility will be adjacent to the GSE shop.

REQUIREMENT:
This Station performs intermediate level maintenance of the ground support equipment which is assigned to the type of aircraft at NAS Willow Grove. Current aircraft loading for NAS Willow Grove supported by the AIMD Department totals fifty-five (55) and the requirement for this project is based on the most recent NAVAIR AIMD/ GSE sizing criteria.

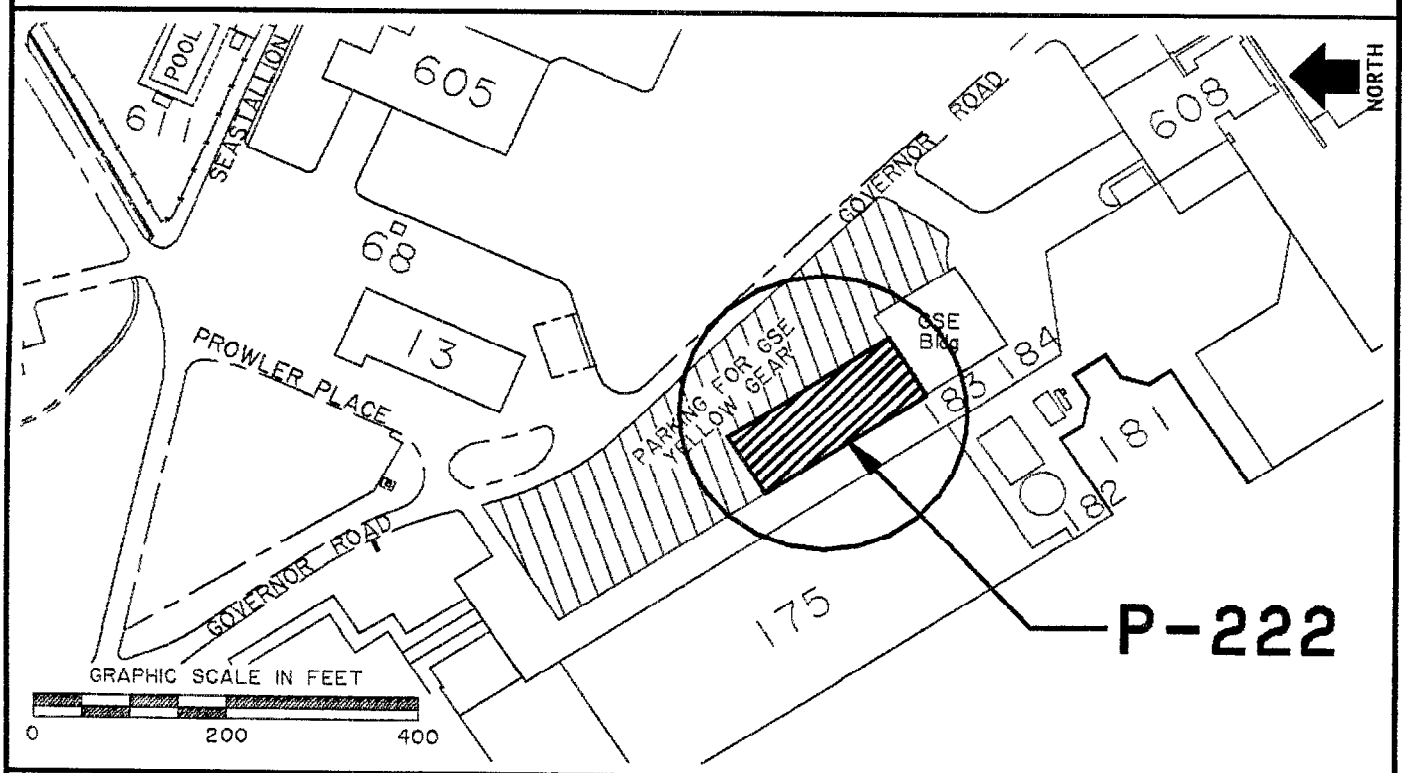
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

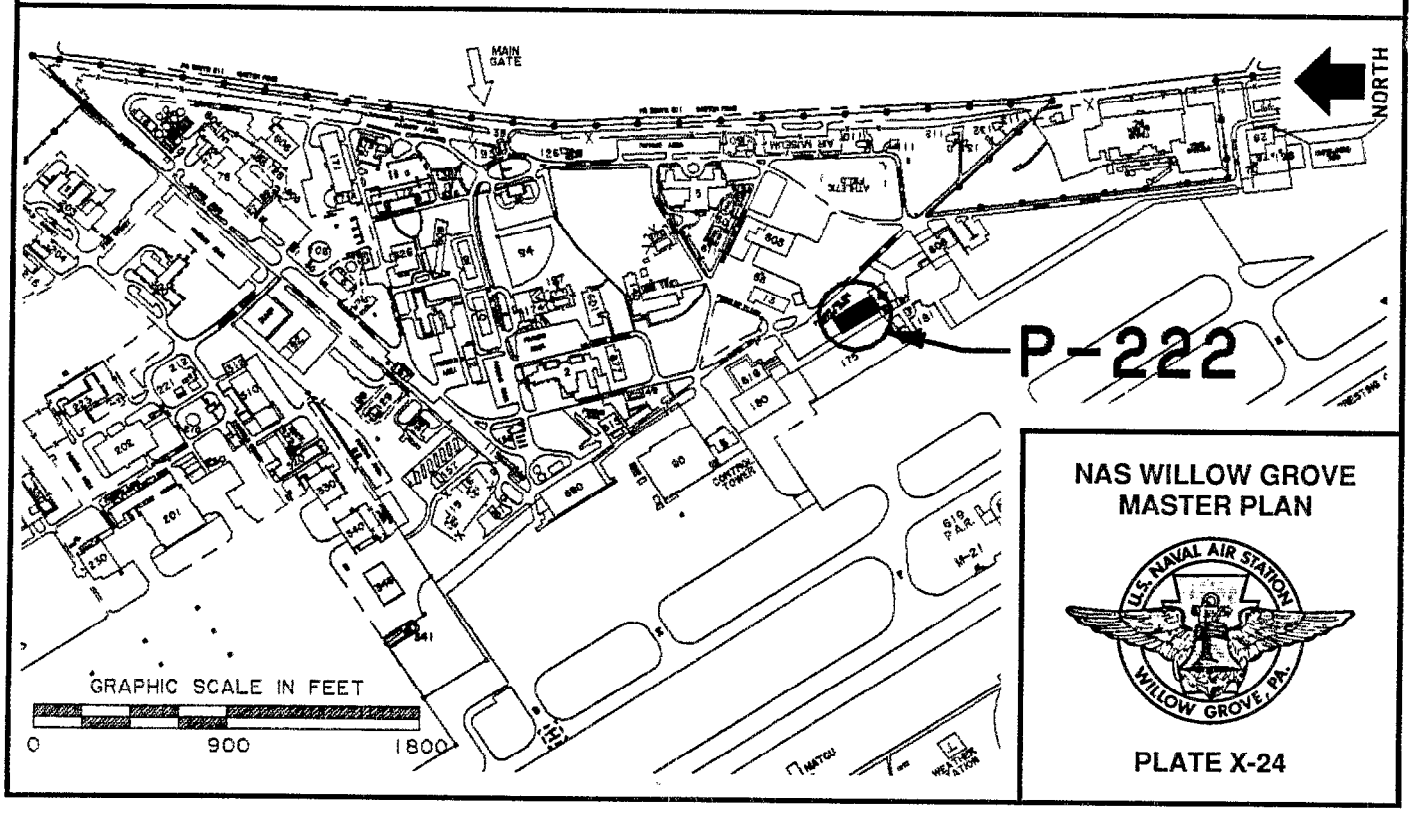
PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
218-61	GROUND SUPPORT EQUIPMENT SHED	14,581	SF	2B	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-222; GROUND SUPPORT EQUIPMENT SHED





NAS WILLOW GROVE
MASTER PLAN

PLATE X-24

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	LAND ACQUISITION, SOUTH CLEAR ZONE, PHASE 2

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	911-10	P-223	13,000 (esc to 4/96)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	AC	16.9	630,000	10,647
SUPPORTING FACILITIES	LS	-	-	0
SUBTOTAL	-	-	-	10,647
CONTINGENCY ~~(5%)~~ (15%)	-	-	-	1,597
TOTAL CONTRACT COST	-	-	-	12,244
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	734
TOTAL REQUEST	-	-	-	12,978
TOTAL REQUEST ROUNDED	-	-	-	13,000
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
Negotiate a fair and reasonable price for the purchase of 16.9 acres of prime real estate located within the south clear zone of NAS Runway 15-33.

REQUIREMENT:
Acquire in fee simple 16.9 acres of land which lies 500 feet from each side of the approach centerline of Runway 15-33. This area considered high risk should an aircraft accident occur. Acquisition is needed to limit incompatible development and ensure the mission viability of the Air Station. The need to buy these properties are stronger than ever because of increasing efforts by local developers to change the zoning and facilitate incompatible development within the south clear zone. This action represents an unacceptable risk to public safety and will jeopardize the flight operation missions of the Air Station.

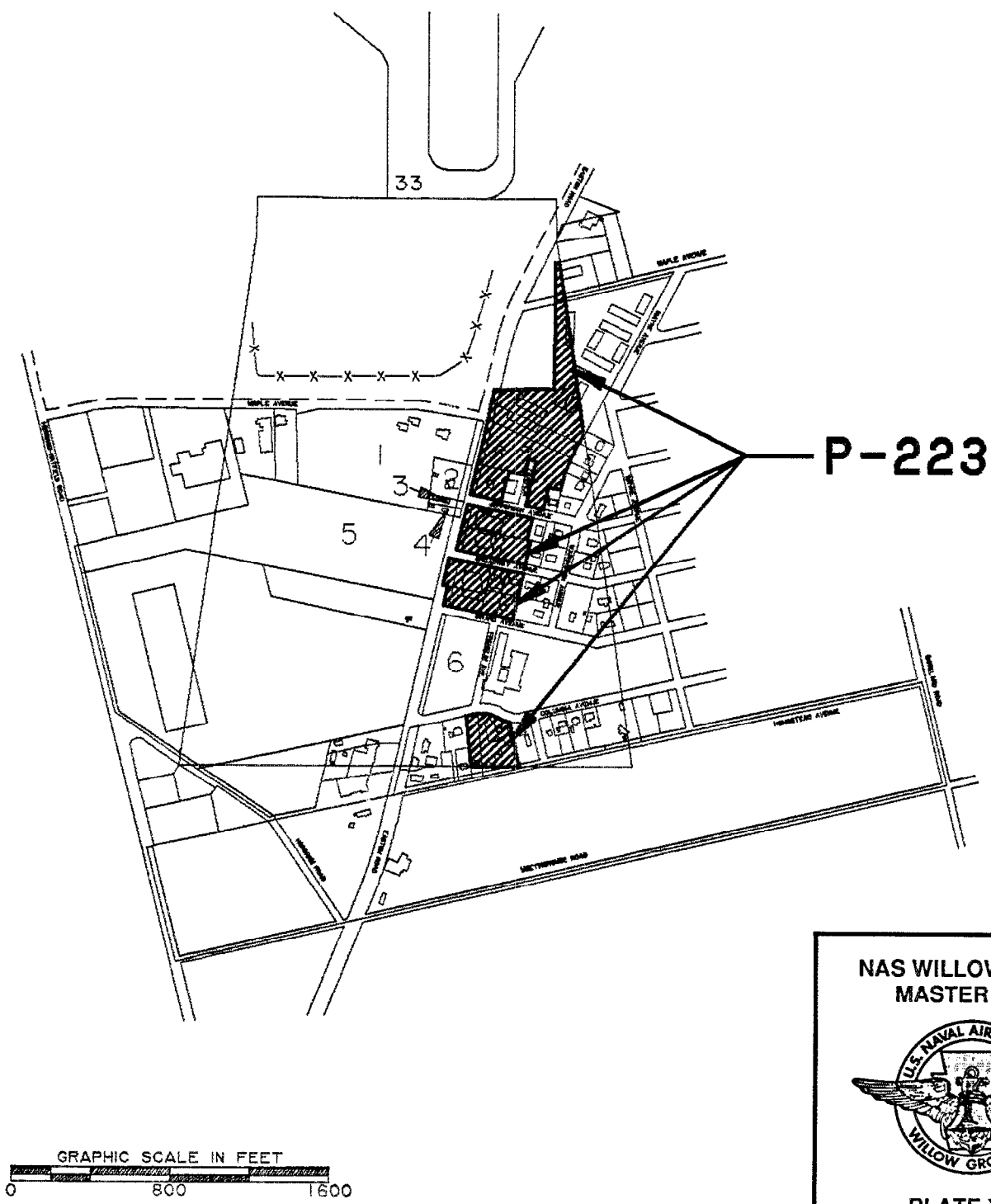
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
911-10	LAND ACQUISITION	16.9	AC	4A	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-223; LAND ACQUISITION, SOUTH CLEAR ZONE, Phase 2



NAS WILLOW GROVE
MASTER PLAN

PLATE X-25

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	LAND ACQUISITION, SOUTH CLEAR ZONE, PHASE 3

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	911-10	P-224	74,000 (esc to 4/99)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	AC	96.9	630,000	61,047
SUPPORTING FACILITIES	LS	-	-	0
SUBTOTAL	-	-	-	61,047
CONTINGENCY ~~(5%)~~ (15%)	-	-	-	9,157
TOTAL CONTRACT COST	-	-	-	70,204
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	4,212
TOTAL REQUEST	-	-	-	74,416
TOTAL REQUEST ROUNDED	-	-	-	74,000
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:
Negotiate a fair and reasonable price for the purchase of 96.9 acres of prime real estate located within the south clear zone of NAS Runway 15-33.

REQUIREMENT:
Acquire in fee simple 16.9 acres of land which lies 500 feet from each side of the approach centerline of Runway 15-33. This area considered high risk should an aircraft accident occur. Acquisition is needed to limit incompatible development and ensure the mission viability of the Air Station. The need to buy these properties are stronger than ever because of increasing efforts by local developers to change the zoning and facilitate incompatible development within the south clear zone. This action represents an unacceptable risk to public safety and will jeopardize the flight operation missions of the Air Station.

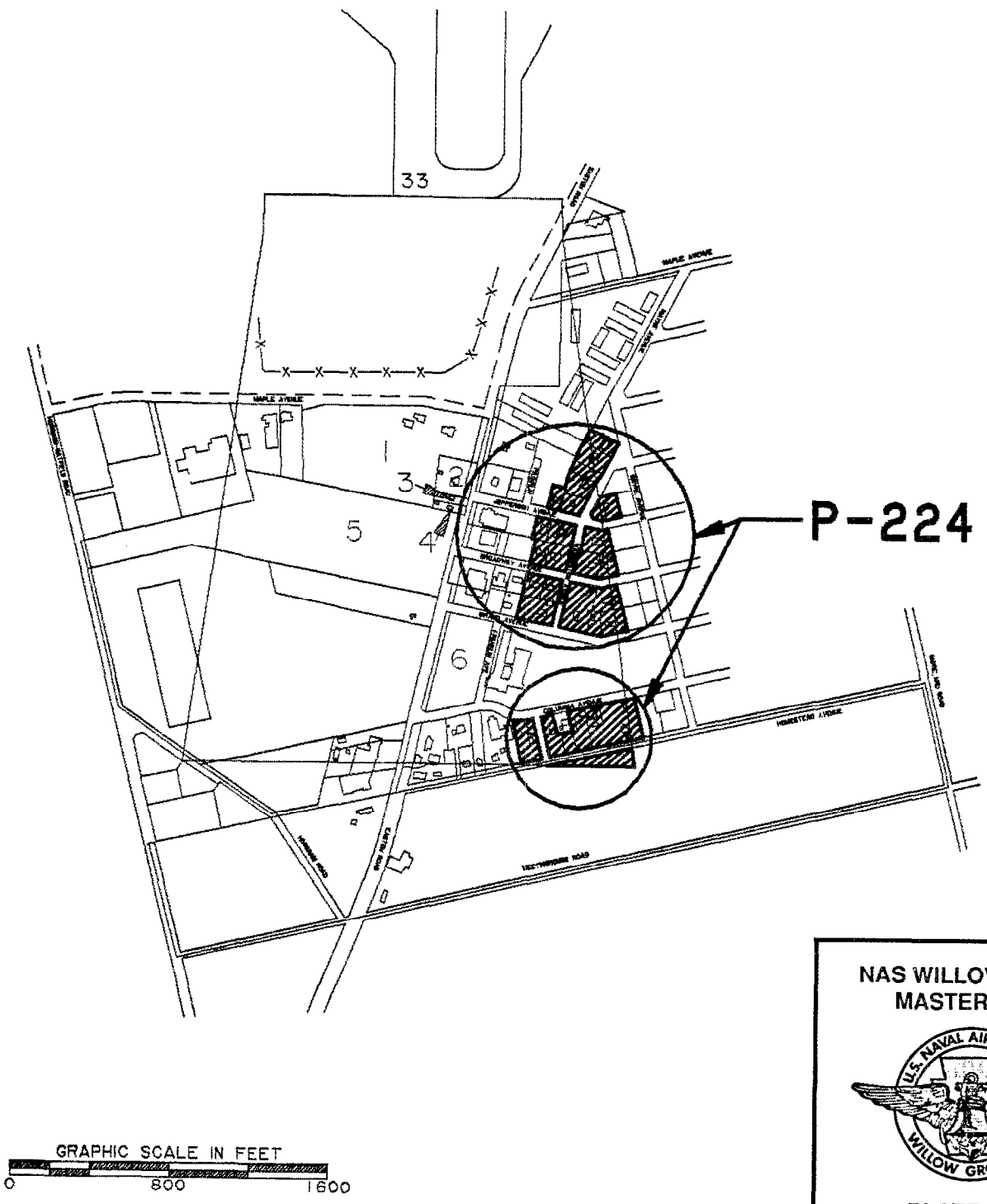
PROGRAMMING DATA:
ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ____
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

PROJECT DETAIL DATA:

CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
911-10	LAND ACQUISITION	96.9	AC	4A	

REQUIREMENTS CERTIFICATION:
ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-224; LAND ACQUISITION, SOUTH CLEAR ZONE, Phase 3



NAS WILLOW GROVE
MASTER PLAN

PLATE X-26

PROJECT DATA SHEET

COMPONENT	PROGRAM YEAR (PROPOSED)	DATE PREPARED
NAVY	UNPROGRAMMED	SEPTEMBER 1990

INSTALLATION AND LOCATION	PROJECT TITLE
NAVAL AIR STATION WILLOW GROVE, PA 19090	RESERVE INTELLIGENCE CENTER

PROGRAM ELEMENT	CATEGORY CODE	PROJECT NUMBER	PROGRAM COST ($000)
	610-10	P-225	620 (esc to 4/92)

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY	SF	5,100	80.00	408
SUPPORTING FACILITIES	LS	-	-	150
SUBTOTAL	-	-	-	558
CONTINGENCY (5%)	-	-	-	28
TOTAL CONTRACT COST	-	-	-	586
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	35
TOTAL REQUEST	-	-	-	621
TOTAL REQUEST ROUNDED	-	-	-	620
EQUIPMENT FROM OTHER APPROPRIATIONS	-	(NON-ADD)		(0)

DESCRIPTION OF PROPOSED CONSTRUCTION:

This project will provide a new reserve intelligence building for the training and administration of the Naval Reserve Intelligence Program. The building will be a one story structure with concrete foundation, concrete slab on grade, and concrete masonry units with brick facing. Building shall be complete with proper lighting, power, fire reporting, and sprinkler system. Provide connections to all utility services, access pavement, parking areas, sidewalks, and curbing. Demolition of Building #65 will be included in this project as this facility will be sited on the former location.

REQUIREMENT:

An adequate facility is required to support the Naval Reserve Intelligence Program. The existing facility is considered inadequate due to various deficiencies. The new facility will replace the inadequate Building #65. The current location is the best location for siting of the new facility.

PROGRAMMING DATA:

ACTIVITY UIC: N00158 ALTERNATE HOST: _____ SUP UNIT: _____ SPEC AREA: _____
INVESTMENT PROGRAM: _____ SIR: _____ RESOURCE SPONSOR: _____
MAJ/SUBCLAIMANT CODE: B INVESTMENT CATEGORY: ___ MOBILIZATION INDICATOR: ___
ACTIVITY PRIORITY: _____ CLAIMANT PRIORITY: _____ FLEP PRIORITY: _____
READINESS RATING: _____

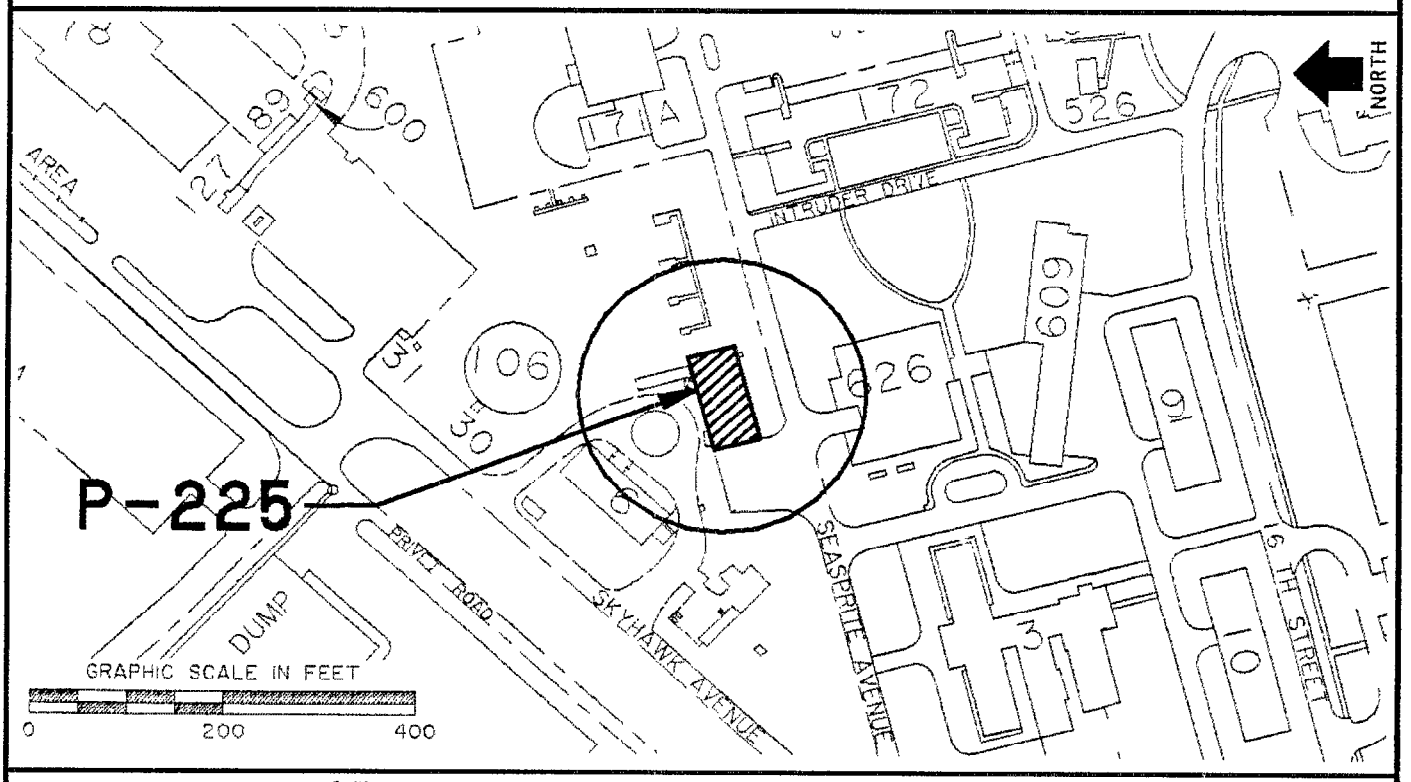
PROJECT DETAIL DATA:

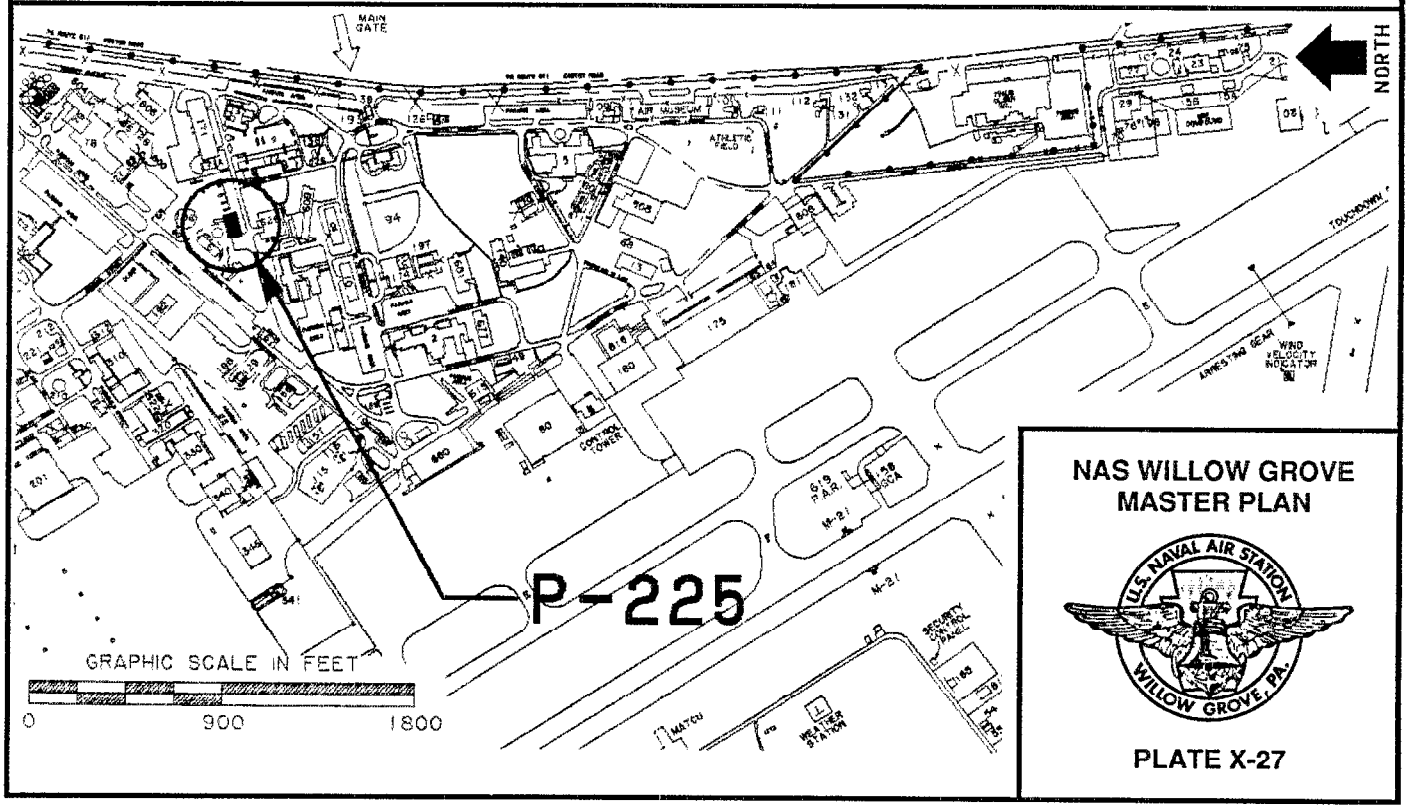
CATEGORY CODE	DESCRIPTION	SCOPE	U/M	CC	VALIDATION INDICATOR
610-10	ADMINISTRATIVE OFFICE	5,100	SF	1B	

REQUIREMENTS CERTIFICATION:

ACTIVITY _____ DATE: _____
MAJOR CLAIMANT _____ DATE: _____
NAVFACENGCOMHQ _____ DATE: _____

P-225; RESERVE INTELLIGENCE CENTER





NAS WILLOW GROVE MASTER PLAN

U.S. NAVAL AIR STATION WILLOW GROVE, PA.

PLATE X-27

H. SPECIAL PROJECTS

Table X-3 is a compilation of Special Projects currently identified in COMNAVRESFOR's Special Project Program. They include: maintenance and repair, minor construction and alterations, and equipment installation. Some of the projects have been funded for a particular fiscal year, while others are unfunded and therefore are unprogrammed.

TABLE X-3

SPECIAL PROJECTS

Project No.	Description	Cost ($000)
Fiscal Year 90		
C3-88	Environmental Controls, HVAC Repairs, AIMD Building #180	67.9
R1-88	Electrical Distribution System Repairs	1,689.4
R4-88	Interior Repairs, Army Reserve Bldg. #176	157.0
R6-88	Repairs & Asbestos Removal, Main Administration Building #1	1,239.3
R8-90	Hangar 80 Repairs, North and South Lean-to's (Phase I)	550.0
R12-86	Repairs to Utilities and Interior, Building #2	344.5
R13-88	Fuel Farm Repairs (Phases I, II, and III)	1,436.0
R13-89	Asbestos Removal, Building #3	118.9
R19-89	Concrete Repair, Hold Fast Area, R/W 15	955.9
R23-89	Concrete Repairs, North & South Rollover Pavement Areas at R/W	935.6

TABLE X-3 (continued)

Project No.	Description	Cost ($000)
Fiscal Year 90		
R30-84	Repair Station Roadways & Pavements (Phase II)	200.0
R45-89	Enlisted Barracks Demolition, Building #12	125.0
Fiscal Year 91		
R4-89	Drainage Trench Repairs	140.0
R5-89	Enlisted Barracks Repairs, Building #9 (Asbestos)	925.0
R8-90	Hangar 80 Repairs, North & South Lean-to's (Phase II)	550.0
R11-89	Water Distribution Repairs (Phase III)	600.0
R16-89	Structural Repairs to Hangar 175	350.0
R18-89	R/W Repairs, Steel Plates under Cross Pendant at Arresting Gear	165.0
R20-89	Parking Apron Bituminous Repairs	75.5
R41-89	Enlisted Barracks Repairs, Building #10	925.0
Fiscal Year 92		
R2-88	Interior Repairs to Hangar 175	130.0
R7-90	Roof Repairs, NAMTRAGRUDET Applied Instruction, Building #601	80.0
R8-89	Bldg. Repairs, South End, Building #15A	150.0

TABLE X-3 (continued)

Project No.	Description	Cost ($000)
Fiscal Year 92		
R10-90	Fire Protection Foam Distribution Repairs, Hangar 175	100.0
R12-89	Bldg. Repairs, Sensitive Compartment Information Facility (SCIF), Building #65	200.0
R13-90	Replace Leaking Concrete Containment Wall, Sewage Plant	300.0
R14-90	Repair Underground Control Cable between Buildings #80 and #139	200.0
R17-89	Fire Alarm System Repairs, RESASWTRACEN Building #140	180.0
R19-90	Repair Roof, BOQ, Building #5	108.0
R20-90	Demolish Hangar 20	250.0
R21-89	Bituminous Repairs, Taxiway "J"	450.0
R22-89	Bituminous Repairs, Taxiways "G" and "K"	350.0
R31-89	Repair Electrical Chase, Air Operations Control Tower	100.0
R35-89	Concrete Repairs, Trim Pad Blast Pavement	200.0
RC13-88	Fuel Farm Repairs, Phase IV	565.0
Fiscal Year UP		
C2-90	Fire Protection System, Building #39 (Base Chapel)	30.0
C7-88	Hazardous Waste Storage, Various Locations	40.0

TABLE X-3 (continued)

Project No.	Description	Cost ($000)
Fiscal Year UP		
R5-88	Bituminous and Concrete Repairs, Various Locations	200.0
R7-89	Exterior Repairs, Building #3 (Child Care)	500.0
R15-89	Optical Systems Repairs	0.0
R15-90	Interior Repairs, RESASWTRACEN Facility	100.0
R22-87	Exterior & Interior Repairs to Recruiting Building #43	300.0
R24-89	Electrical Repairs to PA System, Building #176	80.0
R25-89	HVAC Repairs, Navy Exchange Building	100.0
R26-89	HVAC Repairs, Building #176 (Pitcairn Club)	100.0
R30-89	Repairs to Building #13	500.0
R21-90	HVAC Repairs, BEQ, Building #172	100.0
RC4-87	Repair Airfield Lighting System	0.0
RC8-85	Exterior & Interior Repairs, Building #137 (Dispensary)	0.0
RC9-88	Alterations & Repairs to Old Pass Office, Building #77	153.9
RC24-87	Industrial Ventilation Hazard Abatement, Buildings #80 and #180	150.0
RC26-86	Convert and Repair R/W 6-24 to Taxiway	300.0
RC46-89	Repairs and Alterations to Naval Hospital Branch Clinic, Building #137	350.0

I. BASE EXTERIOR ARCHITECTURE PLAN

1. General

The Base Exterior Architecture Plan (BEAP) is a document which identifies problems and inadequacies in the visual environment of the Station and its attendant facilities. It proposes improvements to upgrade and enhance the appearance of the Station, both to visitors and to NAS Willow Grove personnel.

Development of the BEAP consists of the following tasks:

1. Survey of sites and analysis of visual assets and liabilities of each location.

2. Develop a design concept or environmental theme to correct the liabilities and enhance the visual environment.

3. Develop a comprehensive plan for the Station and its attendant facilities detailing site improvements and related costs.

4. Develop detailed area plans showing suggested improvement projects.

5. Prepare Base Appearance Design Guide providing specific data governing design and construction of projects affecting the visual environment.

6. Consolidate tasks into a final BEAP document for guidance in facility project design and basic base appearance improvement.

2. Design Solution

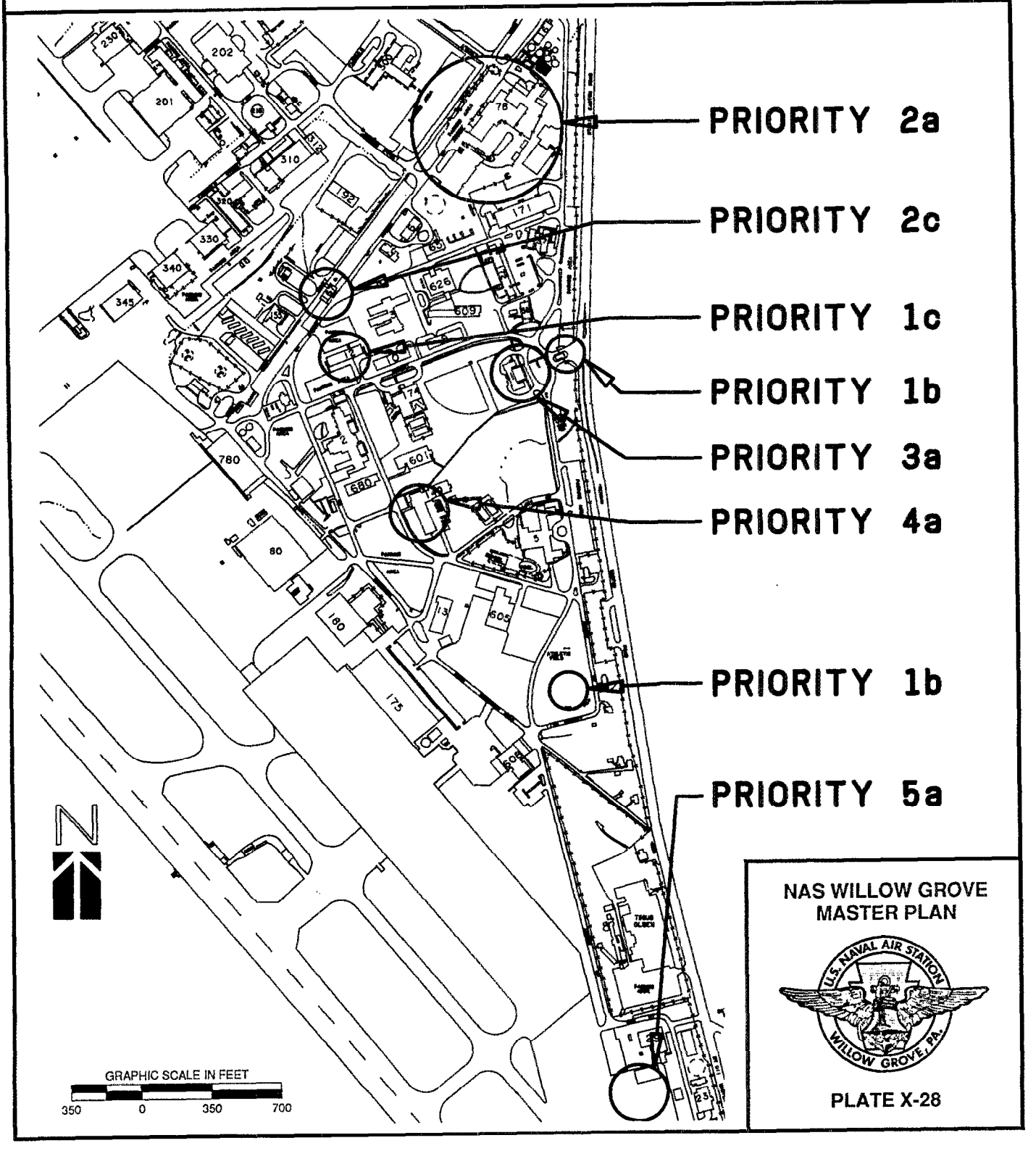
The visual theme, or conceptual theme, suggested for correcting the problems identified at the Station is to build upon the existing sense of a small scale campus in the existing core. The entrance oval, the "parade ground", and the administrative complex consists of human-scale buildings on a commons with handsome mature trees.

There is potential to add more small-scale brick buildings gradually as classrooms are needed, to further the sense of enclosure of the green commons. The landscape can be enhanced by featuring flags, monuments, historic cannons, and other memorabilia.

Signage, lighting, benches, all might be of a character fitting to an older campus context; new roofs and cladding to increase energy efficiency might at the same time reinforce historic styles.

Outside the campus core a contemporary design theme of unifying Navy Blue on metal panels with streamlined tighting and graphics might be employed. Buildings in this area are larger, more horizontal with uniformly bold detailing and landscape.

BASE EXTERIOR ARCHITECTURE PLAN



3. Recommendations

The major recommendations of the BEAP are as follows:

a. Improve Route 611 Main Entrance by relocating fences, planting hedges, relocating bus shelter, and constructing a planted traffic circle.

b. Enhance the station perimeter along Route 611 by constructing a sidewalk, adding landscaping, and painting the fence.

c. Add landscaping and revise the street pattern in the vicinity of the Service Station.

d. Add street trees along 13th Street and revise the parking lot entrances and layout adjacent to the Hobby Shop.

e. Construct screens for the dumpsters throughout the station.

The projects list is divided into three categories; Site Planning Projects, Signage Projects, and Architectural Projects. Plate X-17 shows the general location of each recommended project. Some projects are not site specific and therefore are not illustrated on this plate. The BEAP report should be referenced for design specifics for each of these areas.

A summary of the BEAP projects with a brief description and budget estimate is listed in Table X-4 on page X-81. The cost estimates area preliminary and for discussion purposes only. The cost of building construction and underground utilities are not included in these estimates unless specifically referenced. Projects having a high priority have been written up in previous narrative.

TABLE X-4

BEAP PROJECTS

SITE PLANNING PROJECTS

Priority	Project Description	Estimated Cost ($000)
1a	Typical Dumpster Treatment: Provide wooden screen enclosures around dumpster, construct pads, shrub/tree planting. Various locations.	6
2a	Public Works: Demolition, asphalt paving, brick paving, large trees, small trees, shrubs, signage, flag pole, hedge plants.	170
3a	Entrance Oval: Demolition, concrete paving, asphalt paving, brick paving, small trees, shrubs, ground cover, signage	220
4a	Training Buildings: Demolition, concrete and brick paving, small trees, shrubs, signage, and site furniture.	85
5a	Maintenance Area: Demolition, large and small trees, screening, shrubs, and fencing.	96
6a	Pedestrian Walkways in Campus Area: Bituminous walks interconnecting various facilities, trees, shrubs, and drainage. Various locations.	75

SIGNAGE PROJECTS

1b	Entry/Museum	17
2b	Directional/Parking street name signs; various locations	68
3b	Building identification signs; various locations	34
4b	Station identification signs; various locations	23

TABLE X-4 (continued)

ARCHITECTURAL PROJECTS

Priority	Project Description	Estimated Cost ($000)
2c	Mini Mart, Building #167	28

J. ARMY/PA AIR NATIONAL GUARD PROJECTS

The following tables of Pennsylvania Air National Guard and U.S. Army Reserve Command projects are separate from Navy projects because these activities maintain their own facilities and aircraft but utilize NAS Willow Grove's airfield and supporting facilities. The proposed projects for these activities are illustrated on Plate X-29.

The projects proposed by the PA Air National Guard are required due to a mission change and expansion. The proposed projects are currently under review for site approval.

The projects proposed by the U.S. Army Reserve Command are due to expansion and reorganization.

TABLE X-5

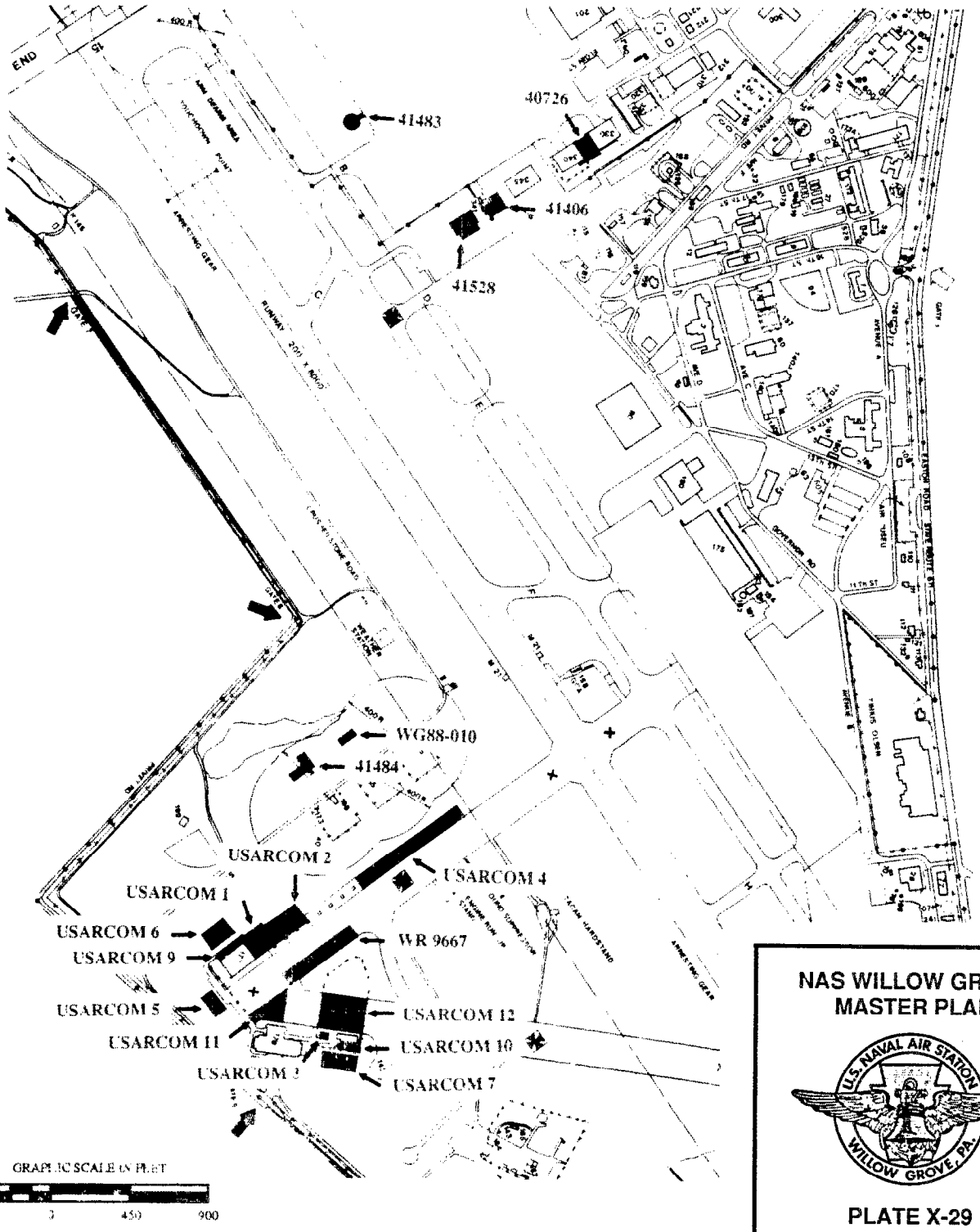
PROPOSED PROJECTS FOR PA AIR NATIONAL GUARD

Project #	Project Title and Description	Cost ($000)
WG88-010	Ammunitions Magazine - Construct a 4,000 SF pre-engineered facility on a concrete pad. Site work is required to clear an area and provide a temporary road surface to make the facility useable. Lighting will be provided. A concrete block fire-wall will be constructed.	120
40726	Addition/Alterations to Maintenance Dock/ Organizational Maintenance/Air Ground Equipment Shop - Construct an aircraft maintenance dock by enclosing the area between Hangars 330 and 340. Construct an aircraft organizational maintenance facility as an addition to the enclosure and construct an addition to the AGE shop in the lean-to of Hangar 340. The existing AGE shop area will be altered. Latrines, lockers, and utilities will be upgraded to support the new addition. Functional areas will include tool/parts room, equipment storage areas, offices, classrooms, maintenance bays, battery rooms, wash rack, and covered storage.	2,700
41406	Weapons and Release Systems Shop - Construct a weapons and release systems shop with masonry walls, concrete foundation, concrete floor slab to support loaded trailers, and steel deck and rubber membrane roof including necessary electrical, mechanical, and structural to provide a complete facility. Functional areas include: maintenance shops, offices, munitions equipment storage, tool/parts room, classroom, restrooms, locker rooms, and mobility equipment storage. One building will be demolished.	1,105

TABLE X-5 (continued)

Project #	Project Title and Description	Cost ($000)
41483	Power Check Pad - Construct a power check pad consisting of an 85 foot radius concrete pad with thrust anchor, taxiway access ramp, 25 foot paved shoulders, deflectors, and utilities.	600
41484	Munitions Maintenance and Storage - Construct a munitions maintenance and storage facility with masonry walls, concrete floor slab to support loaded trailers, and steel deck and rubber membrane roof including necessary electrical, mechanical, and structural to provide a complete facility. Functional areas include: maintenance bays, mobility equipment storage, tool room, locker rooms, classroom, and administrative areas.	1,159
41528	Fuel Systems Maintenance/Corrosion Control - Construct a fuel systems maintenance/corrosion control dock with masonry walls, concrete foundation, concrete floor slab to support aircraft, steel deck, and rubber roof including necessary electrical, mechanical, and structural to provide a complete facility. Functional areas include: two separate hangar bays, maintenance shops, spray booths, paint storage, administrative offices, latrines, and a tool/parts room.	1,879

ARMY/PA AIR NATIONAL GUARD PROJECTS



NAS WILLOW GROVE
MASTER PLAN

PLATE X-29

TABLE X-6

PROPOSED PROJECTS FOR U.S. ARMY

Project #	Project Title and Description	Cost ($000)
Expand ASF 28/AMSA 236 -		10,247
1.	Build a two story administration and training facility next to Building #177. (45,000 SF)	
2.	Build a rotary wing hangar with seven bays and additional shop space next tothe proposed administration and training facility. (23,600 SF)	
3.	Build an additional building next to Building #178 for wheeled combat vehicle maintenance containing three work bays. (6,400 SF)	
4.	Build 20 additional helicopter power-up pads along both sides of the taxiway which is perpendicular to the main runway. (12 pads are required, the remainder can be used for stacking aircraft)	
5.	Build a privately owned vehicle parking lot in the area between Buildings #176 and #177. (5,500 SF) Total required parking area is 9,700 SF.	
6.	Build a privately owned vehicle parking area behind the proposed administration & training facility and Building #177.	
7.	Build a wheeled combat vehicle open storage area south and west of Building #178. (6,000 SF)	
8.	If necessary, relocate the compass calibration pad to a location of the Navy's choosing.	
9.	Build additional A/C shop spaces to Building #177.	

TABLE X-6 (continued)

Project #	Project Title and Description	Cost ($000)
10.	Build additional wheeled combat vehicle shop spaces to Building #178	
11.	Reclaim present privately owned vehicle parking lot and reestablish aircraft useage of the area.	
12.	Reclaim present wheeled combat vehicle storage area and reestablish A/C useage of the area.	
WR 9667	Helicopter Parking Apron - Replace six bituminous helicopter pads with concrete for additional parking and refueling of helicopters. The pads would be 20 ft x 20 ft and six inches thick.	50

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