National Aeronautics and Space Administration

BUDGET ESTIMATES

FISCAL YEAR 1969

Volume III

CONSTRUCTION OF FACILITIES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

TABLE OF CONTENTS

VOLUME III

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

GENERAL STATEMENT

This appropriation provides for contractual services for the design, construction and modification of facilities; the purchase of equipment related to construction and modification; and advance design of facilities planned for future authorization. The principal projects in the 1969 program are described below:

MANNED SPACE FLIGHT: This activity includes funding requirements for modifications and rehabilitation to launch facilities, utility installations, additions and repairs to existing facilities, to support the manned space flight programs. NASA field centers involved are the John F. Kennedy Space Center, NASA, Kennedy Space Center, Fla.; the George C. Marshall Space Flight Center, Huntsville, Ala.; the Manned Spacecraft Center, Houston, Tex.; and the Michoud Assembly Facility, New Orleans, La. Also included are funds for repair, rehabilitation, and improvements to Government-owned facilities, operated by contractors in support of NASA.

SCIENTIFIC INVESTIGATIONS IN SPACE: The estimates for this activity provide for modifications to launch facilities at the John F. Kennedy Space Center and the extension of the beach protection system at the Wallops Station, Wallops Island, Va.

SPACE APPLICATIONS: No 1969 projects included.

SPACE TECHNOLOGY: Funds for this activity provide for a water supply and distribution system at the Ames Research Center, Moffett Field, Calif.

AIRCRAFT TECHNOLOGY: No 1969 projects included.

SUPPORTING ACTIVITIES: This activity includes funds for facility planning and design; a powerplant for the STADAN facility at Fairbanks, Alaska; a special purpose antenna at the Goldstone Complex, Ft. Irwin, Calif.; and a 210-foot diameter advanced antenna system for the deep space instrumentation facility at Canberra, Australia, and Madrid, Spain.

The appropriation for FY 1968 was $35,900,000 and the authorization was $69,980,000. The request for 1969 is $45,000,000, an increase of $9,100,000 over the 1968 appropriation. Total expenditures are estimated to be $75,500,000 in FY 1969, a decrease of $84,500,000 from the $160,000,000 estimated for FY 1968.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1969 ESTIMATES

SUMMARY OF CONSTRUCTION OF FACILITIES BUDGET PLAN AS RECONCILED TO FINANCING SCHEDULE

	Fiscal Year 1967	Fiscal Year 1968	Fiscal Year 1969
Budget Activity			
1. Manned Space Flight.....	$45,057,000	$25,665,000	$18,659,000
2. Scientific Investigations in Space.....	4,688,000	3,595,000	1,200,000
3. Space Applications.....	---	---	---
4. Space Technology.....	8,590,000	2,115,000	386,000
5. Aircraft Technology.....	21,010,000	3,170,000	---
6. Supporting Activities.....	7,066,200	3,255,000	24,755,000
Total Budget Plan.....	$86,411,200	$37,800,000	$45,000,000
Financing:			
Appropriation.....	$83,000,000	$35,900,000	$45,000,000
Transferred from other accounts.....	2,000,000	1,900,000	---
Appropriation (adjusted).	$85,000,000	$37,800,000	$45,000,000
Reprogramming from prior year budget plans.....	1,411,200	---	---
Total financing of budget plan.....	$86,411,200	$37,800,000	$45,000,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1969 ESTIMATES

SUMMARY OF CONSTRUCTION OF FACILITIES BUDGET PLAN
BY BUDGET ACTIVITY SHOWING LOCATION TOTALS INCLUDED IN EACH ACTIVITY

	Fiscal Year 1967	Fiscal Year 1968	Fiscal Year 1969
1. MANNED SPACE FLIGHT.....	$45,057,000	$25,665,000	$18,659,000
John F. Kennedy Space Center, NASA.....	34,157,000	23,745,000	13,209,000
Manned Spacecraft Center....	10,200,000	750,000	3,100,000
Marshall Space Flight Center	---	745,000	---
Michoud Assembly Facility...	700,000	425,000	400,000
Various Locations.....	---	---	1,950,000
2. SCIENTIFIC INVESTIGATIONS IN SPACE.....	$4,688,000	$3,595,000	$1,200,000
Goddard Space Flight Center.	---	565,000	---
Jet Propulsion Laboratory...	350,000	---	---
John F. Kennedy Space Center, NASA.....	1,213,000	2,290,000	700,000
Various Locations.....	2,920,000	---	---
Wallops Station.....	205,000	740,000	500,000
3. SPACE APPLICATIONS.....	---	---	---
4. SPACE TECHNOLOGY.....	$8,590,000	$2,115,000	$386,000
Ames Research Center.....	---	---	386,000
Electronics Research Center.	7,500,000	---	---
Langley Research Center.....	1,090,000	---	---
Lewis Research Center.....	---	2,115,000	---
5. AIRCRAFT TECHNOLOGY.....	$21,010,000	$3,170,000	---
Ames Research Center.....	---	3,170,000	---
Langley Research Center.....	5,010,000	---	---
Lewis Research Center.....	16,000,000	---	---

	Fiscal Year 1967	Fiscal Year 1968	Fiscal Year 1969
6. SUPPORTING ACTIVITIES.....	$7,066,200	$3,255,000	$24,755,000
Goddard Space Flight Center.	710,000	---	---
Jet Propulsion Laboratory...	---	1,900,000	---
Various Locations.....	990,000	---	21,755,000
Facility Planning and Design.....	5,366,200	1,355,000	3,000,000
TOTAL PLAN.....	$86,411,200	$37,800,000	$45,000,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

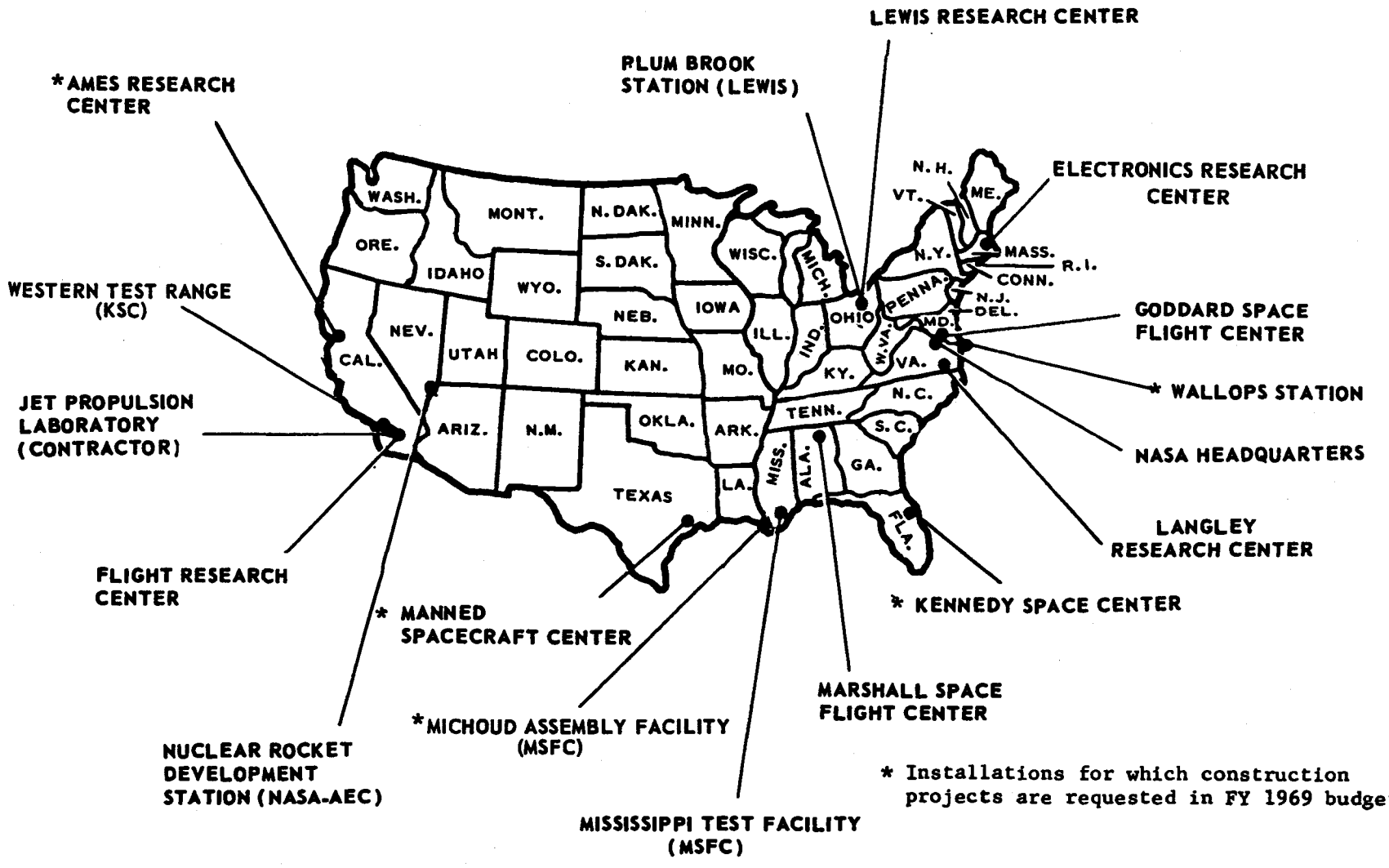
FISCAL YEAR 1969 ESTIMATES

SUMMARY OF CONSTRUCTION OF FACILITIES BUDGET PLAN BY LOCATION

Location	Fiscal Year 1967	Fiscal Year 1968	Fiscal Year 1969
Ames Research Center.....	---	$3,170,000	$386,000
Electronics Research Center.....	$7,500,000	---	---
Goddard Space Flight Center.....	710,000	565,000	---
Jet Propulsion Laboratory.....	350,000	1,900,000	---
John F. Kennedy Space Center, NASA	35,370,000	26,035,000	13,909,000
Langley Research Center.....	6,100,000	---	---
Lewis Research Center.....	16,000,000	2,115,000	---
Manned Spacecraft Center.....	10,200,000	750,000	3,100,000
Marshall Space Flight Center.....	---	745,000	---
Michoud Assembly Facility.....	700,000	425,000	400,000
Various Locations.....	3,910,000	---	23,705,000
Wallops Station.....	205,000	740,000	500,000
Facility Planning and Design.....	5,366,200	1,355,000	3,000,000
Total Plan.....	$86,411,200	$37,800,000	$45,000,000

The geographic location of NASA installations is shown on the following page. Installations for which construction projects are requested in the fiscal year 1969 budget are identified.

NASA INSTALLATIONS



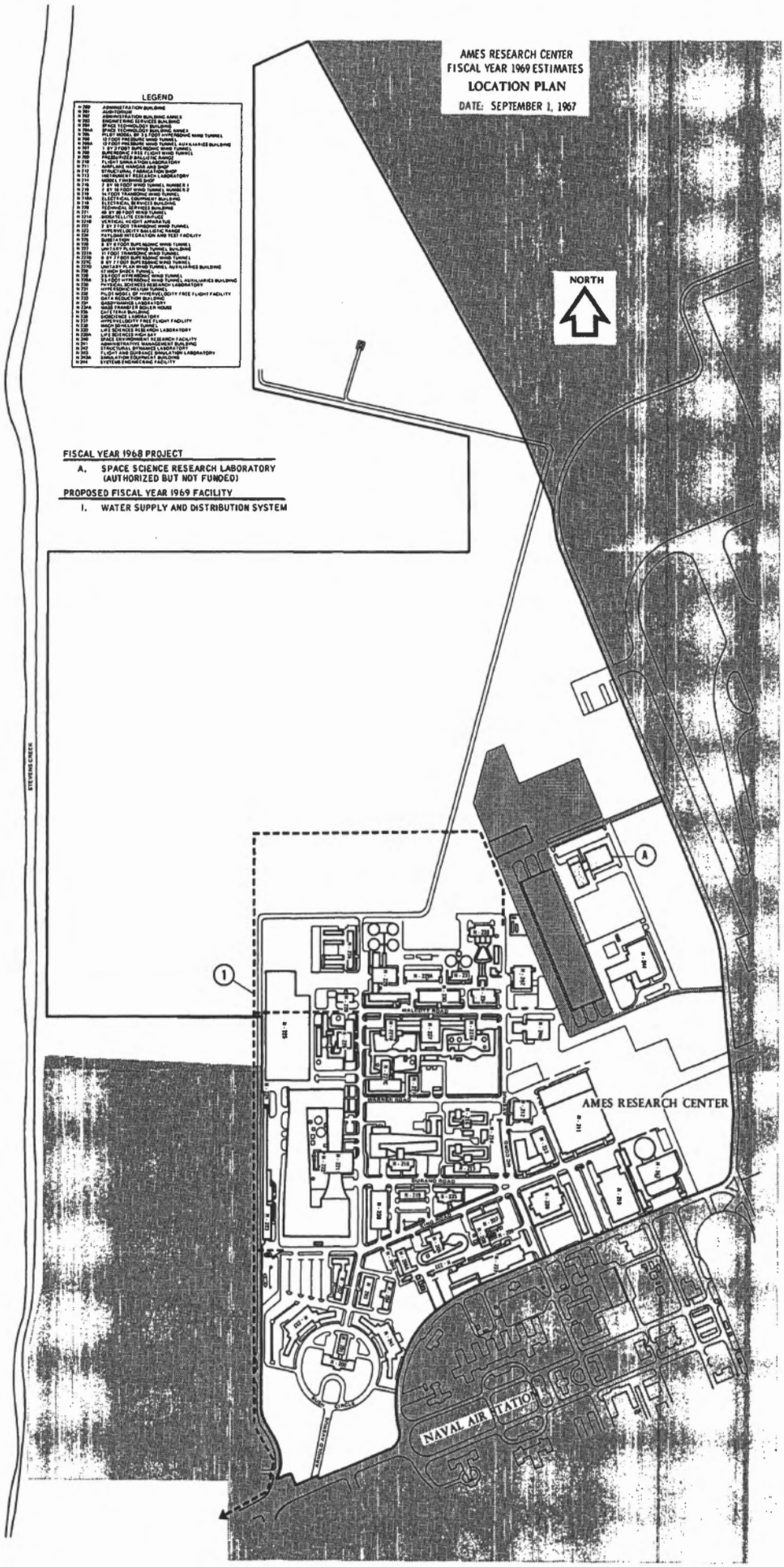
* Installations for which construction projects are requested in FY 1969 budget.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

AMES RESEARCH CENTER


AMES RESEARCH CENTER
FISCAL YEAR 1969 ESTIMATES
LOCATION PLAN
DATE: SEPTEMBER 1, 1967
LEGEND
NORTH
FISCAL YEAR 1968 PROJECT
A. SPACE SCIENCE RESEARCH LABORATORY (AUTHORIZED BUT NOT FUNDED)
PROPOSED FISCAL YEAR 1969 FACILITY
1. WATER SUPPLY AND DISTRIBUTION SYSTEM
STEVENS CREEK
MOFFETT BLVD.
AMES RESEARCH CENTER
NAVAL AIR STATION

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 19 69 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION		COGNIZANT PROGRAM OFFICE FOR INSTALLATION
Ames Research Center		Advanced Research and Technology
LOCATION OF INSTALLATION	**COUNTY**	**NEAREST CITY**
Moffett Field, California	Santa Clara	Mountain View, California

INSTALLATION MISSION

Laboratory research in aerodynamics, thermodynamics, materials, structures, guidance and control, space sciences, environmental biology, life detection, life synthesis, human factors, and fundamental physics and chemistry; project management of unmanned space flight projects (scientific probes and satellites); development of scientific experiment payloads for space flight projects managed at Ames and elsewhere.

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 19 59 THRU CURRENT YR	FY 19 69 (Estimated)	FUTURE YEARS (Estimated)	TOTAL ALL YEARS (Estimated)
Water Supply and Distribution System	ART	18	386		404
ALL OTHER PROJECTS		53,862			
TOTALS		53,880	386		

NASA FORM 1029 JUN 67 PREVIOUS EDITIONS ARE OBSOLETE.

GPO 923-682
CF 1-2

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

WATER SUPPLY AND DISTRIBUTION SYSTEM

AUTHORIZATION LINE ITEM: Ames Research Center

PROGRAM OFFICE FOR THE PROJECT: Office of Advanced Research and Technology

LOCATION OF PROJECT: Moffett Field, Santa Clara County, California

COGNIZANT NASA INSTALLATION: Ames Research Center

TYPE OF CONSTRUCTION PROJECT: New

FUNDING:

FY 1968 and Prior Years	$18,000
FY 1969 Estimate	386,000
Total Funding Through FY 1969	$404,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$386,000
Utilities	LS	---	$386,000	386,000
Equipment	---	---	---	---
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$386,000

PROJECT PURPOSE:

To make water supply and distribution modifications and improvements essential to orderly, efficient, and safe operation of the Center. The proposed additional main water supply and modifications to the distribution system will provide the Center with a reliable source of water and increase the pressure flow to an adequate level throughout the Center.

PROJECT DESCRIPTION:

The proposed addition and modification to the water system consists of a second main water supply and improvement of the existing water distribution system. The project will involve running an 18 inch pipeline from the San Francisco Water Company's transmission mains approximately 4,000 feet to an existing water meter pit at the main entrance to Moffett Field and then distributing the water throughout the Center with 5,000 feet of 18 inch pipe and 1,600 feet of 12 inch pipe. The existing 18 inch water supply from Moffett Field will then be lined with cement to provide a reliable secondary source.

PROJECT JUSTIFICATION:

The proposed modifications are required to provide the Center with a reliable source of water. Further expansion of Center facilities will make the need for these improvements more critical. The proposed modification will be designed to allow Center expansion without severe penalty to future facility construction budgets. It is essential that an adequate water supply system be constructed to insure that water is available at each research facility at all times. An adequate and continuous supply of water is particularly important for fire protection and for the operation of large wind tunnels and noninterruptible life science experiments; e.g., continuous operating centrifuges.

Water is presently supplied to the Naval Air Station, Ames, and Moffett Homes (Navy dependents' housing) by an 18 inch diameter 3/16 inch wall steel pipe installed seventeen years ago. It runs along Tyrella Avenue from the Hetch Hetchy lines, across Bayshore, and along the Moffett Field fence line to a meter pit located near the main gate. About seven years ago, a major leak under Bayshore Freeway caused a shutdown of this line for approximately three months. A 10 inch backup line was put into service and by carefully monitoring water storage and usage the Center was able to continue operations. A similar occurrence today would shut down the Center for the duration of the line repair. The 10 inch line is now useless since the joints leak due to failure of the joint compounds. Repair is impossible without complete excavation of the line. Installations such as Ames, and the Naval Air Station, should have two reliable supplies of water since an accidental interruption to any one service line could occur at any time.

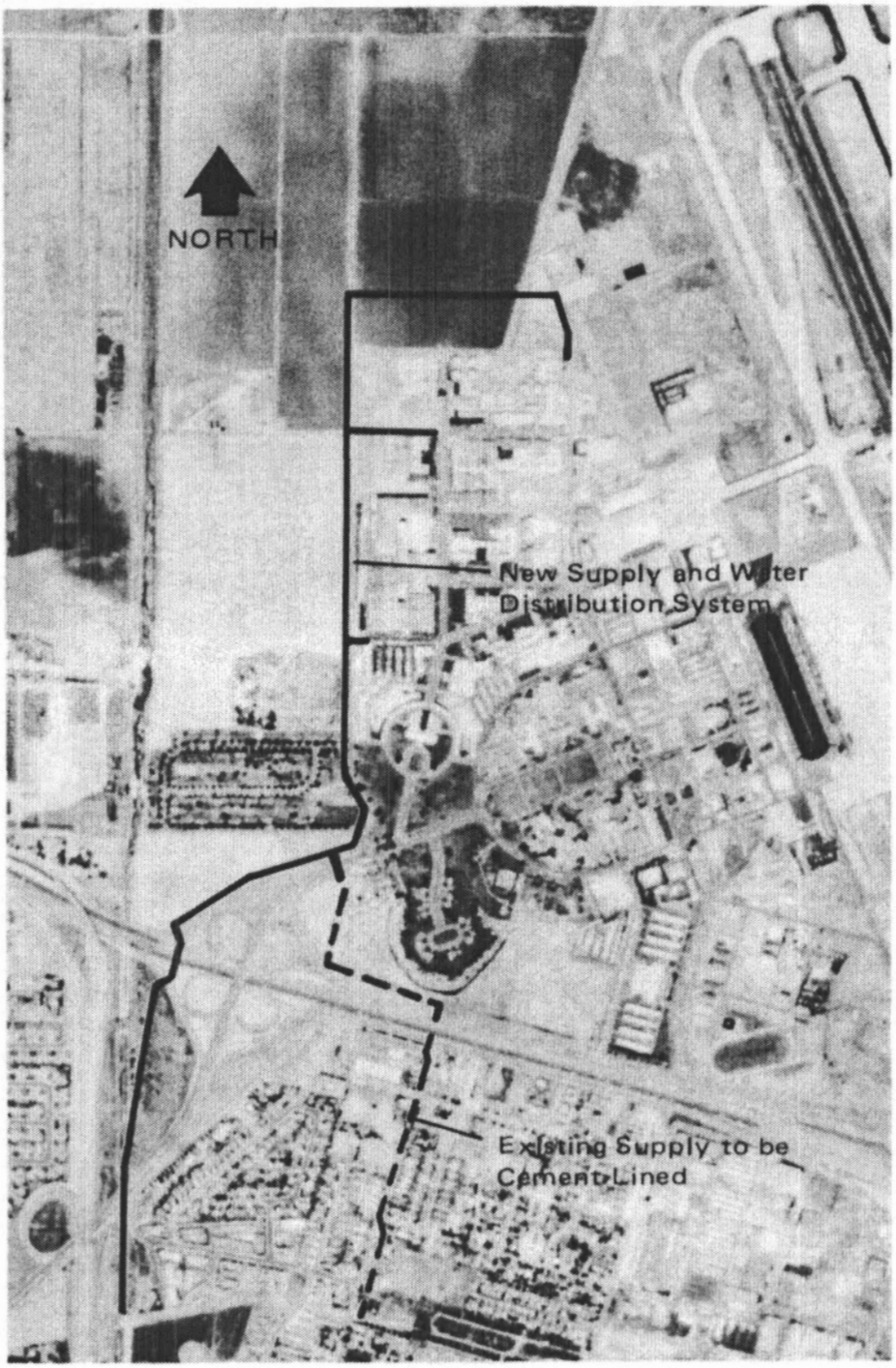
The proposed distribution system will eliminate the present requirement for two booster pumping stations and the attendant maintenance. In addition, the modifications will improve the existing 25 year old system and provide service more in line with present requirements.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

AMES RESEARCH CENTER
FISCAL YEAR 1969 ESTIMATES

WATER SUPPLY AND DISTRIBUTION SYSTEM

SEPTEMBER 1, 1967



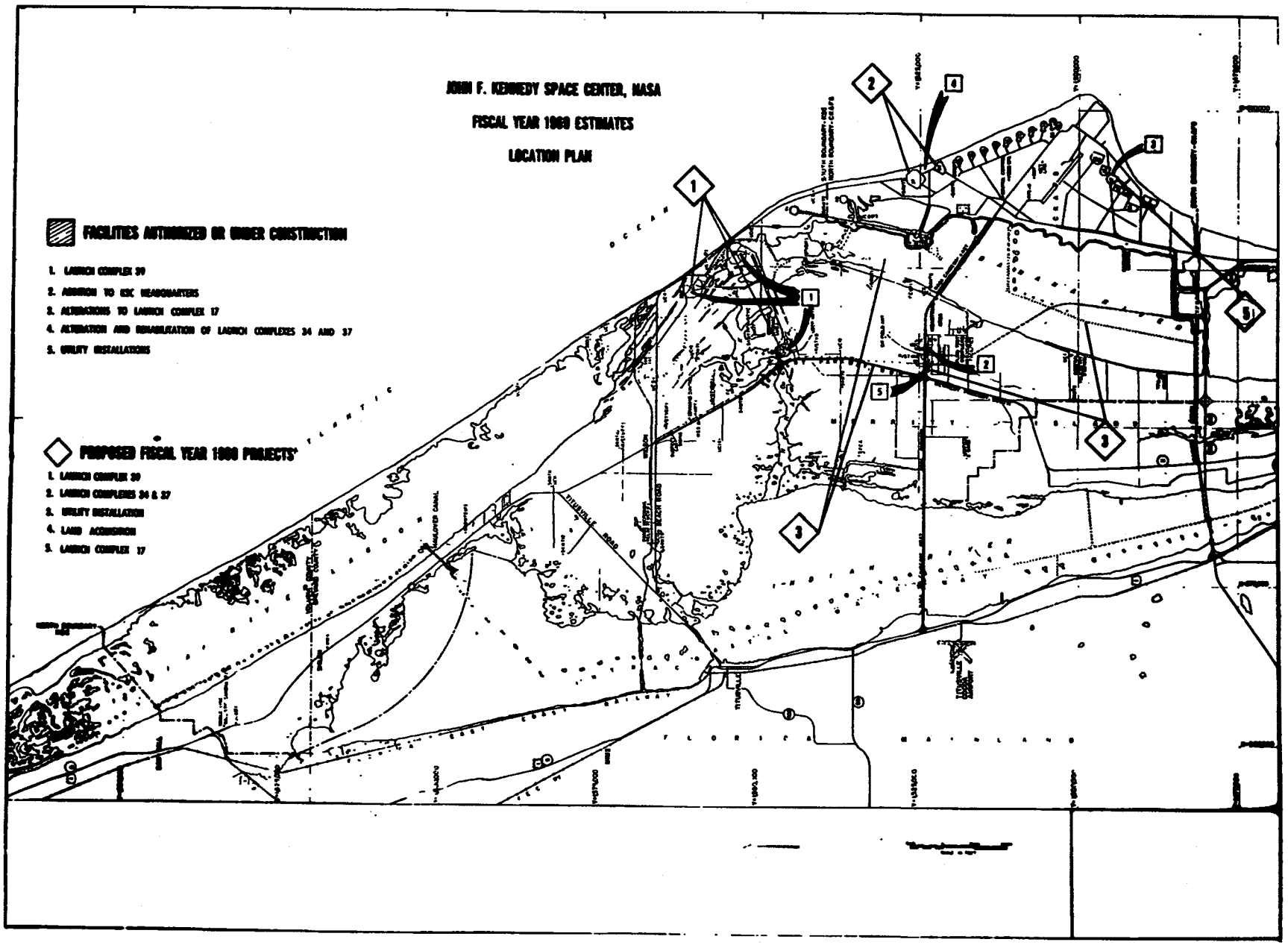
FACILITY SITE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

JOHN F. KENNEDY SPACE CENTER, NASA


JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1988 ESTIMATES
LOCATION PLAN
FACILITIES AUTHORIZED OR UNDER CONSTRUCTION
1. LAUNCH COMPLEX 39
2. ADDITION TO KSC HEADQUARTERS
3. ALTERATIONS TO LAUNCH COMPLEX 17
4. ALTERATION AND REHABILITATION OF LAUNCH COMPLEXES 34 AND 37
5. UTILITY INSTALLATIONS
PROPOSED FISCAL YEAR 1988 PROJECTS*
1. LAUNCH COMPLEX 39
2. LAUNCH COMPLEXES 34 & 37
3. UTILITY INSTALLATION
4. LAND ACQUISITION
5. LAUNCH COMPLEX 17
ATLANTIC OCEAN
BANANA RIVER
INDIAN RIVER
BANANA RIVER DRIVE
SAMPSON ROAD
T.T.R.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION		COGNIZANT PROGRAM OFFICE FOR INSTALLATION
John F. Kennedy Space Center, NASA		Manned Space Flight
LOCATION OF INSTALLATION	**COUNTY**	**NEAREST CITY**
Merritt Island, Florida	Brevard	Cocoa Beach, Florida

INSTALLATION MISSION

The Center conducts overall planning and supervision of the integration, test, checkout and launch of NASA space vehicle systems at the Air Force Eastern Test Range and Merritt Island, and provides support services for all NASA elements located in the area.

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1959 THRU CURRENT YR	FY 1969 (Estimated)	FUTURE YEARS (Estimated)	TOTAL ALL YEARS (Estimated)
Launch Complexes 34 and 37	MSF	106,846	1,800		108,646
Launch Complex 39	MSF	488,679	5,328		494,007
Utility Installations	MSF	65,125	2,521		67,646
Land Acquisition	MSF	73,413	3,560		76,973
Alteration to Launch Complex 17	SSA	6,999	700	500	8,199
ALL OTHER PROJECTS		163,787			
TOTALS		904,849	13,909		

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

LAUNCH COMPLEXES 34 AND 37

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Alteration and Rehabilitation

FUNDING:

FY 1968 and Prior Years	$106,845,898
FY 1969 Estimate	1,800,000
Total Funding Through FY 1969	$108,645,898

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$1,800,000
Service structure modifications	LS	---	1,320,000	1,320,000
Umbilical tower modifications	LS	---	480,000	480,000
Equipment	---	---	---	---
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$1,800,000

PROJECT PURPOSE:

This project will provide for the modification and rehabilitation of Launch Complexes 34 and 37 which are required to support continuing launches of the Saturn IB vehicles.

PROJECT DESCRIPTION:

This project will provide for modification and rehabilitation of Launch Complexes 34 and 37 to support continuing launch programs. The operational features of each complex will be modified and the complexes adapted to meet new mission requirements. Modifications to the service structures and umbilical towers for the Apollo Applications Program (AAP) include structural changes such as enlargement of service structure platform openings, changes to and relocation of swing arms, changes in the instrumentation, electrical power, communication, water, pneumatic and mechanical systems. These changes are in the nature of a relocation or modification of structures and systems to assure a compatible interface with new flight hardware and current support equipment.

PROJECT JUSTIFICATION:

Launch Complexes 34 and 37 are currently configured to support existing flight hardware and ground support equipment with respect to structural, electrical, propellant, environmental, piping, instrumentation and communications systems. With the advent of the larger and more complex spacecraft combinations such as the Orbital Workshop, Air Lock, and Multiple Docking Adapter, the proposed modifications are necessary to provide Kennedy Space Center with a capability to assemble, test, checkout and launch the AAP configured vehicles.

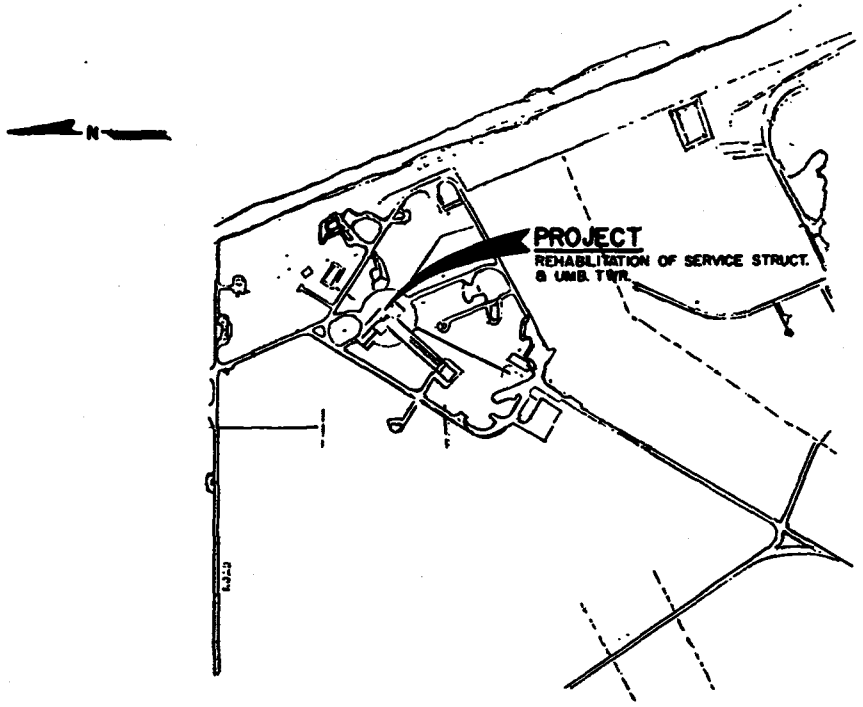
In order to have the complexes available for the AAP launches the modifications must be accomplished during FY 1969 when the schedule provides sufficient time between launches to accomplish the work.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: This requirement will be dependent upon the extent of follow-on and future programs. An estimated yearly expenditure of between $1,000,000 and $2,000,000 will be required to safeguard the current investment.

JOHN F. KENNEDY SPACE CENTER, NASA

FISCAL YEAR 1969 ESTIMATES

LAUNCH COMPLEXES 34 AND 37

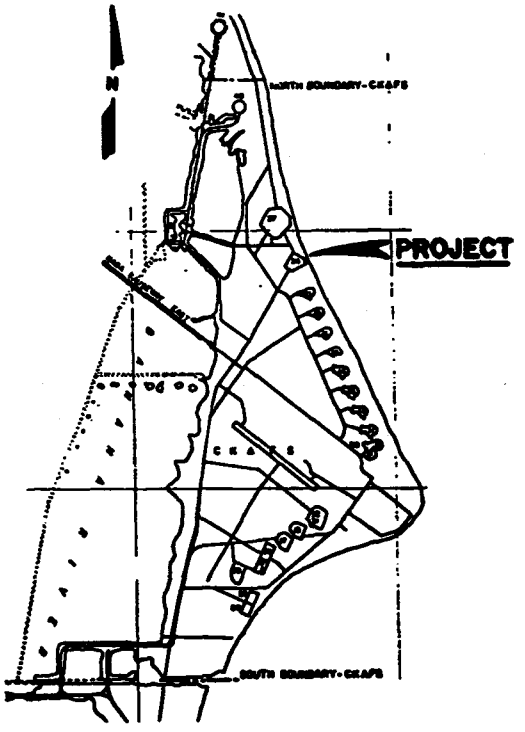


LAUNCH COMPLEX 34

SITE PLAN

800 0 800 1600

SCALE IN FEET



LOCATION MAP

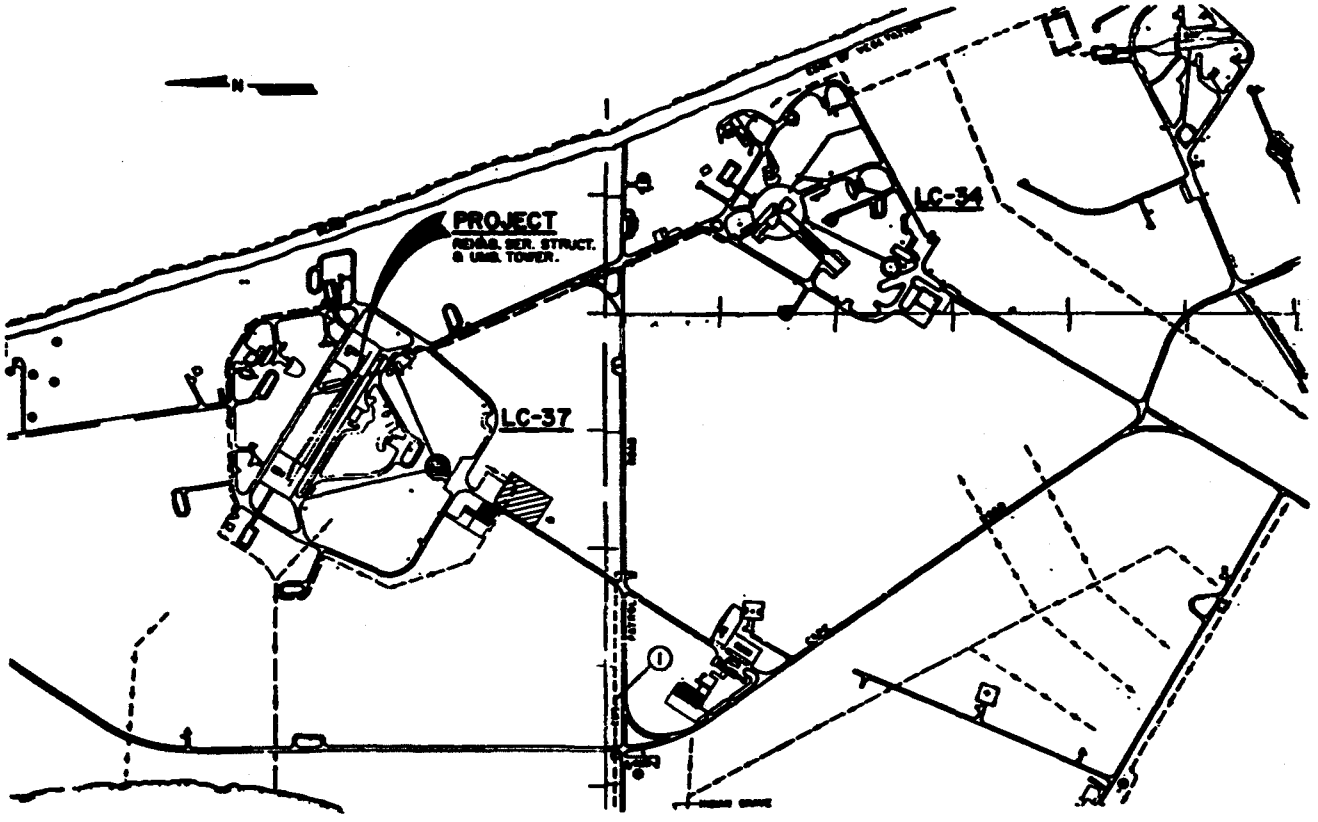
10,000 0 10,000 20,000

SCALE IN FEET

JOHN F. KENNEDY SPACE CENTER, NASA

FISCAL YEAR 1969 ESTIMATES

LAUNCH COMPLEXES 34 AND 37

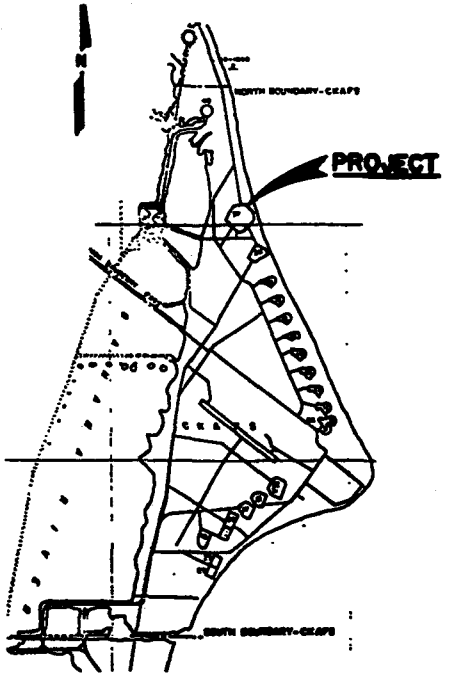


LAUNCH COMPLEX 37

SITE PLAN

800 0 800 1600

SCALE IN FEET



LOCATION MAP

10,000 0 10,000 20,000

SCALE IN FEET

CF 2-6

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

LAUNCH COMPLEX 39

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Alteration and Rehabilitation

FUNDING:

FY 1968 and Prior Years	$488,678,845
FY 1969 Estimate	5,328,000
Total Funding Through FY 1969	$494,006,845

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$5,328,000
MSS, LUT and pad rehabilitation and modification	LS	---	$2,728,000	2,728,000
Pad water system rehabilitation	LS	---	600,000	600,000
Pad purge system extension	LS	---	260,000	260,000
Crawlerway rehabilitation	LS	---	240,000	240,000
Instrumentation and communications	LS	---	1,500,000	1,500,000
Equipment	---	---	---	---

	Unit of Measure	Quantity	Unit Cost	Total Cost
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$5,328,000

PROJECT PURPOSE:

To provide for rehabilitation and modifications to Launch Complex 39 in support of continuing launch programs.

PROJECT DESCRIPTION:

In Fiscal Year 1969, Launch Complex 39 must undergo rehabilitation and modification to assure operational readiness for continuing launch programs.

Rehabilitation will include the refurbishment or replacement of worn, deteriorated, or corroded structural, mechanical and electrical components in such elements of the complex as pedestals and structures; industrial and potable water systems, power, communications, and instrumentation systems; crawlerways; and associated peripheral equipment.

Modifications to specific elements of the complex will be required to improve operational effectiveness and to adapt the facilities to meet the ever changing requirements of continuing launch programs. This will include such work as modifications to the mobile service structure and launch umbilical towers, the pad purge and water systems, and instrumentation and communication systems.

PROJECT JUSTIFICATION:

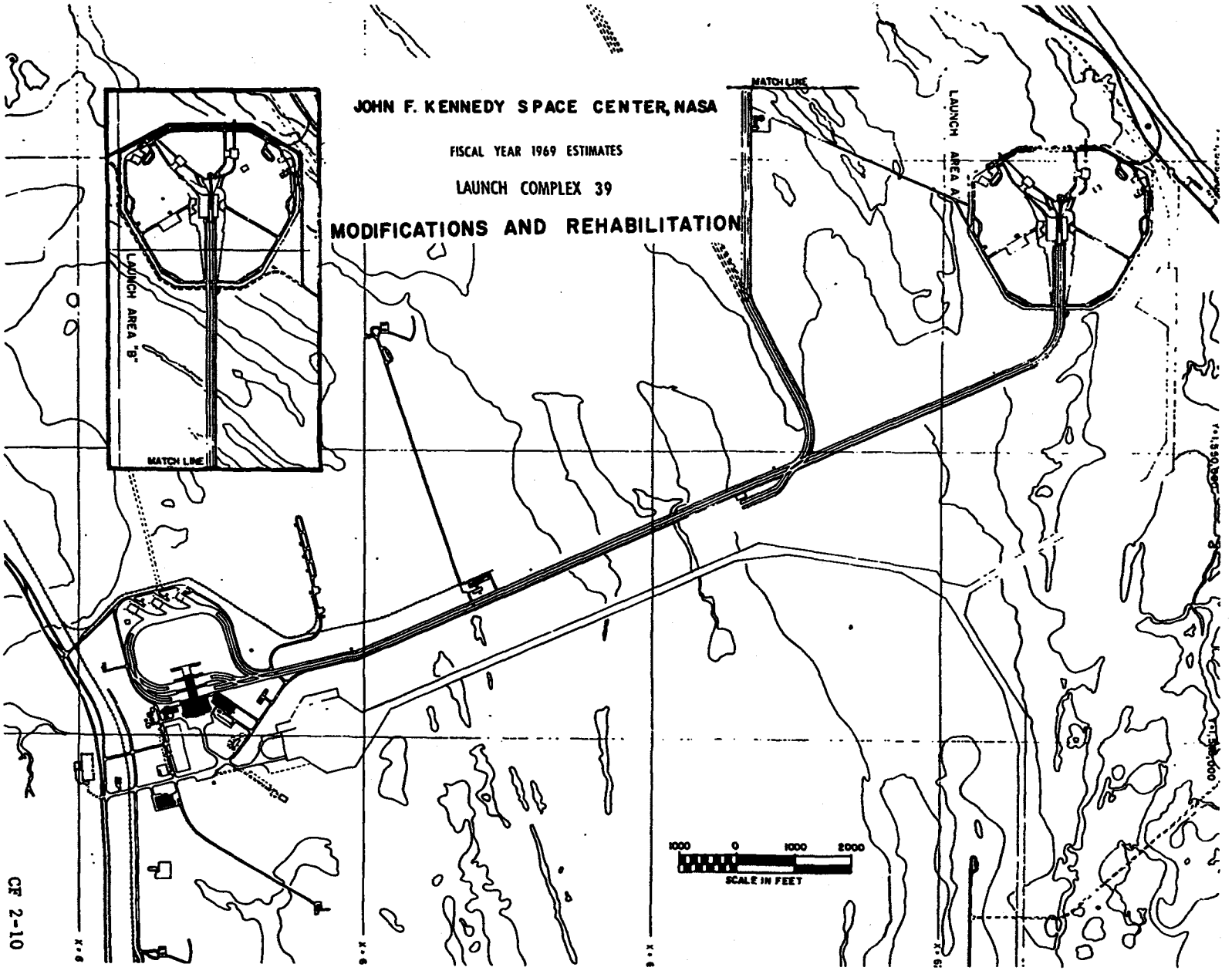
This work is required to maintain Launch Complex 39 in a state of operational readiness for the support of on-going launch programs and to effect such changes as are needed to preclude facility obsolescence. By the FY 1969 time period the combined effects of several launches and exposure of the structures and system to the corrosive environment of the area will have resulted in deterioration of critical systems which will necessitate corrective action. For example, the 42 inch water mains, which provide untreated water to the pad deflectors, are deteriorating due to dissolved sulphur which is present in sufficient quantity to form sulphuric acid which results in a corrosive reaction with the weld metal.

Atmospheric corrosion of the mobile service structure and launch umbilical towers is sufficiently serious to require a continuous spot painting program. However, by FY 1969 a complete sandblasting and repainting operation must

be undertaken to protect inaccessible parts of these structures such as those covered by cabling or ground support equipment. This task necessitates stripping of the cabling and equipment, sandblasting the structure to remove corrosion and rust from the parent metal, and finally the repainting of all surfaces and replacement of all cabling and equipment. It is also anticipated that replacement or extensive repair will be necessary to such peripheral equipment as pedestals, deflectors, and cabling systems due to the combined effect of exhaust products from launches and the salt laden atmosphere.

Modification will be necessary to optimize the capability of the complex to support continuing programs. A typical example of such work is the extension of the high pressure gas purge system throughout the launch pad area. Originally the purge system was planned as a deterrent against the intrusion of hazardous gases. However, it has since been found that the purge gas can also protect ground service equipment (GSE) components, such as motors and pumps, from the corrosive effects of the salt atmosphere of the area. The system will therefore be extended to provide a purge capability throughout the pad area. Another proposed modification falling in this category will include enlargement and enclosure of mobile service structure platforms no. 3 and 4 to provide increased space for essential additional spacecraft GSE.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: It is estimated that $5,000,000 to $10,000,000 will be required on a yearly basis for rehabilitation, modifications and new construction dictated by deterioration and specific test requirements.


JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1969 ESTIMATES
LAUNCH COMPLEX 39
MODIFICATIONS AND REHABILITATION
LAUNCH AREA "B"
MATCH LINE
MATCH LINE
LAUNCH AREA A
1000 0 1000 2000
SCALE IN FEET

CF 2-10

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

UTILITY INSTALLATIONS

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Rehabilitation, Alteration and Extension

FUNDING:

FY 1968 and Prior Years	$65,125,058
FY 1969 Estimate	2,521,000
Total Funding Through FY 1969	$67,646,058

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$1,400,000
Banana River barge channel				890,000
Dredging	Cu. Yd.	(1,740,000)	($0.50)	(870,000)
Dolphins	Each	(5)	(4,000)	(20,000)
High temperature hot water system	LS	---	510,000	510,000
Equipment				$1,121,000
Extension to communication systems	LS	---	1,121,000	1,121,000

	Unit of Measure	Quantity	Unit Cost	Total Cost
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$2,521,000

PROJECT PURPOSE:

To provide for improvements to the Banana River barge channel, rehabilitation of the high temperature hot water distribution system, and extensions to the communication systems.

PROJECT DESCRIPTION:

This project provides for the following modifications and/or rehabilitations:

Improvements to Banana River Barge Channel - Dredging the 15 mile long Banana River barge channel from a point west of the Port Canaveral locks to the Saturn IB dock and the Vehicle Assembly Building (VAB) turning basin, from the present design depth of 10 feet to a new depth of 12 feet. In addition, a 12 foot deep mooring area will be dredged adjacent to the channel near the Port Canaveral locks, and 5 mooring dolphins will be installed.

Rehabilitation of High Temperature Hot Water System - Replacement of approximately 12,000 linear feet of supply and return piping in portions of the existing high temperature hot water distribution system which serves facilities in the Merritt Island industrial area. Also included are modifications to manholes and the installation of additional valves and by-pass lines.

Extension to the Communication Systems - Installation of additional communication and instrumentation circuits to support program requirements in the FY 1969 time frame. These additions will include audio circuits, video circuits, and wideband transmission and receiving terminal units between the Central Telephone Office, Launch Complex 39 and the Industrial Area.

PROJECT JUSTIFICATION:

Improvement to Banana River Barge Channel - The design depth of the Banana River channel is currently only ten feet. This depth is inadequate for safe navigation since normal silting action has caused the barges,

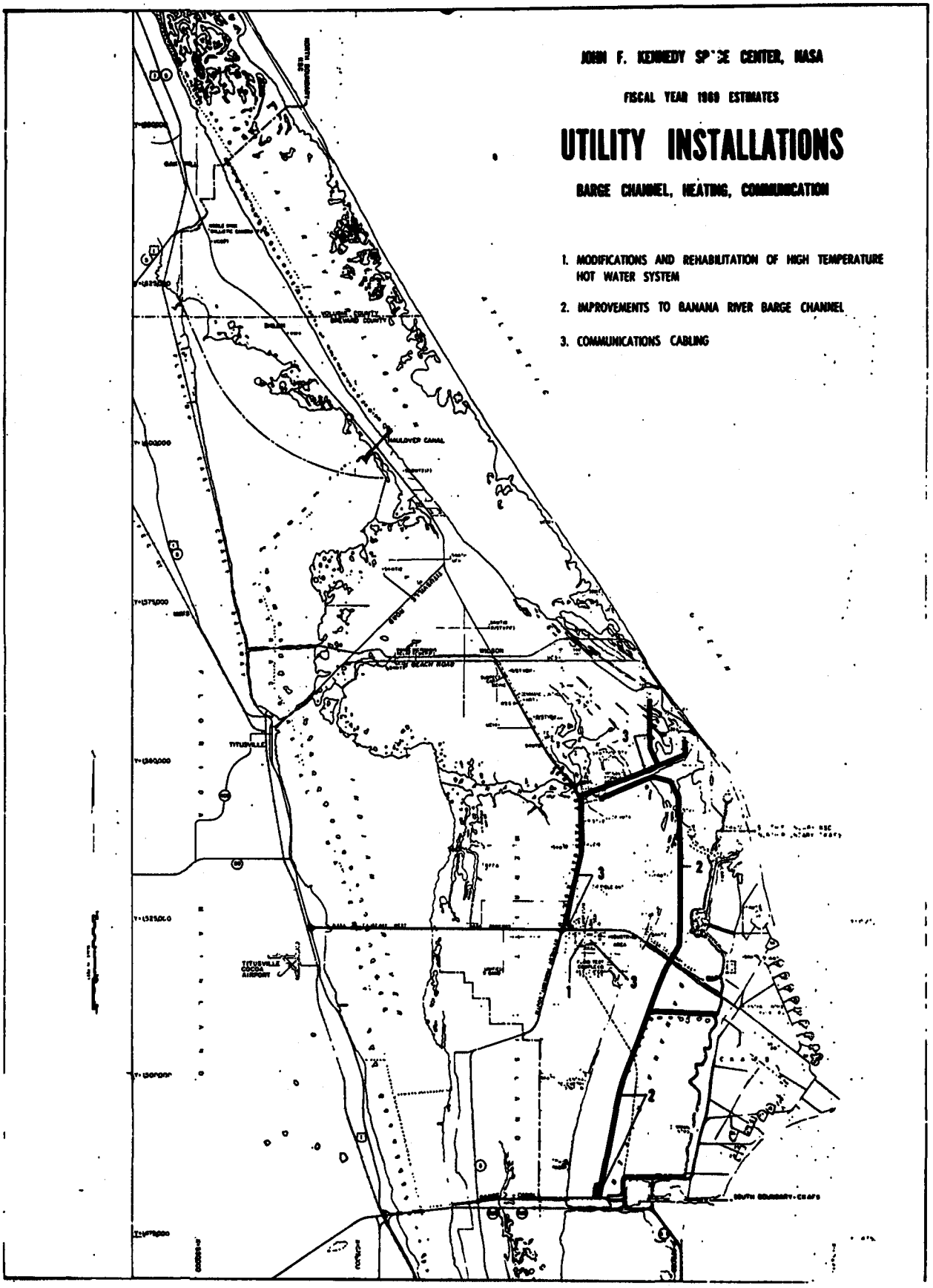
carrying multi-million dollar launch vehicle stages, to scrape bottom with resulting physical damage. By dredging the channel to a depth of twelve feet, these problems will be eliminated. The depth of ten feet corresponded to the original depth of the connecting intracoastal waterway system. However, similar problems with the intracoastal waterway resulted in dredging of this waterway to 12 feet in order to assure safe navigation. Therefore, the 12 foot depth of the Banana River barge channel will be compatible with the connecting waterway.

The mooring area is required to assure the availability of safe barge mooring facilities in the Port Canaveral area at all times. The barge channel is not always navigable since it is not marked for night operations and there are times when the weather will not permit safe passage. It is, therefore, necessary to provide a NASA owned mooring capability in the lock area since it is not possible to schedule the arrival of barges to coincide with the availability of existing harbor facilities at Port Canaveral. This will preclude the necessity of anchoring at sea with the attendant risks of such action.

Rehabilitation of High Temperature Hot Water System - The existing high temperature hot water system was installed in 1963 to provide heat and critical humidity control to facilities in the Merritt Island Industrial Area. During the past year a number of leaks have been encountered indicating a corrosive condition in the underground portions of the system which results in a breakdown of the pipe and its protective external casing. While normal repair can handle the present breakdowns, the increasing number of leaks dictates the initiation of a replacement program for parts of the system during the FY 1969 period. Installation of valves and by-pass lines will provide greater flexibility in the system. Manholes will require modification to adapt to the improved piping system.

Extension to Communication Systems - Additional audio and wideband circuits and terminals are required to meet the increased requirements for real-time data which will be generated by the continuing launch programs during the FY 1969 time period. These requirements are based on the need to support near simultaneous major tests for a Saturn IB on the launch pad, a Saturn V in the VAB and an additional Saturn V at the launch pad. Based on current schedules launch vehicle activity in this time frame exceeds the current capacity of communication systems. Experience has shown that the existing communication network can support current requirements but the network does not possess the capacity to handle the increased load which will be generated by concurrent operations. Additional wide band circuitry must be provided between the Central Telephone Office and the VAB, Repeater Building, Central Instrumentation Facility and other Industrial Area facilities to satisfy the above requirements. Additional audio capability is also required at Pads A and B.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: It is anticipated that additional funds will be required for utilities and center development to support any new mission or future construction program.


JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1969 ESTIMATES
UTILITY INSTALLATIONS
BARGE CHANNEL, HEATING, COMMUNICATION
1. MODIFICATIONS AND REHABILITATION OF HIGH TEMPERATURE HOT WATER SYSTEM
2. IMPROVEMENTS TO BANANA RIVER BARGE CHANNEL
3. COMMUNICATIONS CABLING
TITUSVILLE
MALABAR CANAL
SOUTH BOUNDARY CCAFS

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

LAND ACQUISITION

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

ESTIMATING OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Not applicable

FUNDING:

FY 1968 and Prior Years	$73,413,000
FY 1969 Estimate	3,560,000
Total Funding Through FY 1969	$76,973,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	LS	---	$3,560,000	$3,560,000
Construction	---	---	---	---
Equipment	---	---	---	---
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$3,560,000

PROJECT PURPOSE:

To provide funds required for the completion of land acquisition at the Kennedy Space Center.

PROJECT DESCRIPTION:

An additional $3,560,000 will be required for the payment of judgments resulting from condemnation proceedings associated with land acquisition at the Kennedy Space Center.

PROJECT JUSTIFICATION:

The acquisition of land, now totaling 87,763 acres, at the Kennedy Space Center was authorized through the Fiscal Year 1962 and 1963 Construction of Facilities Programs. During the acquisition process it was indicated that a total of $73,413,000 would be adequate for real estate acquisition, including contingencies. Since then judgments rendered by the courts in condemnation cases have been far in excess of amounts originally deemed reasonable by the Government and placed on deposit with the courts. Sufficient funds are on hand to provide for the payment of all judgments which are scheduled to occur through Fiscal Year 1968. It is expected, however, that 25 tracts totaling 4,029 acres will remain to be settled during Fiscal Year 1969 and succeeding years. A total of $4,201,400 has been placed on deposit with the courts for these tracts as the amount considered reasonable and equitable by the Government appraisers, but based upon experience with cases adjudicated to date, an additional $3,560,000 will be required for settlement.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

ALTERATIONS TO LAUNCH COMPLEX 17

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Space Science and Applications

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Modification and Renovation

FUNDING:

FY 1968 and Prior Years	$6,998,527
FY 1969 Estimate	700,000
Total Funding Through FY 1969	$7,698,527

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$298,000
6,000 psi helium tank	Cu. Ft.	300	$180.00	54,000
6,000 psi nitrogen tank	Cu. Ft.	300	180.00	54,000
High pressure piping	LF	600	80.00	48,000
Pressure regulator, relief and shutoff valves and manifolds	LS	---	88,000	88,000
Tank supports and fragmentation revetments	LS	---	54,000	54,000
Equipment				$402,000
First stage pressurization control and monitor console	LS	---	214,000	214,000

	Unit of Measure	Quantity	Unit Cost	Total Cost
Second stage pressurization control and monitor console modification and calibration	LS	---	$43,000	$43,000
Refurbish and rewire relay rack and junction boxes	LS	---	85,000	85,000
Special interconnecting cable assemblies	LS	---	60,000	60,000
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$700,000

PROJECT PURPOSE:

This project is to provide improved safety and launch complex systems reliability in support of the multi-stage Delta launch vehicle.

PROJECT DESCRIPTION:

Launch Complexes 17A and 17B comprise the entire east coast capability for multi-stage Delta vehicle launches. This project provides for the following rehabilitation and renovation to Launch Complex 17B and the blockhouse control consoles:

High Pressure Helium and Nitrogen Gas System: Includes disassembly relocation, reassembly and replacement of various components of the existing high pressure gas system. The new location will be approximately 800 feet east of the present location, between launch pads A and B and adjacent to the existing low pressure nitrogen system. New valves, manifolds, and controls will be replaced as needed to meet safety standards. The high (6,000 psi) pressure vessels will be installed on a new 35' x 75' concrete pad, protected by fragmentation revetments.

Composite Pneumatic Control and Distribution System: A new first stage pressurization control and monitor console will be provided for the Launch Complex 17B side of the blockhouse to be compatible with the pneumatic console at the launch pad which is used to remotely control and monitor the valves and pressure regulators controlling the loading of the propellants and pressurants. The second stage pressurization

control console also located in the blockhouse will be modified by the replacement of meters, switches, and internal rewiring. Special blockhouse and service structure cable assemblies will be replaced.

PROJECT JUSTIFICATION:

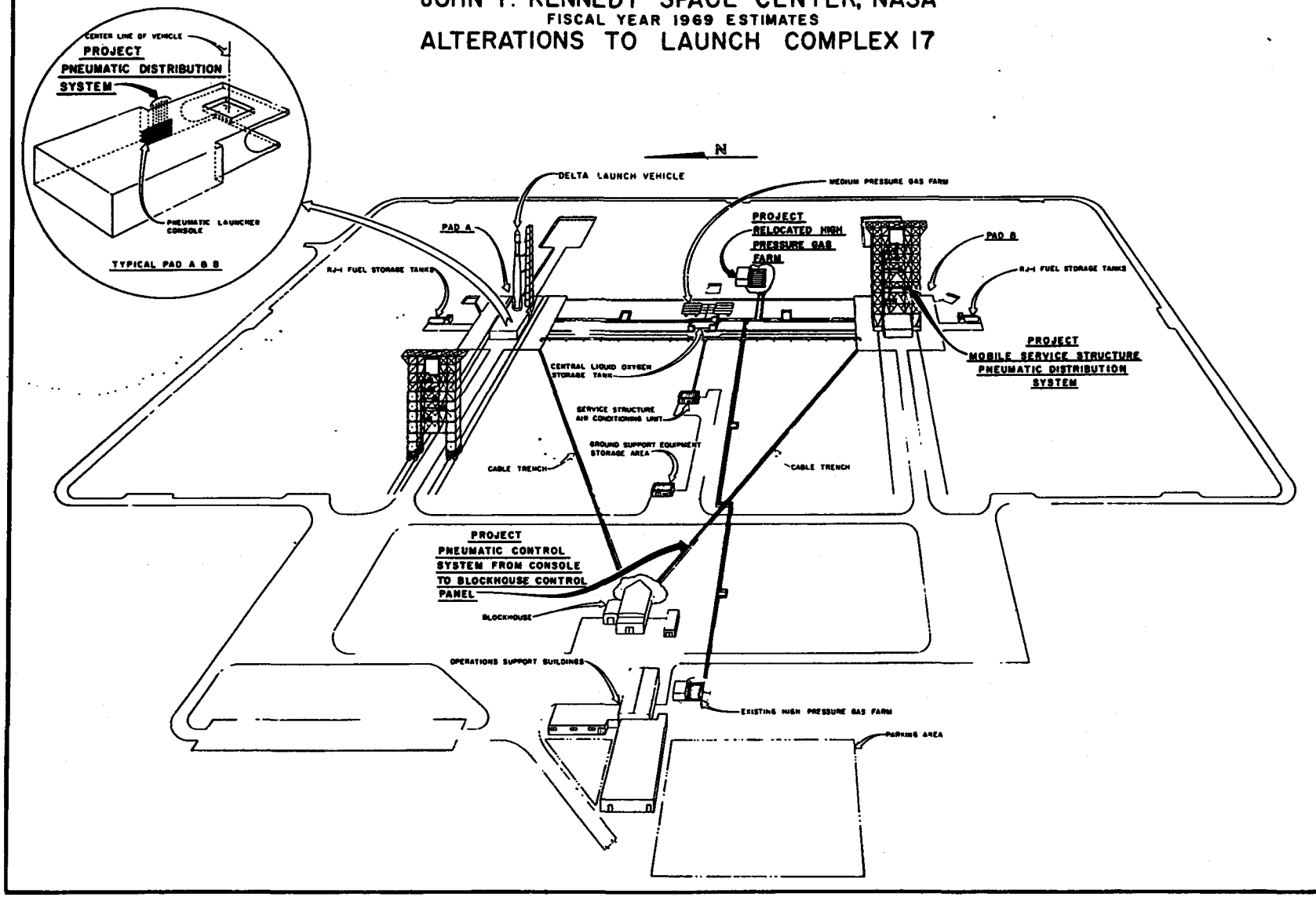
Relocation and Improvement of High Pressure Gas System: The present high pressure gas system constitutes a safety hazard due to the antiquated components and the present location, which is adjacent to the complex operations building. The new location will be at sufficient distance from major work areas to reduce most personnel hazards in the event of a component or systems rupture.

Composite Pneumatic Distribution and Control Systems: Changes in manufacturing technique and improved technology for valves, solenoids, and components combined with the nonavailability of replacement parts make selective correction to the existing distribution and control systems impractical. Complete replacement of the existing unreliable systems is the only alternative for correcting the current problems.

In the present blockhouse configuration, the first stage pressurization control console is separated from the monitoring console. Thus, two operators are required and real time control is delayed when anomalies occur during fueling and tank pressurization operations. The new console will combine these control and monitoring functions under a single operator.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: $500,000

JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1969 ESTIMATES
ALTERATIONS TO LAUNCH COMPLEX 17



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

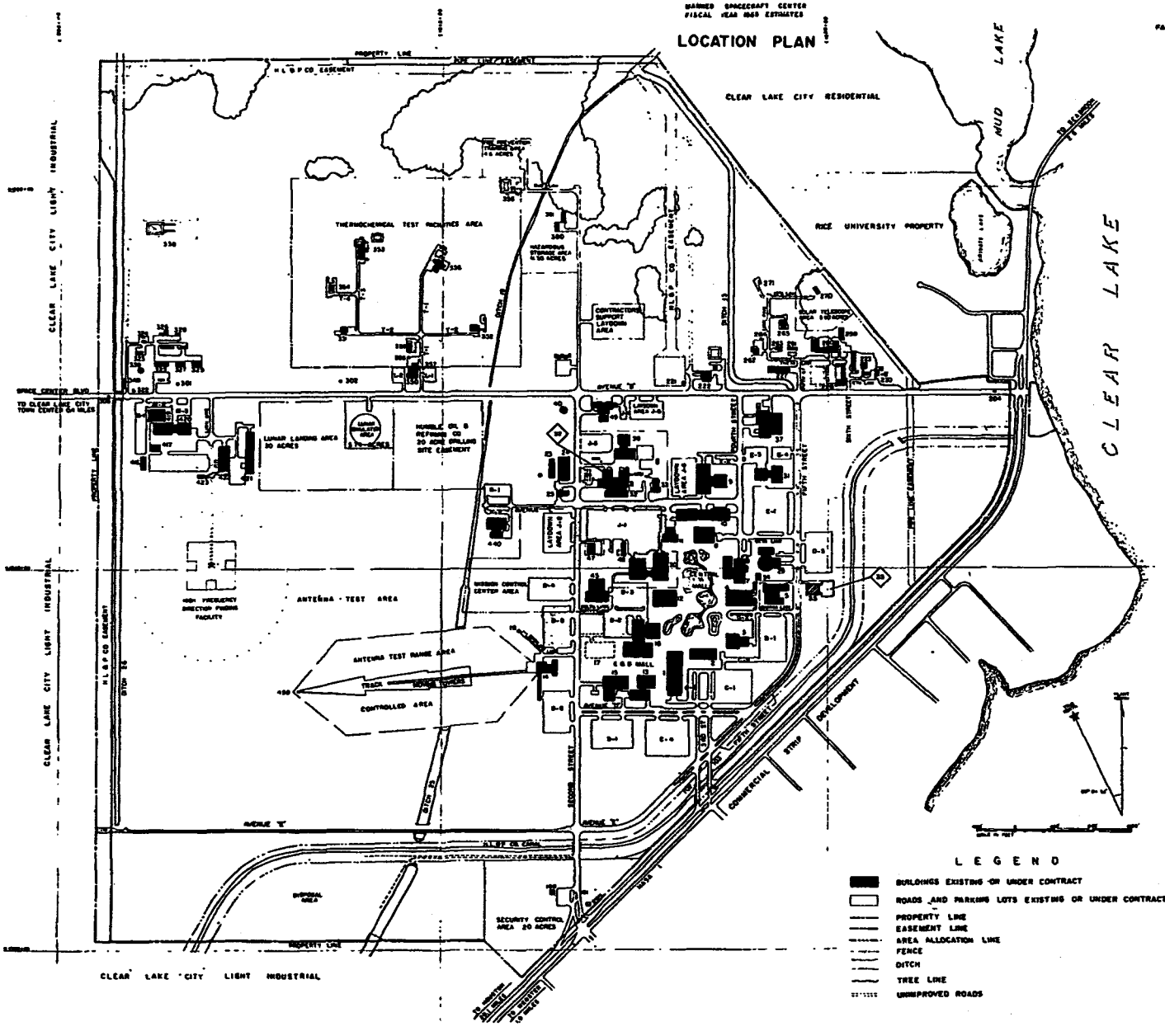
CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

MANNED SPACECRAFT CENTER

MANNED SPACECRAFT CENTER
FISCAL YEAR 1969 ESTIMATES

LOCATION PLAN



LEGEND

- BUILDINGS EXISTING OR UNDER CONTRACT
- ROADS AND PARKING LOTS EXISTING OR UNDER CONTRACT
- PROPERTY LINE
- EASEMENT LINE
- AREA ALLOCATION LINE
- FENCE
- DITCH
- TREE LINE
- UNIMPROVED ROADS

FACILITY INDEX

FACILITY NO.	FACILITY TITLE	FUNDING YEAR
1	AUDITORIUM	65
2	PROJECT MANAGEMENT BUILDING	65
3	CENTRAL CAFETERIA	65
4	FLIGHT OPERATIONS OFFICE	65
5	ORBITER SIMULATOR AND TRAINING FACILITY	65
7	LIFE SYSTEMS LABORATORY	65,66
8	TECHNICAL SERVICES OFFICE	65
9	TECHNICAL SERVICES FACILITY	65
10	TECHNICAL SERVICES SHOP	65
11	BRANCH CAFETERIA	65
12	CENTRAL DATA OFFICE	65
13	SYSTEMS EVALUATION LABORATORY	65
14	ANECHOIC CHAMBER TEST FACILITY	65
15	INSTRUMENTATION AND ELECTRONIC SYSTEMS LABORATORY	65
16	SPACECRAFT RESEARCH OFFICE AND LABORATORY	65,66
20	LEW GORESIGHT RANGE CONTROL BUILDING	64
24	CENTRAL HEATING AND COOLING PLANT	65,65,66,69
25	FIRE STATION	65
29	FLIGHT ACCELERATION FACILITY	65
30	MISSION CONTROL CENTER-HOUSTON	65
31	LUNAR MISSION AND SPACE EXPLORATION FACILITY	65
32	SPACE ENVIRONMENT SIMULATION LABORATORY	66,68
33	ULTRA HIGH VACUUM SPACE CHAMBER FACILITY	64
34	FLIGHT ACCELERATION MOTOR-GENERATOR BUILDING	65
35	FLIGHT CREW TRAINING FACILITY	65
36	CONTRACTOR SUPPORT FACILITY	65
37	LUNAR RECEIVING LABORATORY	67
40	ELEVATED WATER TANK	65
45	PROJECT ENGINEERING FACILITY	64,65
47	SOUTHWESTERN BELL TELEPHONE BUILDING	65
48	EMERGENCY POWER BUILDING (MCC-H)	65
49	VIBRATION AND ACOUSTIC TEST FACILITY	64
100	SECURITY CONTROL CENTER	65
101	GUARDHOUSE	65
102	GUARDHOUSE	65
103	GUARDHOUSE	65
104	GUARDHOUSE	65
221	ELECTRICAL SUBSTATION	65
222	ATMOS. RE-ENTRY MAT. & STRUCTURES EVAL. FACILITY	64
225	SEWAGE TREATMENT PLANT	63,64
226	SERVICE CONTRACTORS COMPLEX	65,66
227	PRINTING AND REPRODUCTION FACILITY	65
230	CREW SYSTEMS BIOLOGICAL FACILITY	64
250	EQUIPMENT STORAGE BUILDING	66
260	TRANSLATION AND DOCKING FACILITY	65
261	RADIOLOGICAL CALIBRATION AND WASTE STORAGE FACILITY	65
262	ARC JET, RADIANT HEATING AND WASTE STORAGE FACILITY	65
263	HEALTH PHYSICS LABORATORY	66
264	BIOLOGICAL INCINERATOR	66
265	RADIATION AND FIELDS ACCELERATOR LABORATORY	66
270	SOLAR TELESCOPE FACILITY	65
271	SOLAR RADIO TELESCOPE FACILITY	65
301	WATER WELL NO. 1	65
302	WATER WELL NO. 2	65
303	GUARDHOUSE	65
310	WATER TREATMENT	65
323	FILTER CLEANING AND STORAGE FACILITY	65
324	CLASSIFIED WASTE INCINERATOR FACILITY	65
325	MAINTENANCE SHOP FACILITY	65
326	ROADS AND GROUNDS EQUIPMENT MAINTENANCE FACILITY	65
327	MSC WORK CONTROL CENTER	65
328	ROADS AND GROUNDS MATERIALS STORAGE FACILITY	66
329	WAREHOUSE FACILITY	66
330	WATER-LAND IMPACT TEST FACILITY	66
339	GROUND WATER STORAGE TANK	66
340	GAS METERING STATION	66
350	THERMOCHEMICAL TEST FACILITY	65
351	THERMOCHEMICAL SPACE CHAMBER FACILITY	65
352	ELECTRO EXPLOSIVE DEVICES FACILITY	65
353	REACTION CONTROL TEST FACILITY	65
354	SPACE POWER SYSTEMS TEST FACILITY	65
355	COMPONENTS TEST FACILITY	65
357	THERMOCHEMICAL TEST AREA GATE HOUSE	65
358	THERMOCHEMICAL SEWAGE TREATMENT FACILITY	65
359	THERMOCHEMICAL EQUIPMENT STORAGE FACILITY	66
360	HAZARDOUS MATERIAL STORAGE FACILITY	66
361	CENTRAL GAS CYLINDER STORAGE FACILITY	66
416	INTERIM OFFICE SUPPORT FACILITY	65
417	GARAGE	65
419	SUPPORT OFFICE	65
420	SUPPORT SHOP AND WAREHOUSE	65
421	MISSION SUPPORT WAREHOUSE	65
422	LOGISTIC SUPPORT WAREHOUSE	65
423	ASCATS INTERIM FACILITY	65
440	ELECTRONIC SYSTEMS COMPATIBILITY FACILITY	65
450	ANTENNA SERVICE BUILDING AND TOWER	64

FACILITIES AUTHORIZED & UNDER CONSTRUCTION

38 FLIGHT CREW TRAINING FACILITY

PROPOSED FISCAL YEAR 1969 PROJECTS

32 MODIFICATIONS TO THE ENVIRONMENTAL TESTING LAB
38 ADDITION TO FLIGHT CREW TRAINING FACILITY

CF 3-1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 19 69 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION		COGNIZANT PROGRAM OFFICE FOR INSTALLATION
Manned Spacecraft Center		Manned Space Flight
LOCATION OF INSTALLATION	**COUNTY**	**NEAREST CITY**
Houston, Texas	Harris	Houston, Texas

INSTALLATION MISSION

The Manned Spacecraft Center has as its primary mission the development of spacecraft for manned space flight programs. The Center is also responsible for manned space flight operations, conduct of astronaut training, and the earth resources program.

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 19 59 THRU CURRENT YR	FY 19 69 (Estimated)	FUTURE YEARS (Estimated)	TOTAL ALL YEARS (Estimated)
Modifications to the Environmental Testing Laboratory	MSF	48,229	1,500		49,729
Addition to the Flight Crew Training Facility	MSF	1,235	1,600		2,835
ALL OTHER PROJECTS		44,057			
TOTALS		93,521	3,100		

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

MODIFICATIONS TO THE ENVIRONMENTAL TESTING LABORATORY

AUTHORIZATION LINE ITEM: Manned Spacecraft Center

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Houston, Harris County, Texas

COGNIZANT NASA INSTALLATION: Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: Modification

FUNDING:

FY 1968 and Prior Years	$48,228,500
FY 1969 Estimate	1,500,000
Total Funding Through FY 1969	$49,728,500

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction	---	---	---	---
Equipment				$1,500,000
Vacuum systems	LS	---	$545,000	545,000
Electrical power systems	LS	---	560,000	560,000
Manned qualification systems	LS	---	245,000	245,000
Instrumentation and data acquisition systems	LS	---	150,000	150,000
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$1,500,000

PROJECT PURPOSE:

To provide the necessary modifications and additions to improve the manned rated capability and operational efficiency and effectiveness of the Environmental Testing Laboratory.

PROJECT DESCRIPTION:

The project will provide for modifications and additions to various systems associated with the vacuum chambers which are located in the Environmental Testing Laboratory. Specifically, the project involves major work in the following areas:

Vacuum Systems - Repair and/or replacement of worn pumps, valves, piping and related systems as well as installation of additional equipment to increase vacuum pumping efficiency.

Electrical Power Systems - Installation of emergency power equipment and associated switching arrangements to assure continuous power to critical tests.

Manned Qualification Systems - Installation and modification of environmental control systems, biomedical monitoring equipment, and the chamber ingress/egress system to provide the necessary support and safety features for more complex manned operations.

Instrumentation and Data Acquisition Systems - Installation and replacement of equipment to increase the quality of test data and provide sufficient capability to satisfy more complex test programs.

PROJECT JUSTIFICATION:

This project is required to upgrade the environmental chamber systems in order to maintain a high level of operating efficiency and reliability and to keep pace with test requirements.

The Apollo Applications Program (AAP) will involve the development of a long duration operational capability under two concepts not previously demonstrated in manned space flight. The first is that of open-ended, long duration missions which will continue as long as no major flight hardware problems arise and sufficient expendables remain. The second concept is that of resupply, revisitation and reuse of multi-module assemblies left in orbit. The test of hardware in support of these concepts will require that the long duration operational potential of such hardware be established as rapidly and economically as technology will permit. Validation of hardware capabilities to meet AAP open-ended missions will require extensive use of systems engineering analysis and evaluation of previous test results. However, ground test programs must also be accomplished to assure appropriate

levels of confidence in achieving primary mission objectives and maintaining crew safety. In order to achieve these confidence levels, long duration thermal vacuum testing must be accomplished.

The thermal vacuum tests for AAP are required to demonstrate space hardware operation and man/machine performance under normal and emergency modes during simulated phases of the space mission; to determine thermal modes and provide baseline data for hardware development; and to determine thermal response and performance characteristics of structures, systems, and subsystems in a simulated space environment. Such testing must be accomplished on all new hardware which has not been previously ground or flight tested, and on hardware tested in previous programs in order to qualify it for long duration AAP requirements.

The AAP payload will have several new modules added to the basic Apollo such as the Apollo Telescope Mount, Multiple Docking Adapter, Air Lock and Orbital Workshop. The standard Block II Apollo Command Service Module (CSM) configuration and the Apollo Lunar Module Ascent Stage will also be modified to meet new requirements. Examples of some of the associated systems which must be validated to meet AAP open-ended missions are: two-gas activation control system to pressurize the S-IVB work-shop, and an environmental conditioning system for the Air Lock/Multiple Docking Adapter and the S-IVB Workshop; power distribution system for receiving power supplied by CSM fuel cells and the S-IVB Workshop; controls and displays for operation of Apollo Telescope Mount experiments and support subsystems.

The heat loads experienced with recent testing in the environmental chamber have established that additional helium refrigeration capacity is required for the cryogenic pumping system in order to provide adequate redundancy in the event of failure of an existing refrigeration unit. The additional unit will also prevent contamination of the chamber due to the uncontrolled reentry of cryogenically deposited material in the chamber which can result in lengthy and costly test aborts. Since the chamber will have operated over 1,500 hours without major rehabilitation, certain components of the vacuum systems must be repaired or replaced to maintain operating efficiency.

The emergency power system must be expanded to include additional critical loads such as for helium refrigeration, data handling systems, air handling and chilled water systems, and compressed air units so that a test will not have to be aborted in the event of a power failure. Additional transformers must also be installed to provide adequate redundancy for the primary electrical power system. To date failure has been experienced in four of the eight existing transformers which dictates the installation of redundant equipment.

With respect to the manned qualification systems, environmental control systems to provide the two gas environment must be installed as well as

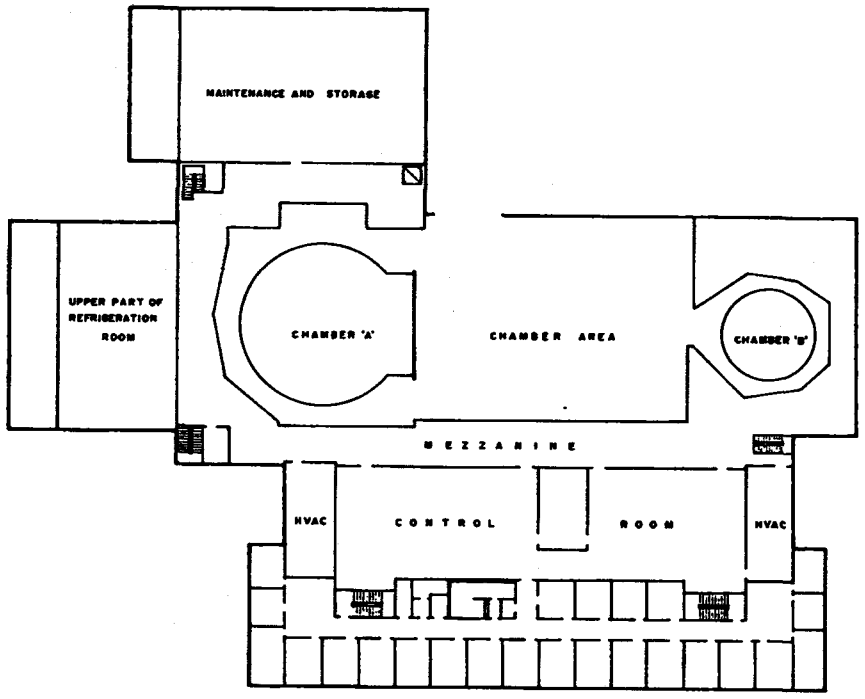
improved and larger capacity crew life support systems for longer duration testing. For safety reasons, the existing ingress/egress chamber must be modified to provide the proper interface with the new modules being tested. Adequate biomedical and life support systems must also be provided to insure the safety of the chamber occupants.

The instrumentation systems and data acquisition system consist of computers and items necessary to accept the outputs from computers and issue data in a format compatible with the spacecraft and ground support equipment. Testing new spacecraft hardware will involve an amount of test data which will exceed the handling capability of existing equipment. Therefore, modifications to existing computer systems and additional information channels must be provided.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: Due to the complex and sophisticated nature of this facility, $1,000,000 to $2,000,000 will be required on a yearly basis to retain present capabilities and incorporate technological advances.

MANNED SPACECRAFT CENTER
FISCAL YEAR 1969 ESTIMATES

MODIFICATIONS TO THE ENVIRONMENTAL TESTING LABORATORY



FLOOR PLAN

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

ADDITION TO THE FLIGHT CREW TRAINING FACILITY

AUTHORIZATION LINE ITEM: Manned Spacecraft Center

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Houston, Harris County, Texas

COGNIZANT NASA INSTALLATION: Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: Addition

FUNDING:

FY 1968 and Prior Years	$1,235,000
FY 1969 Estimate	1,600,000
Total Funding Through FY 1969	$2,835,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$1,135,000
Site preparation	LS	---	30,000	30,000
Utilities	LS	---	23,000	23,000
Building addition	Sq. Ft.	32,000	28.50	912,000
Air handling system	LS	---	90,000	90,000
Bridge cranes	LS	---	80,000	80,000
Equipment				$455,000
Neutral buoyancy test tank and support systems	LS	---	350,000	350,000
Instrumentation	LS	---	75,000	75,000
Medical equipment	LS	---	30,000	30,000

	Unit of Measure	Quantity	Unit Cost	Total Cost
Design	---	---	---	---
Fallout Shelter	---	---	---	10,000
		TOTAL		$1,600,000

PROJECT PURPOSE:

To provide a zero gravity environment for astronaut crew training, development of spacecraft and operational procedures, and the evaluation of extravehicular activity tasks and devices.

PROJECT DESCRIPTION:

This project provides for the construction and outfitting of a 32,000 square foot, high bay laboratory addition to the Flight Crew Training Facility. The structure will have a steel frame with precast concrete wall panels. All utilities will be extended from the existing building, and paved access areas will be provided.

The key element of the project is a 60 foot diameter neutral buoyancy water test tank with a height of 30 feet, which will be used to simulate the zero gravity environment needed for astronaut training, and engineering and development activities. Support space for maintenance, spacecraft mock-ups, control room, and storage for diving gear and equipment, will also be included.

The project will provide all necessary support equipment such as water treatment facilities, special lighting, photographic equipment, access platforms, communication systems, and medical equipment.

PROJECT JUSTIFICATION:

During early Gemini extravehicular flights, it became apparent that the methods used for training astronauts in tasks to be performed in a zero gravity environment were not adequate. It was determined that a facility was required which could provide a capability to simulate a zero gravity environment for long duration activities associated with extravehicular crew training, development of operational procedures, and evaluation of spacecraft hardware and equipment arrangements. Subsequent studies indicated that by operating with the astronauts and flight hardware immersed in water, a neutral buoyancy condition could be achieved that realistically simulates a zero gravity condition. In order to meet the time critical needs of the Gemini and early Apollo programs, outdoor swimming pools and a small tank at MSC were used to meet specific tasks which required early solution. However, outdoor swimming pools do not provide the depth, protected environment, or support facilities required to conduct a comprehensive and

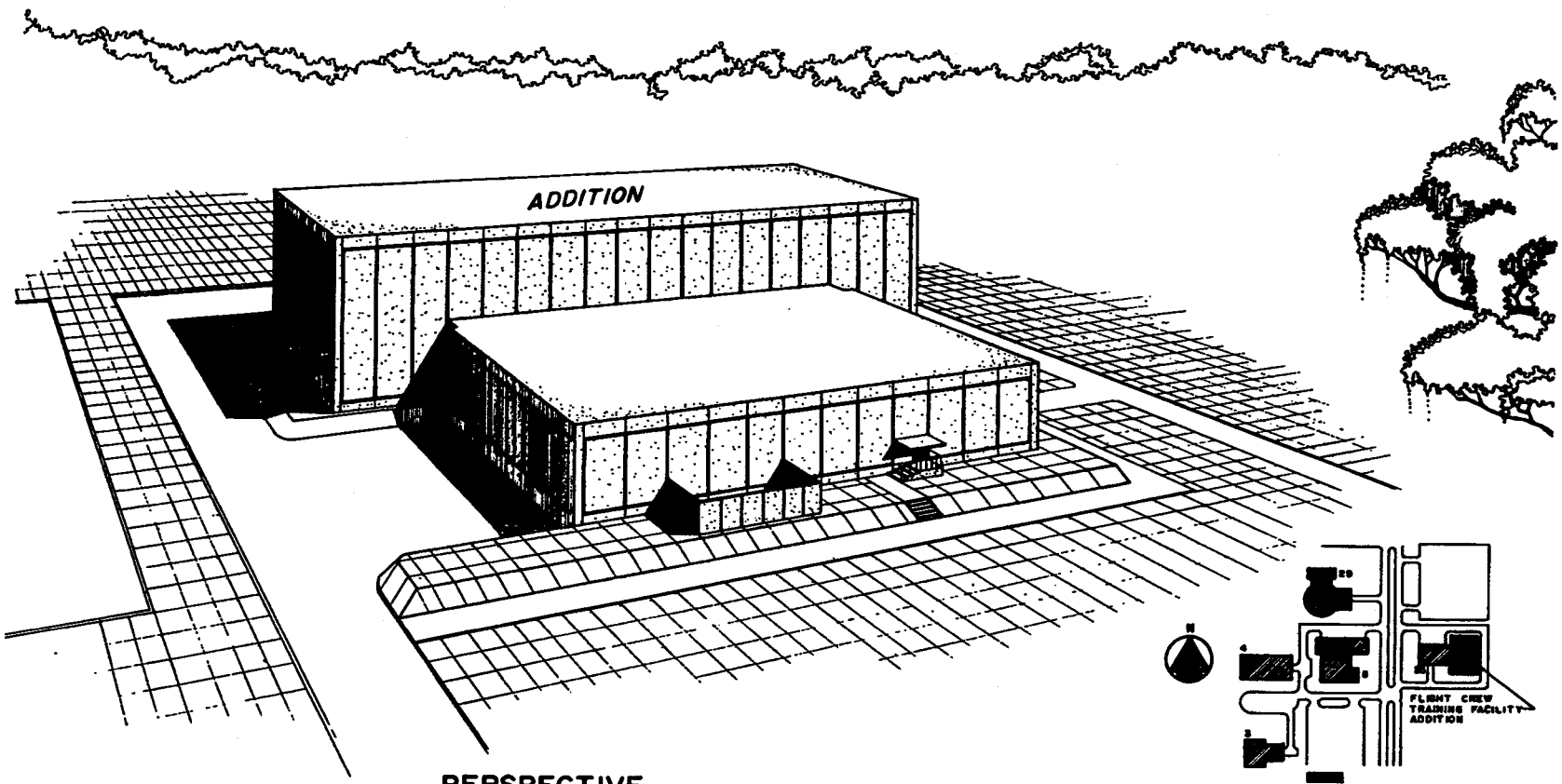
controlled test program. Also, the existing tank will not accommodate the larger sized spacecraft modules required for the test and training programs which will be conducted in support of future missions.

Future missions will involve a variety of spacecraft hardware such as the Air Lock Module, Apollo Telescope Mount, and Orbital Workshop which will be integrated with the modified Apollo Command Service Module and Lunar Module assent stage through the Multiple Docking Adapter. The activation and operation of such an integrated spacecraft will require extensive extravehicular and intravehicular activity involving translation between modules; transfer, assembly, attachment and operation of equipment; and, the retrieval and storage of data. Thus, this facility will provide for astronaut training in crew tasks and evaluation of man-equipment interfaces under a simulated zero gravity environment, and, as a consequence, assure a completely reliable and successful mission.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

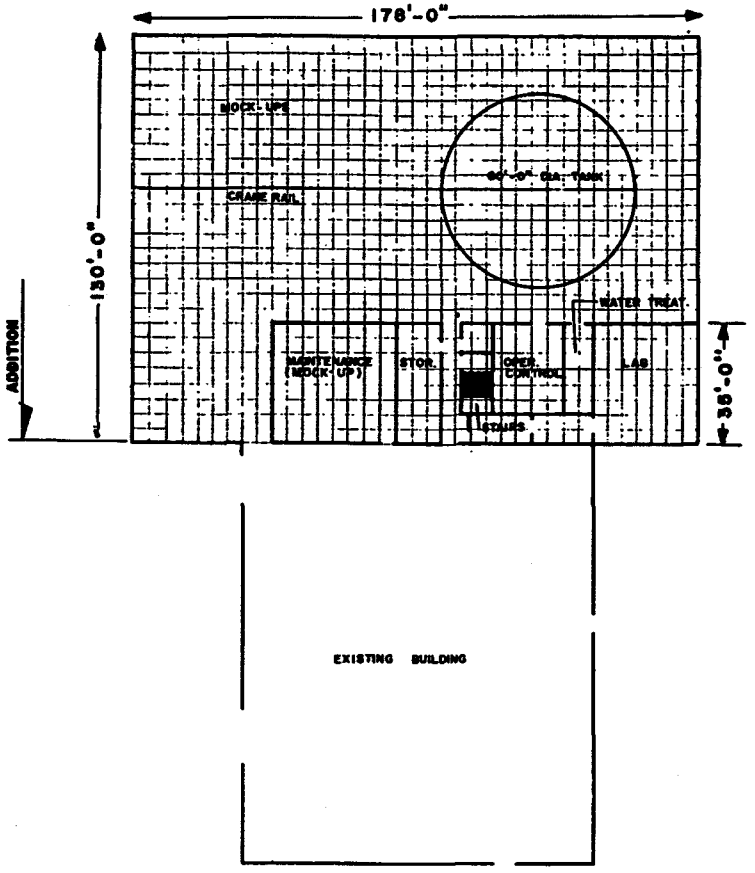
MANNED SPACECRAFT CENTER
FISCAL YEAR 1969 ESTIMATES

ADDITION TO FLIGHT CREW TRAINING FACILITY



MANNED SPACECRAFT CENTER
FISCAL YEAR 1969 ESTIMATES

ADDITION TO FLIGHT CREW TRAINING FACILITY

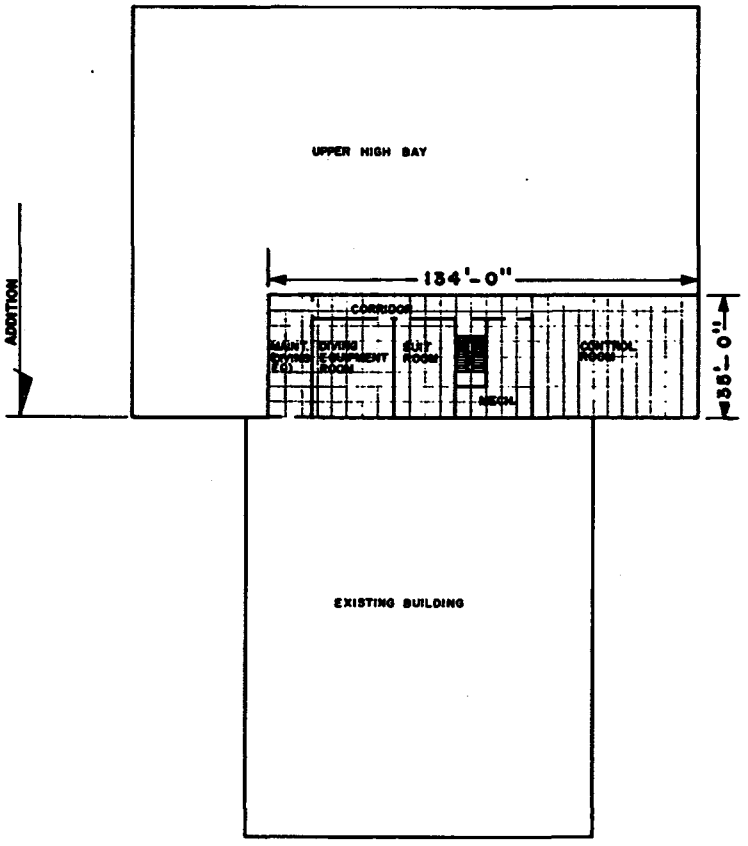


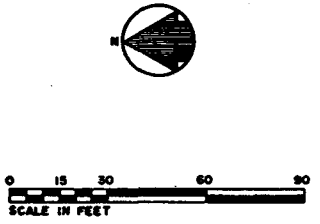
FIRST FLOOR PLAN

CF 3-12

MANNED SPACECRAFT CENTER
FISCAL YEAR 1969 ESTIMATES

ADDITION TO FLIGHT CREW TRAINING FACILITY

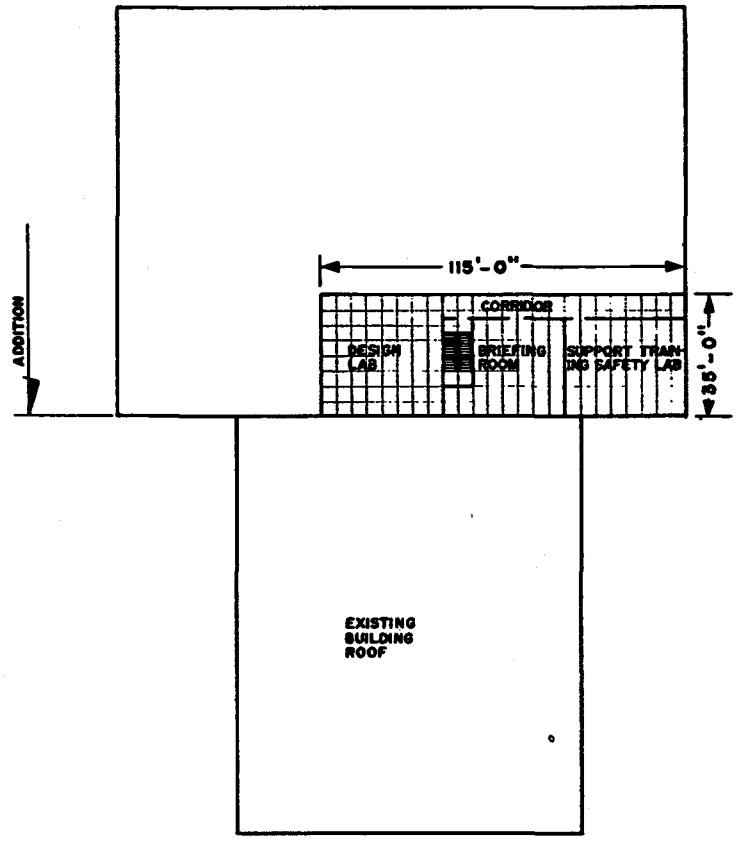




SECOND FLOOR PLAN

MANNED SPACECRAFT CENTER
FISCAL YEAR 1969 ESTIMATES

ADDITION TO FLIGHT CREW TRAINING FACILITY



THIRD FLOOR PLAN

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

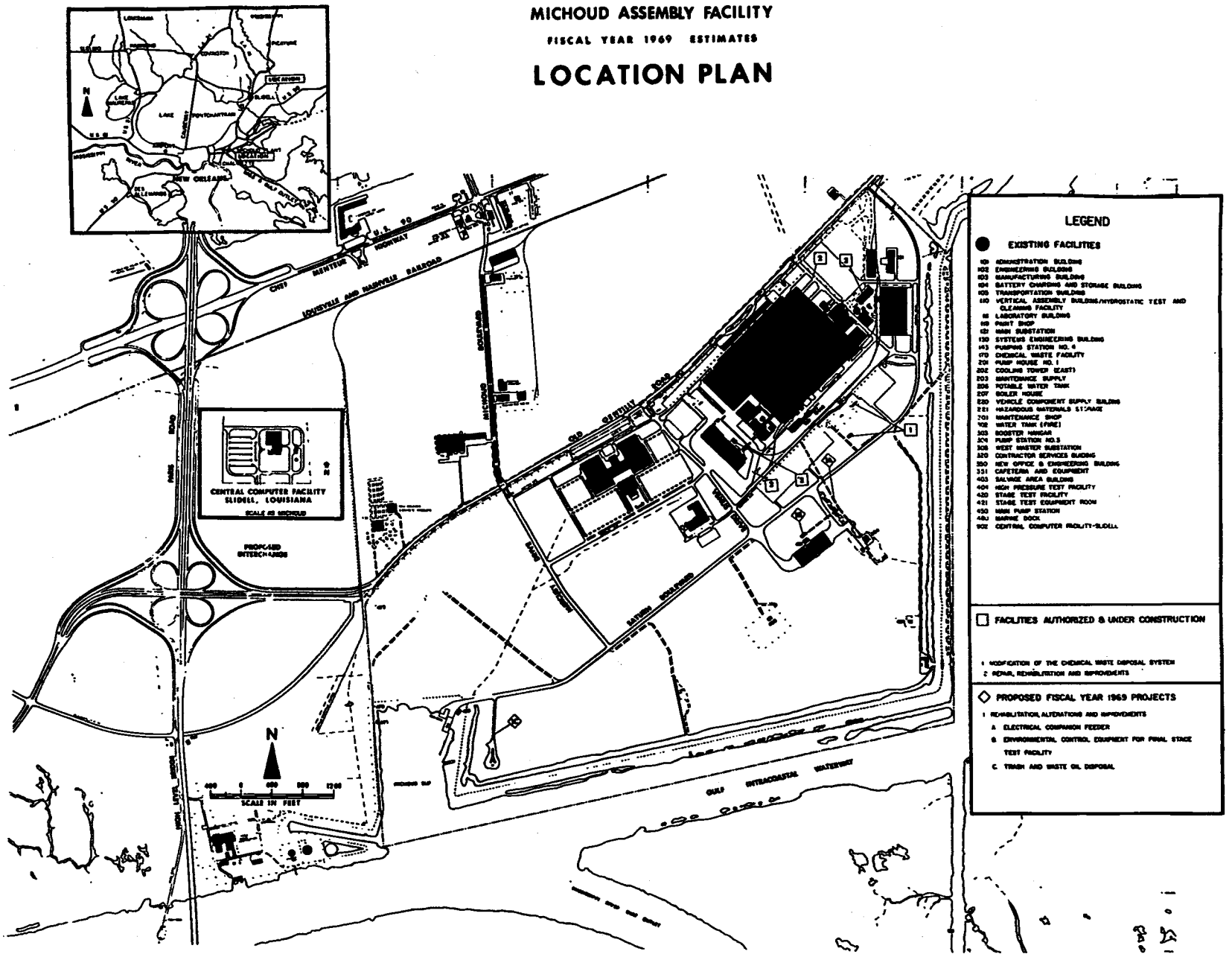
FISCAL YEAR 1969 ESTIMATES

MICHOUD ASSEMBLY FACILITY

MICHOUD ASSEMBLY FACILITY

FISCAL YEAR 1969 ESTIMATES

LOCATION PLAN



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 19 69 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION		COGNIZANT PROGRAM OFFICE FOR INSTALLATION
Michoud Assembly Facility		Manned Space Flight
LOCATION OF INSTALLATION	**COUNTY**	**NEAREST CITY**
New Orleans, Louisiana	Orleans Parish	New Orleans, Louisiana

INSTALLATION MISSION

The mission of the Michoud Assembly Facility is the manufacturing of the first stage booster of the Saturn family of launch vehicles.

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 19 59 THRU CURRENT YR	FY 19 69 (Estimated)	FUTURE YEARS (Estimated)	TOTAL ALL YEARS (Estimated)
Rehabilitation, Alterations and Improvements	MSF	23,887	400		24,287
ALL OTHER PROJECTS		20,120			
TOTALS		44,007	400		

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

REHABILITATION, ALTERATIONS AND IMPROVEMENTS

AUTHORIZATION LINE ITEM: Michoud Assembly Facility

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: New Orleans, Orleans Parish, Louisiana

COGNIZANT NASA INSTALLATION: Marshall Space Flight Center

TYPE OF CONSTRUCTION PROJECT: Rehabilitation and Extensions

FUNDING:

FY 1968 and Prior Years	$23,886,866
FY 1969 Estimate	400,000
Total Funding Through FY 1969	$24,286,866

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$400,000
Electrical companion feeders	LS	---	86,000	86,000
Environmental control system final stage test facility	LS	---	224,000	224,000
Refuse and waste oil disposal system	LS	---	90,000	90,000
Equipment	---	---	---	---
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$400,000

PROJECT PURPOSE:

To provide for rehabilitation, alteration, and improvements of utility systems and equipment at the Michoud Assembly Facility.

PROJECT DESCRIPTION:

This project will provide for alterations and improvements which are necessary for the operation of the plant and the protection of the government investment in this facility. Specific areas of work include:

a. Installation of companion powerlines to preclude power outages at the Final Stage Test Facility and the High Pressure Test Facility.

b. Replacement of the environmental control system serving the Final Stage Test Facility.

c. Installation of an incinerator system for the disposal of refuse and waste oil in accordance with city ordnances.

PROJECT JUSTIFICATION:

The work which will be accomplished is necessary to maintain the plant in effective operational condition and prevent costly work stoppages. The power load requirements for the High Pressure Test Facility have increased steadily over the past four years due to the need to test stage components under higher pressures than originally anticipated. Hence, the power lines serving this facility, and the Final Stage Test Facility, are now undersized and unable to carry the required load. This has resulted in power failures and the consequent disruption of component testing, post-manufacturing checkout, and final post-static checkout of the S-IC stage. To preclude power outages in the future, and to insure continuous operation of these critical facilities, installation of companion power feeders is necessary.

The environmental control system is essential to the final checkout of the S-IC stage which is accomplished in automatic sequence by using computers and equipment that can function only under controlled conditions of temperature and humidity. The environmental control system is also used to free the stage of moisture prior to such tests. During the past two years, the underground steam, condensate and chilled water lines have experienced frequent breaks due to soil settlement and the deterioration of pipe joints and metal casings. This has resulted in disruptions of stage checkout and sequence testing and necessitates a repetition of such tests. Repeating tests is both costly and time consuming. The difficulty associated with locating and correcting line breaks in the normally wet soil also contributes to the time lost. In order to insure against work

shutdowns in the S-IC area and to eliminate the need for costly maintenance of underground lines, a separate environmental control system will be installed to serve this facility.

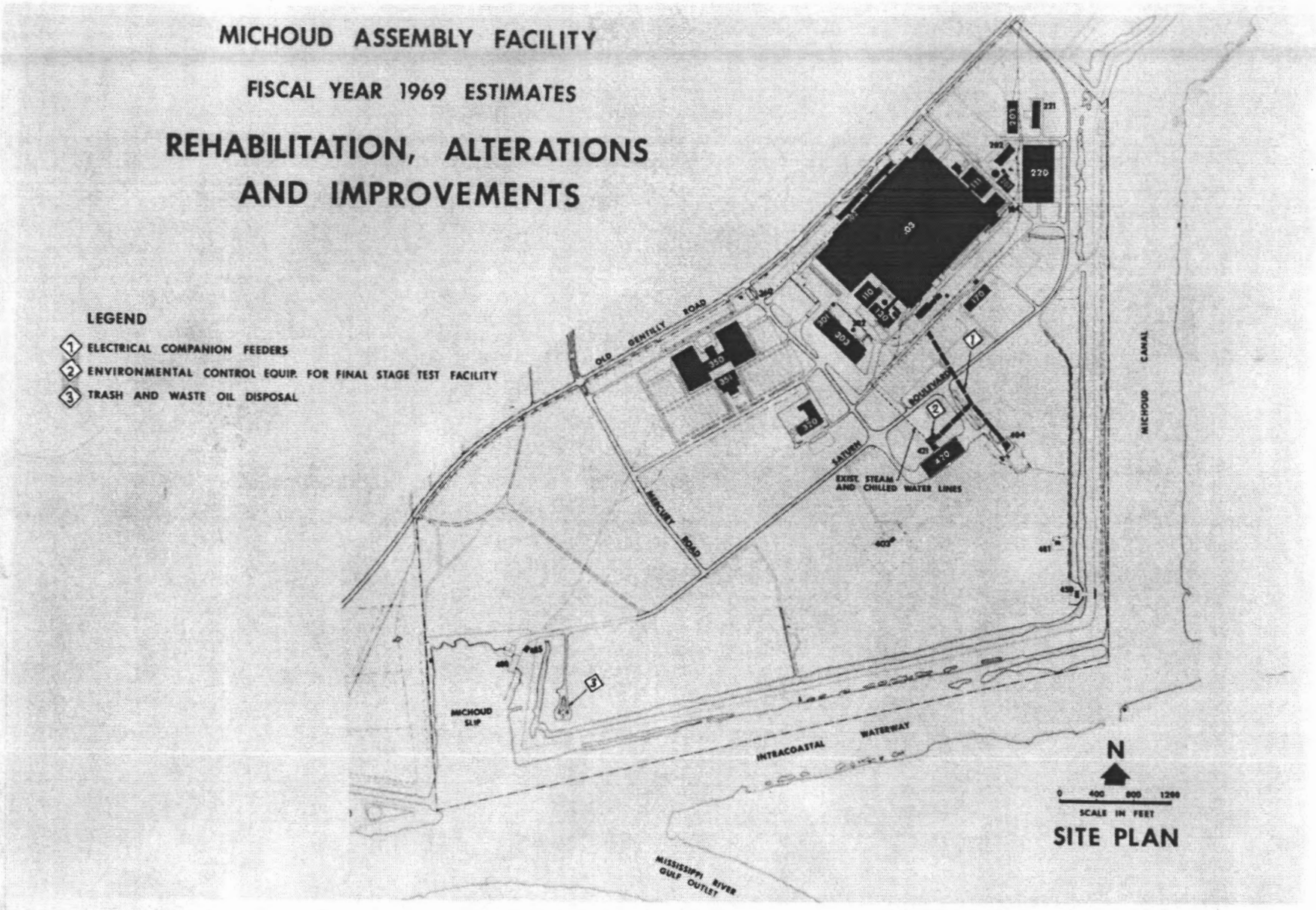
The Michoud Assembly Facility generates approximately 500 cubic yards of non-compactable refuse and 50 gallons of waste oils per day. These wastes are currently being disposed of by open field burning which contributes to the air pollution problem in the area. The tightening of city and federal codes against such practices dictates the installation of incinerator facilities.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: It is estimated that about $500,000 per year will be required to protect the government investment at the Michoud Assembly Facility, and keep the plant in operation.

MICHOUD ASSEMBLY FACILITY

FISCAL YEAR 1969 ESTIMATES

REHABILITATION, ALTERATIONS AND IMPROVEMENTS



SITE PLAN

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

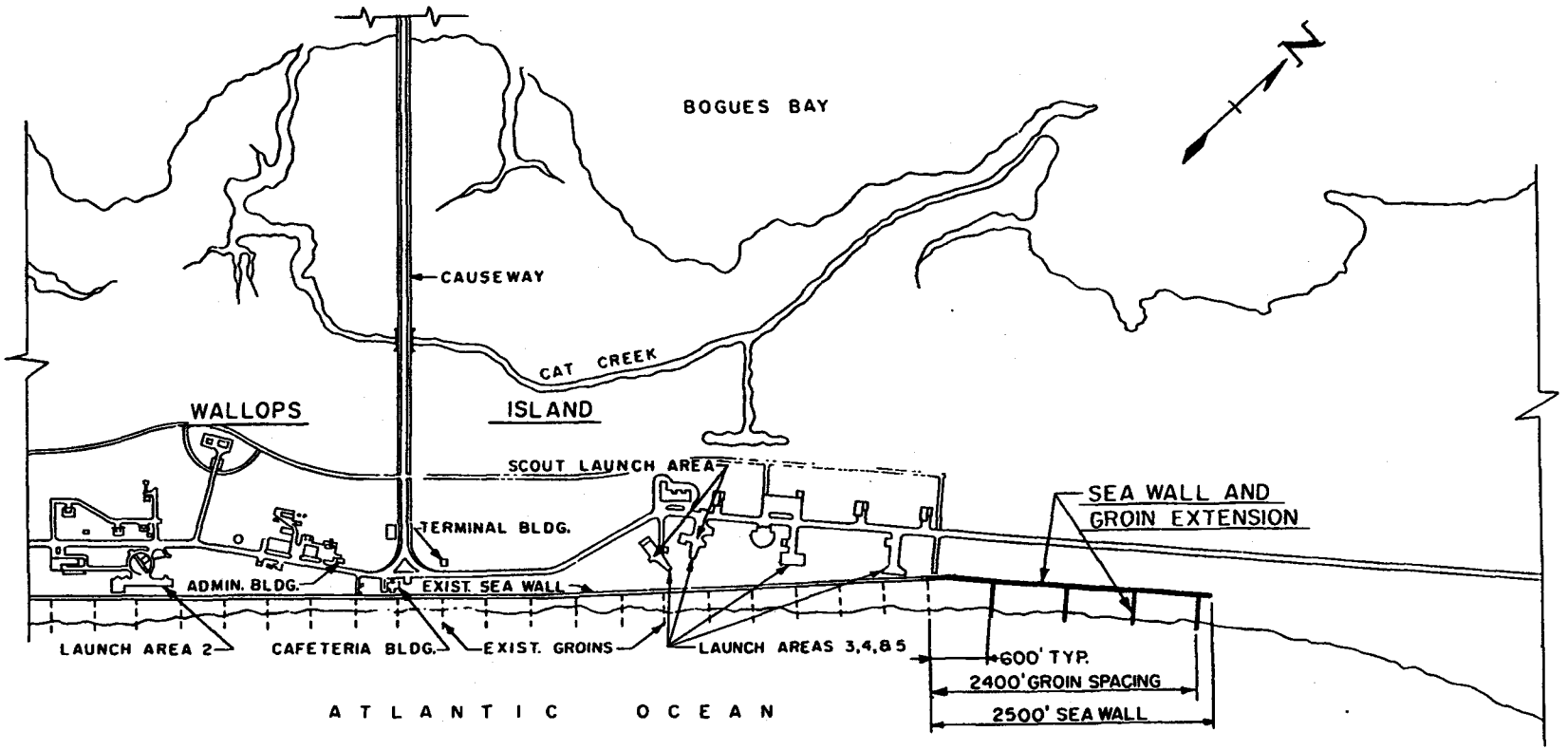
FISCAL YEAR 1969 ESTIMATES

WALLOPS STATION

WALLOPS STATION

FISCAL YEAR 1969 ESTIMATES

BEACH EROSION PROTECTION



LOCATION PLAN

0 500' 1000' 1/2 MILE 1 MILE

CE 5-1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 1969 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION		COGNIZANT PROGRAM OFFICE FOR INSTALLATION
Wallops Station		Space Science and Applications
LOCATION OF INSTALLATION	**COUNTY**	**NEAREST CITY**
Eastern Shore of Virginia	Accomack	Temperanceville, Virginia

INSTALLATION MISSION

The basic mission of the Station is to prepare, assemble, and launch scientific experiments, achieve the desired position and velocity in space, track, acquire and record the data sought. These data are processed and reduced to meaningful form and analyzed.

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1959 THRU CURRENT YR	FY 1969 (Estimated)	FUTURE YEARS (Estimated)	TOTAL ALL YEARS (Estimated)
Beach Erosion Protection	SSA	25	500	-0-	525
ALL OTHER PROJECTS		37,819			
TOTALS		37,844	500		

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

BEACH EROSION PROTECTION

AUTHORIZATION LINE ITEM: Wallops Station

PROGRAM OFFICE FOR THE PROJECT: Office of Space Science and Applications

LOCATION OF PROJECT: Wallops Station, Accomack County, Virginia

COGNIZANT NASA INSTALLATION: Wallops Station

TYPE OF CONSTRUCTION PROJECT: Major Addition

FUNDING:

FY 1968 and Prior Years	$25,000
FY 1969 Estimate	500,000
Total Funding Through FY 1969	$525,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$500,000
Sand fill	Cu. Yd.	130,000	1.20	156,000
Earth fill	Cu. Yd.	32,000	1.40	45,000
Sheetpiling and wales	Bd. Ft.	360,000	.63	226,000
Piles	LF	25,500	2.82	72,000
Seeding	LS	---	1,000	1,000
Equipment	---	---	---	---
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$500,000

PROJECT PURPOSE:

This project will provide an addition to the existing seawall and groin system, in order to stabilize a section of diminishing shoreline and provide a reinforced physical barrier to deleterious storm wave action.

PROJECT DESCRIPTION:

The project will extend the existing groin and seawall protection northward from Launch Pad No. 5. The seawall will be constructed parallel to the beach, running approximately 2,100 feet from the point of connection to the existing steel sheetpiling. Four groins, spaced at 600-foot intervals, are to be projected at right angles to the seawall for a distance of about 400 feet each. The top of the seawall will be at an elevation of 8 feet above mean sea level, at its crest, extending 2,500 feet from its point of connection with the existing fill. Top, or crest elevation of the dyke will be 12 feet above mean sea level. Sand fill will be provided between the groins to prevent downdrift erosion.

Groins and seawall shall be constructed from timber sheet and round piles, timber wales, and bronze bolts. Earth fill will be select sand-clay compacted to maximum density.

PROJECT JUSTIFICATION:

The project is based on, and arises out of, a periodic study of the shoreline in the area of the recommended construction. The shoreline is steadily moving inland, and a relatively thin sand dune is the only protection now existing to inundation from severe storm water action.

This project is necessary to: (1) stabilize the shoreline, thereby preventing further encroachment of the sea on real estate which is necessary to the continued mission of the Station; and (2) to provide an extended reinforcing link in an existing protective system, all of which is necessary to the safety of the north launch and assembly area.

Failure to extend the groin and seawall protection provided by this project will risk the cutting of an inlet, by a hurricane or severe northeast storms, from the sea into the Intercoastal Waterway. If this should occur, extensive facilities in the northern half of the Island would be isolated. These facilities include camera stations, rocket motor ready storage area, payload checkout, and the dynamic balance test complex. The mission of the Station would be impaired greatly pending repair of such storm damage.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

VARIOUS LOCATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 19 69 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION		COGNIZANT PROGRAM OFFICE FOR INSTALLATION
Various Locations		Various
LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
Not Applicable	Not Applicable	Not Applicable

INSTALLATION MISSION

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 19 59 THRU CURRENT YR	FY 19 69 *(Estimated)*	FUTURE YEARS *(Estimated)*	TOTAL ALL YEARS *(Estimated)*
Repairs, Rehabilitation & Improvements at Various Locations	MSF	80	1,600		1,680
Air Pollution Control Facility	MSF	19	350		369
Deep Space Antenna (210 foot) Facilities	TDA	540	17,000	17,000	34,540
Phased Array Antenna System	TDA	60	2,880		2,940
Power Plant Replacement STADAN Facility-Fairbanks, Alaska	TDA	135	1,875		2,010
ALL OTHER PROJECTS		643,905			
TOTALS		644,739	23,705		

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

REPAIRS, REHABILITATION AND IMPROVEMENTS AT VARIOUS LOCATIONS

AUTHORIZATION LINE ITEM: Various Locations

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Various Locations

COGNIZANT NASA INSTALLATION: Marshall Space Flight Center/Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: Rehabilitation and Improvements

FUNDING:

FY 1968 and Prior Years	$80,000
FY 1969 Estimates	1,600,000
Total Funding Through FY 1969	$1,680,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$1,600,000
Edwards Test Facility	LS	---	180,000	180,000
Seal Beach Assembly Facility	LS	---	392,000	392,000
Sacramento Test Facility	LS	---	278,000	278,000
NASA Industrial Plant, Downey	LS	---	150,000	150,000
Air Force industrial plants:				
AF Plant #56 Canoga Park	LS	---	380,000	380,000
AF Plant #57 Santa Susana	LS	---	220,000	220,000
Equipment	---	---	---	---

	Unit of Measure	Quantity	Unit Cost	Total Cost
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$1,600,000

PROJECT PURPOSE:

To provide for repair, rehabilitation and improvements which are essential to the operation of government owned, contractor operated facilities at Edwards, Seal Beach, Sacramento, Downey, and the Air Force industrial plants which are being utilized for NASA programs.

PROJECT DESCRIPTION:

This project will provide for essential repair, rehabilitation and improvements to government owned facilities at various locations in order to maintain existing manufacturing and testing capabilities in support of continuing NASA programs. Typical items of work are:

Edwards Test Facility - Repair of concrete aprons and deflector water channels at the base of the F-1 engine test stands, and replacement of approximately 2,400 linear feet of water distribution piping serving the test facilities.

Seal Beach Test Facility - Rehabilitation of the chemical processing system in the bulkhead fabrication building, and rehabilitation of the water conditioning plant.

Sacramento Test Facility - Rehabilitation of the cryogenic transfer system, including overhaul of hydrogen and nitrogen vaporizers, replacement of pipe insulation and repair of the hydrogen burn ponds, rehabilitation of critical power systems serving ground support equipment, and overhaul of electrical and mechanical utility systems.

NASA Industrial Plant, Downey - The replacement of approximately 20,000 square feet of corrugated metal roofing, and improvement of the drainage system for the 660,000 square foot sawtooth roof of the manufacturing building.

Air Force industrial plants - Capital type rehabilitation of Air Force plants used in support of NASA programs as follows:

AF Plant #56 (Canoga Park) - Improvements to factory lighting, rehabilitation of floor and roof areas, and improvements to the site drainage system.

AF Plant #57 (Santa Susana) - Rehabilitation and improvements to the domestic sewerage system, replacement of the industrial water pump serving the deflector cooling and firex system, and repair of perimeter fire roads.

PROJECT JUSTIFICATION:

The capital investment in government owned industrial and test facilities in support of NASA programs approximates $296,000,000. This investment must be protected by a planned program which encompasses capital type rehabilitation, "one-time" maintenance work and those alterations and improvements considered necessary to maintain the capability of these facilities.

At Edwards, the turbulence generated by F-1 engine testing has caused the concrete aprons at the base of the 1-C and 1-E test stands and the deflector water channels in the flame impingement areas to crack so that repair is now required. The domestic and firex water distribution systems are experiencing failures at a rate that will make replacement mandatory in FY 1969. This has been caused by a high corrosion rate resulting from excessive free oxygen in the water supply.

At Seal Beach, where final assembly of the S-II stage is accomplished, the processing units which are used to chemically clean bulkheads, bulkhead gores and other S-II stage components have experienced a deterioration of piping, pumps and control valves due to the corrosive action of the chemical liquids involved. Similarly the water conditioning plant, which provides for the treatment and storage of 1,200,000 gallons of high purity water needed to support S-II stage manufacturing, is also experiencing corrosion of pipes, valves and storage tanks. To maintain the capability of the chemical cleaning system and the water conditioning plant, replacement of deteriorating pipes, pumps, valves and relining of the storage tanks must be accomplished.

At Sacramento, where the S-IVB stages are tested, the cryogenic transfer system serving the Beta complex will require major rehabilitation due to the embrittlement and fatigue caused by the subfreezing temperatures of liquid propellants. The liquid hydrogen and liquid nitrogen vaporizers require overhaul, and polyurethane foam insulation protecting the cryogenic piping must be replaced. The concrete burn ponds have cracked and spalled as a result of the burning of liquid hydrogen in the course of testing and must be repaired. The direct current rectifiers and rotating generator sets which provide critical power to the ground support equipment must

undergo major overhaul due to heavy usage. Similarly a number of items in mechanical and electrical systems serving the test complexes such as pumps sets, motorized valves and the cooling tower will require major repair.

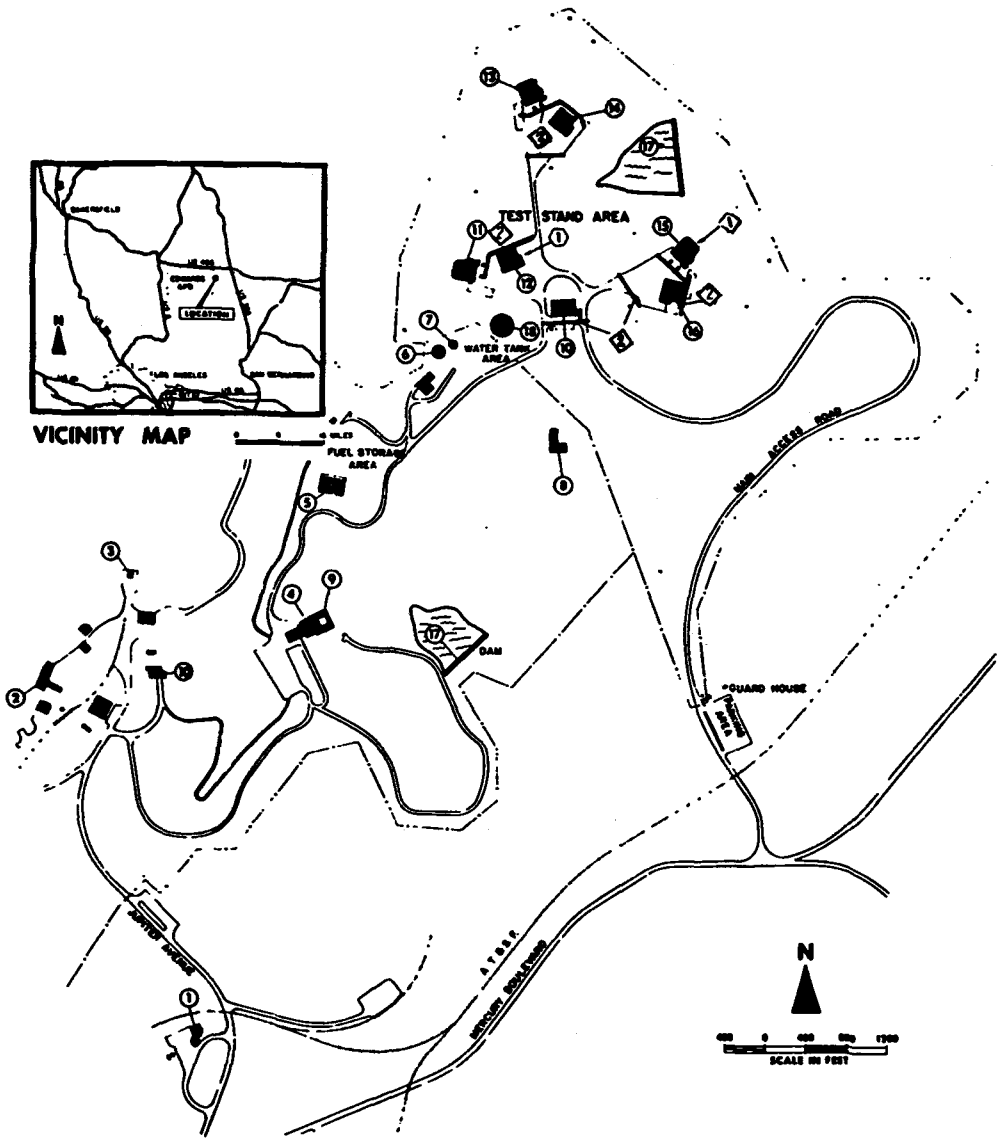
At Downey, the site of Apollo spacecraft fabrication activities, portions of the 25 year old roof of the 15 acre manufacturing building have rusted and are developing leaks at a rate which indicates that at least partial replacement is mandatory. The roof drainage system of this structure has also deteriorated to a point where replacement of gutters, drain pipes and non-clogging mesh screens will be necessary.

Rehabilitation, improvements and repair at the Air Force industrial plants at Canoga Park and Santa Susana must be accomplished in accordance with NASA/DOD agreement to maintain these plants in good operating condition. This item provides for the NASA share of the cost.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: It is estimated that about $1,000,000 per year will be required to protect the government investment and keep these Various Location Plants in operation.

VARIOUS LOCATIONS

EDWARDS AIR FORCE BASE, CALIF.



VICINITY MAP

LEGEND

● EXISTING FACILITIES

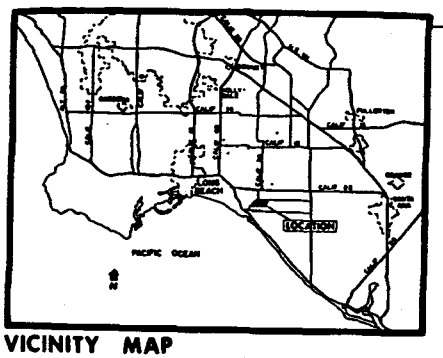
1 LIQUID OXYGEN STORAGE
2 TEST STAND 2-A
3 TEST STAND 1-A
4 TEST STAND 1-B
5 FUEL STORAGE
6 WATER STORAGE
7 400,000 GAL. FIBER TANK
8 PUMP HOUSE AREA
9 MODIFICATION OF TEST STAND 1-B
10 CONTROL CENTER
11 TEST STAND 1-C
12 PRE-TEST BUILDING 1-C
13 TEST STAND 1-D
14 PRE-TEST BUILDING 1-D
15 TEST STAND 1-E
16 PRE-TEST BUILDING 1-E
17 RECLAMATION DAM & RESERVOIR
18 3,000,000 GAL. DEFLECTOR WATER TANK

◇ PROPOSED FISCAL YEAR 1969 PROJECT

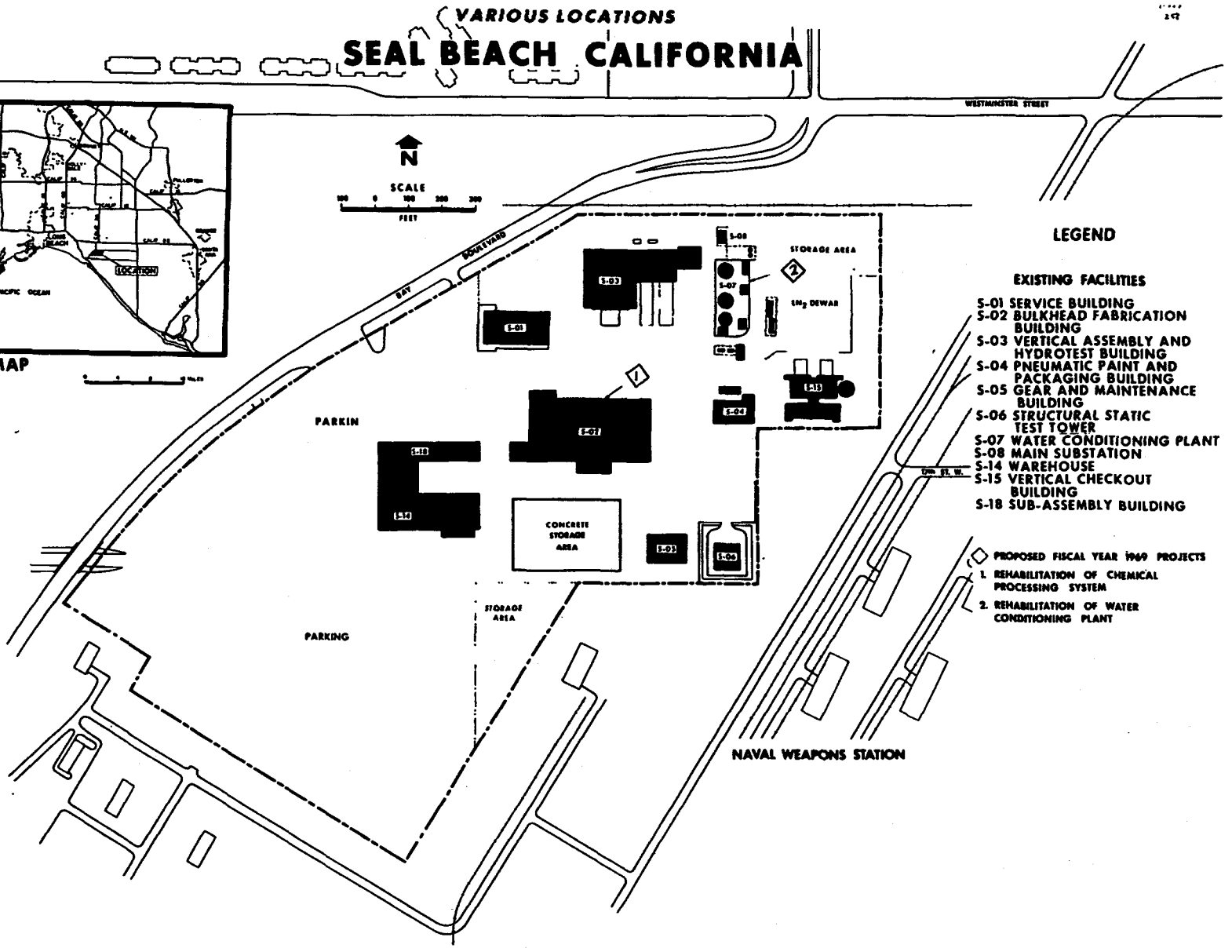
1 REPAIR OF APRONS AND DEFLECTOR WATER CHANNELS
2 REPLACEMENT OF WATER DISTRIBUTION SYSTEM

VARIOUS LOCATIONS

SEAL BEACH CALIFORNIA



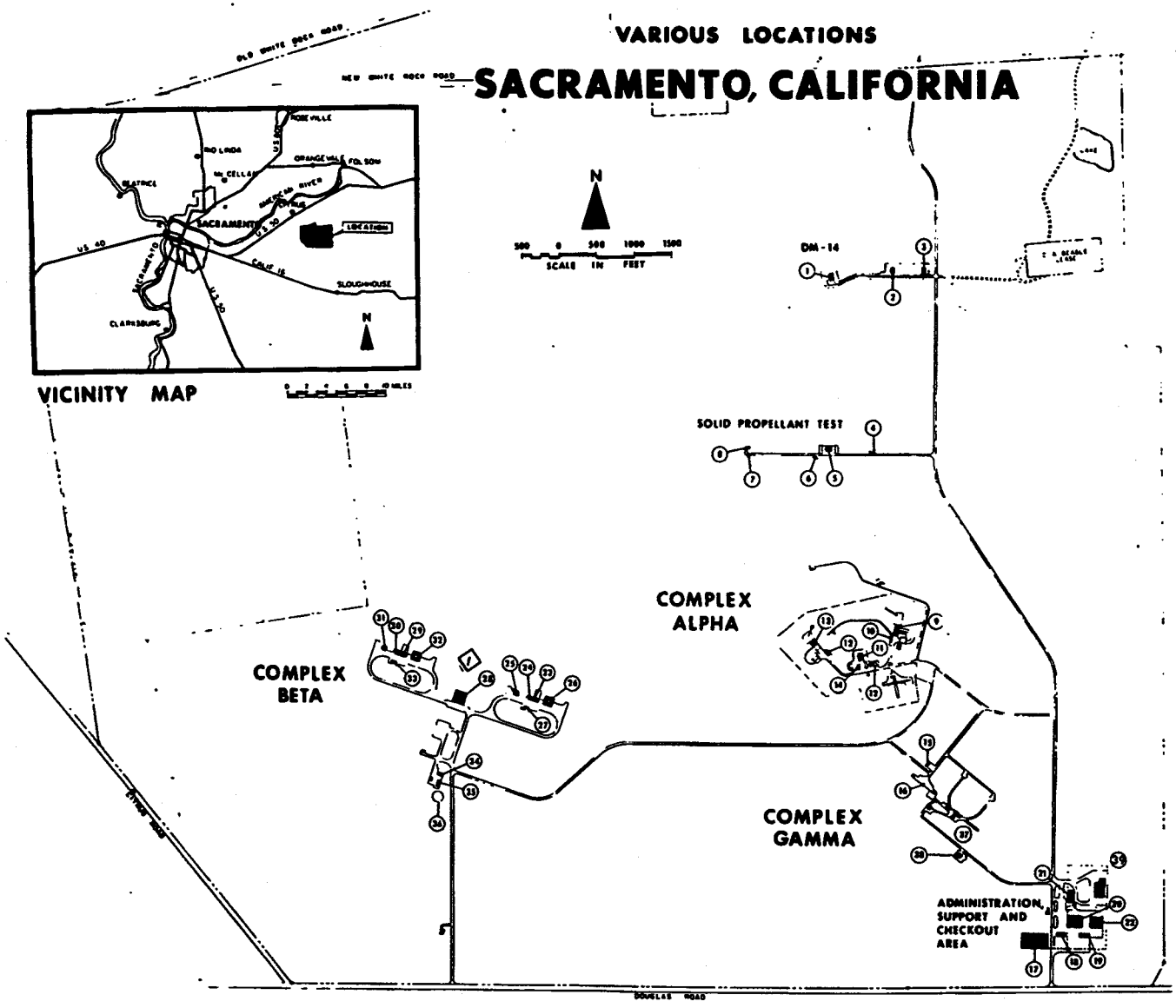
VICINITY MAP



VARIOUS LOCATIONS

SACRAMENTO, CALIFORNIA

VICINITY MAP



LEGEND

● EXISTING FACILITIES

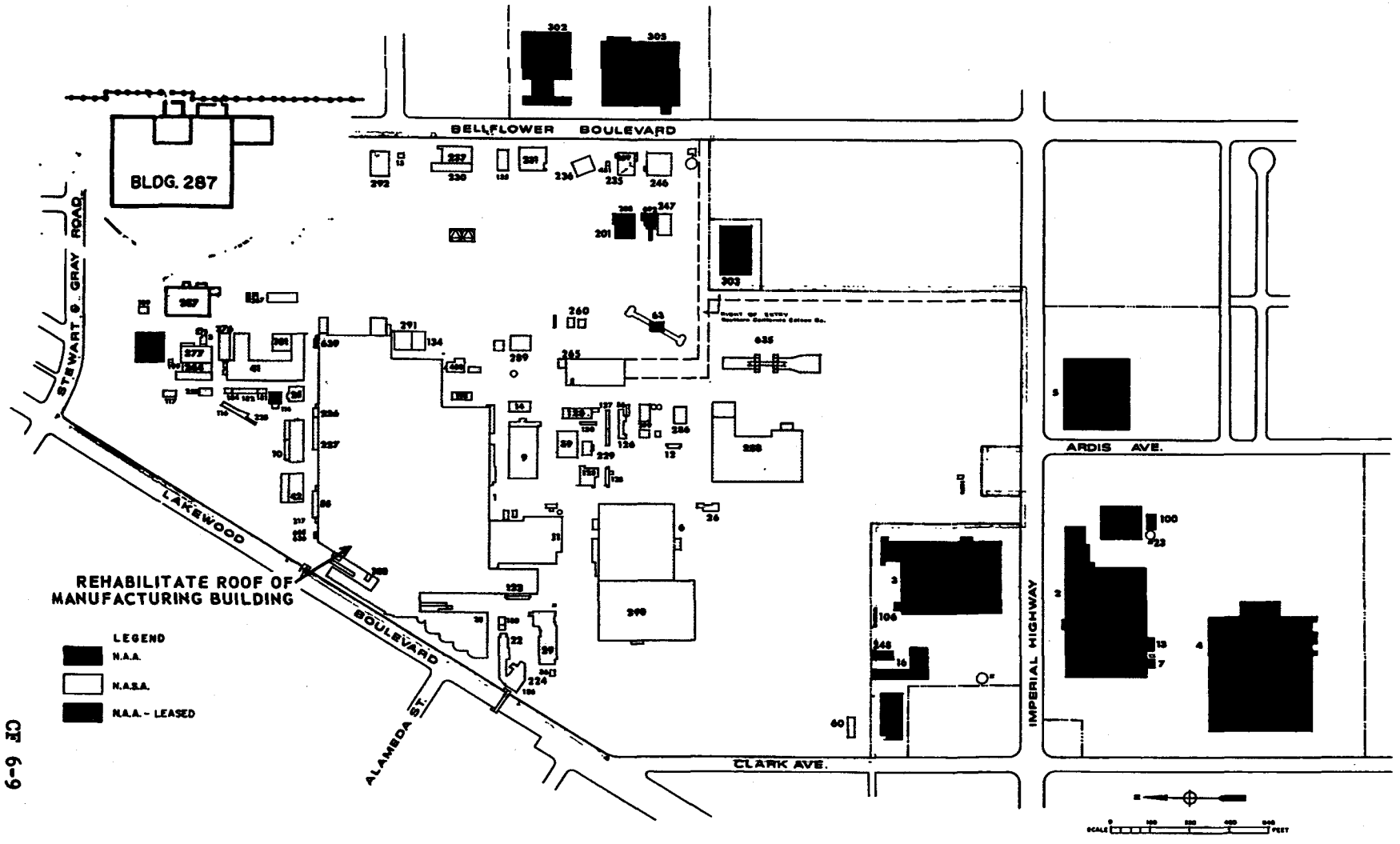
1 PROPELLANT STORAGE
2 PARTS STORAGE
3 ASSEMBLY BLDG
4 CONDITIONING CELLS
5 ASSEMBLY BLDG
6 CONTROL BLDG
7 SHOP
8 THRUST BLOCK
9 TEST STAND
10 SHOP
11 CONTROL BLDG
12 SHOP
13 DUAL TEST STAND
14 COMPRESSOR BLDG
15 CRYOSTAT
16 SUB STATION
17 ENGINEERING BLDG
18 SERVICE BLDG
19 ENGINEERING BLDG
20 MODIFICATION HANGAR
21 CAFETERIA
22 SYSTEMS EVALUATION BLDG
23 TEST STAND, BETA I
24 TERMINAL EQUIPMENT
25 LOX STORAGE
26 LH_2 STORAGE
27 TEST STAND SHOP
28 TEST CONTROL CENTER
29 TEST STAND BETA III
30 TERMINAL EQUIPMENT
31 LOX STORAGE
32 LH_2 STORAGE
33 TEST STAND SHOP
34 CALIBRATION TOWER
35 PUMP HOUSE
36 WATER STORAGE
37 ATTITUDE CONTROL MOTOR TEST
38 MAINTENANCE & ASSEMBLY BUILDING
39 VERTICAL CHECKOUT LABORATORY

◇ PROPOSED FISCAL YEAR 1969 PROJECTS

1 REHABILITATION OF CRYOGENIC SYSTEMS, CRITICAL POWER SYSTEMS, AND ELECTRICAL AND MECHANICAL UTILITY SYSTEMS

VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATE

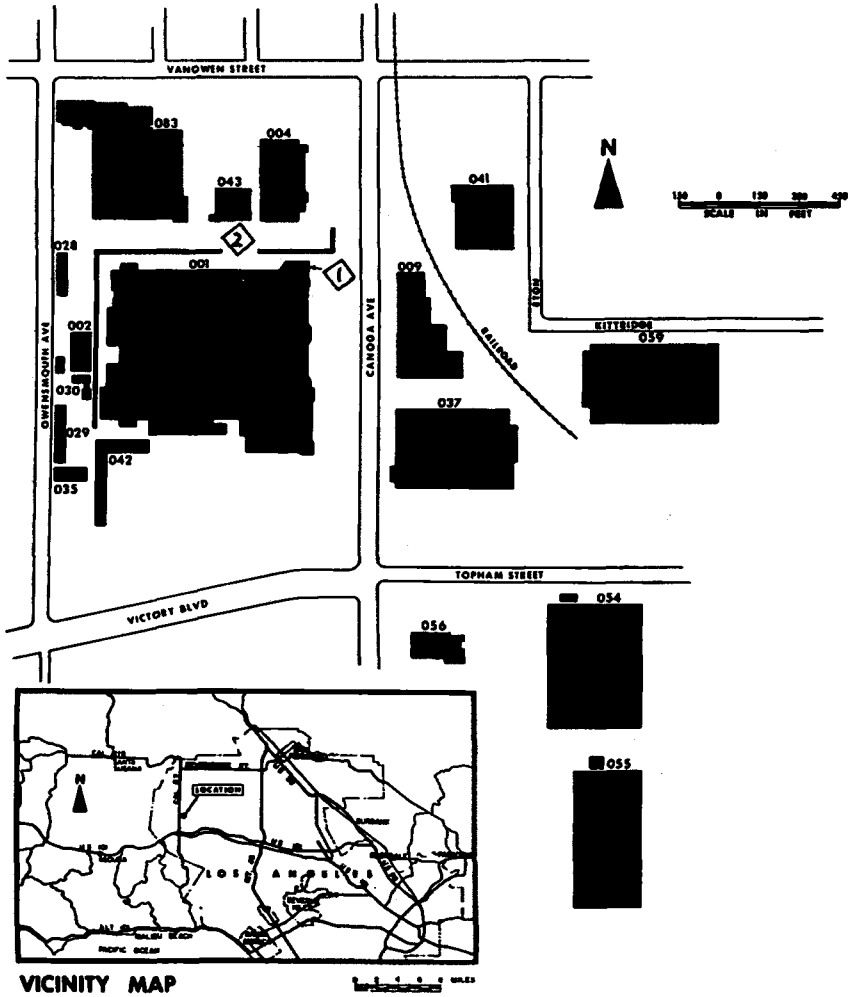
NASA INDUSTRIAL PLANT, DOWNEY CALIFORNIA
GENERAL SITE PLAN AND BUILDING OWNERSHIP



CT 6-9

VARIOUS LOCATIONS

CANOGA PARK, CALIF.



VICINITY MAP

LEGEND

○ **EXISTING FACILITIES**

056	HEADQUARTERS BUILDING
054	MANUFACTURING BUILDING NO. 2
055	MANUFACTURING BUILDING NO. 3
037	MANUFACTURING BUILDING NO. 1
009	MATERIAL BUILDING
001	MAIN BUILDING
041	WAREHOUSE
004	ANNEX
083	VANOWEN
043	CAFE
028	NORTH SHED
002	MAINTENANCE BUILDING
029	SOUTH SHED
035	PAINT & CHEMICAL STORAGE
042	SHED
030	PAINT SPRAY BOOTH
059	MANUFACTURING BUILDING NO. 4

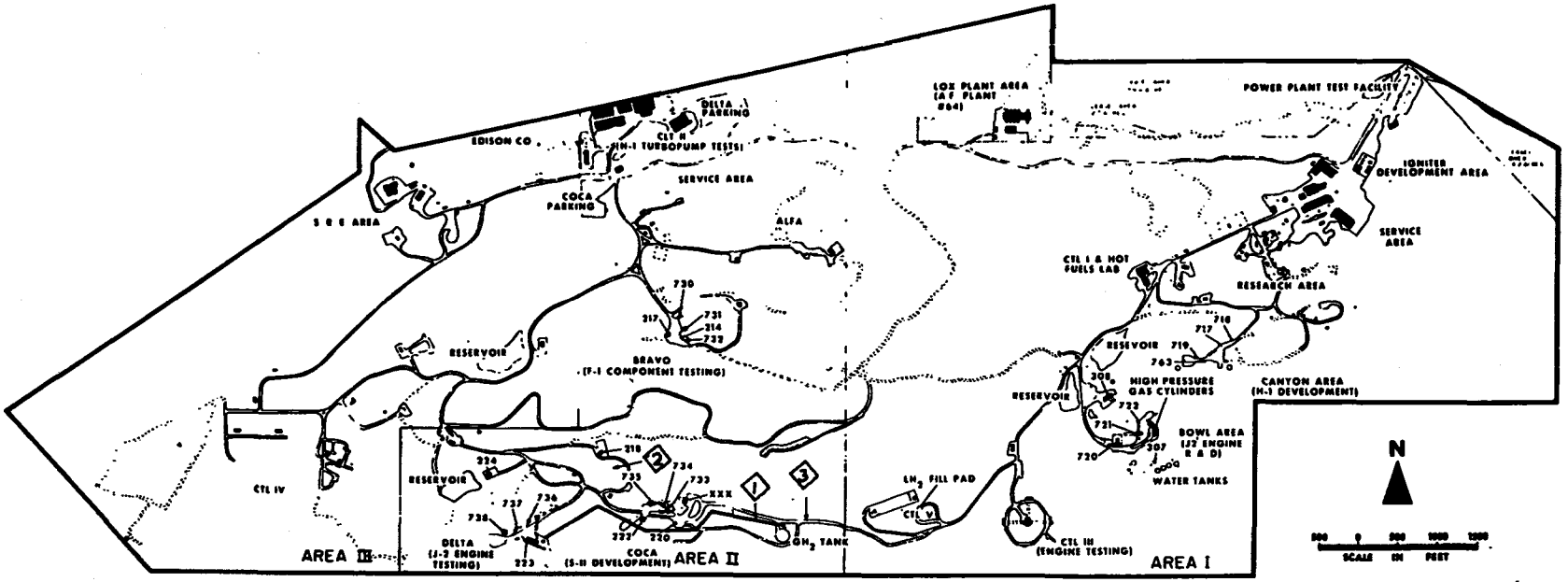
◇ **PROPOSED FISCAL YEAR 1969 PROJECTS**

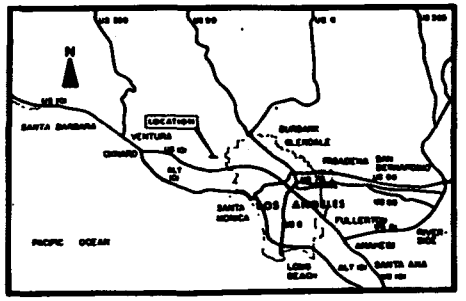
1 REHABILITATION AND IMPROVEMENTS OF ROOF, FLOOR AND LIGHTING
2 STORM DRAINAGE

CF 6-10

VARIOUS LOCATIONS

SANTA SUSANA, CALIFORNIA





VICINITY MAP

LEGEND

214	TERMINAL	720	VTS 3
217	PRETEST BUILDING	721	VTS 1
218	COCA CONTROL CENTER	722	VTS 2
220	VEHICLE SHELTER	730	BRAVO 1
222	PRETEST BUILDING	731	BRAVO 2
223	DELTA PRETEST BUILDING	732	BRAVO 3
224	DELTA CONTROL CENTER	733	COCA 1 TEST STAND
XXX	COCA 4 TEST STAND	734	COCA 2 TEST STAND
307	PUMP HOUSE #2	735	COCA 3 TEST STAND
308	CONTROL CENTER	736	DELTA 1 TEST STAND
717	CANYON TEST STAND H1	737	DELTA 2 TEST STAND
718	CANYON TEST STAND H2	738	DELTA 3 TEST STAND
719	CANYON TEST STAND H3	763	OPERATIONS OFFICE

◇ PROPOSED FISCAL YEAR 1969 PROJECT

1. IMPROVEMENT TO DOMESTIC SEWERAGE SYSTEM
2. REPLACEMENT OF INDUSTRIAL WATER PUMP
3. RESURFACING PERIMETER FIRE ROADS

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

AIR POLLUTION CONTROL FACILITY

AUTHORIZATION LINE ITEM: Various Locations

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: NASA Industrial Plant, Downey, Los Angeles County, California

COGNIZANT NASA INSTALLATION: Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: Modification and Extension

FUNDING:

FY 1968 and Prior Years	$19,000
FY 1969 Estimate	350,000
Total Funding Through FY 1969	$369,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$60,400
Building addition	Sq. Ft.	2,800	18.00	50,400
Utilities	LS	---	10,000	10,000
Equipment				289,600
Fume incinerator	LS	---	229,600	229,600
Paint spray booth	LS	---	60,000	60,000
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$350,000

PROJECT PURPOSE:

To comply with Los Angeles County air pollution control regulations by installing facilities which will control the discharge of organic solvents into the atmosphere.

PROJECT DESCRIPTION:

In order to comply with Los Angeles County air pollution regulations, the following additions and modifications to the Downey Plant will be accomplished:

a. Construction of a 2,800 square foot extension to the Bonding and Testing Facility to house a paint spray booth with associated air handling equipment. The structure will have a steel frame with metal siding.

b. Installation of a fume incinerator system adjacent to the Bonding and Testing Facility. The fume incinerator system will serve the new paint spray facility, and an existing oven baking facility which is located in the Bonding and Testing Facility. To effect economy the oven baking and paint spraying facilities will be centralized so that one incinerator can burn the exhaust products from both operations.

PROJECT JUSTIFICATION:

The installation of air pollution control equipment must be accomplished in order to comply with a rule recently adopted by Los Angeles County in connection with the abatement of air pollution. This rule limits the amount of material which may be discharged into the atmosphere during a 24 hour period to 15 pounds of organic solvent from operations such as oven baking and heat curing; and 40 pounds of photochemically reactive organic solvent from operations such as cleaning and spraying.

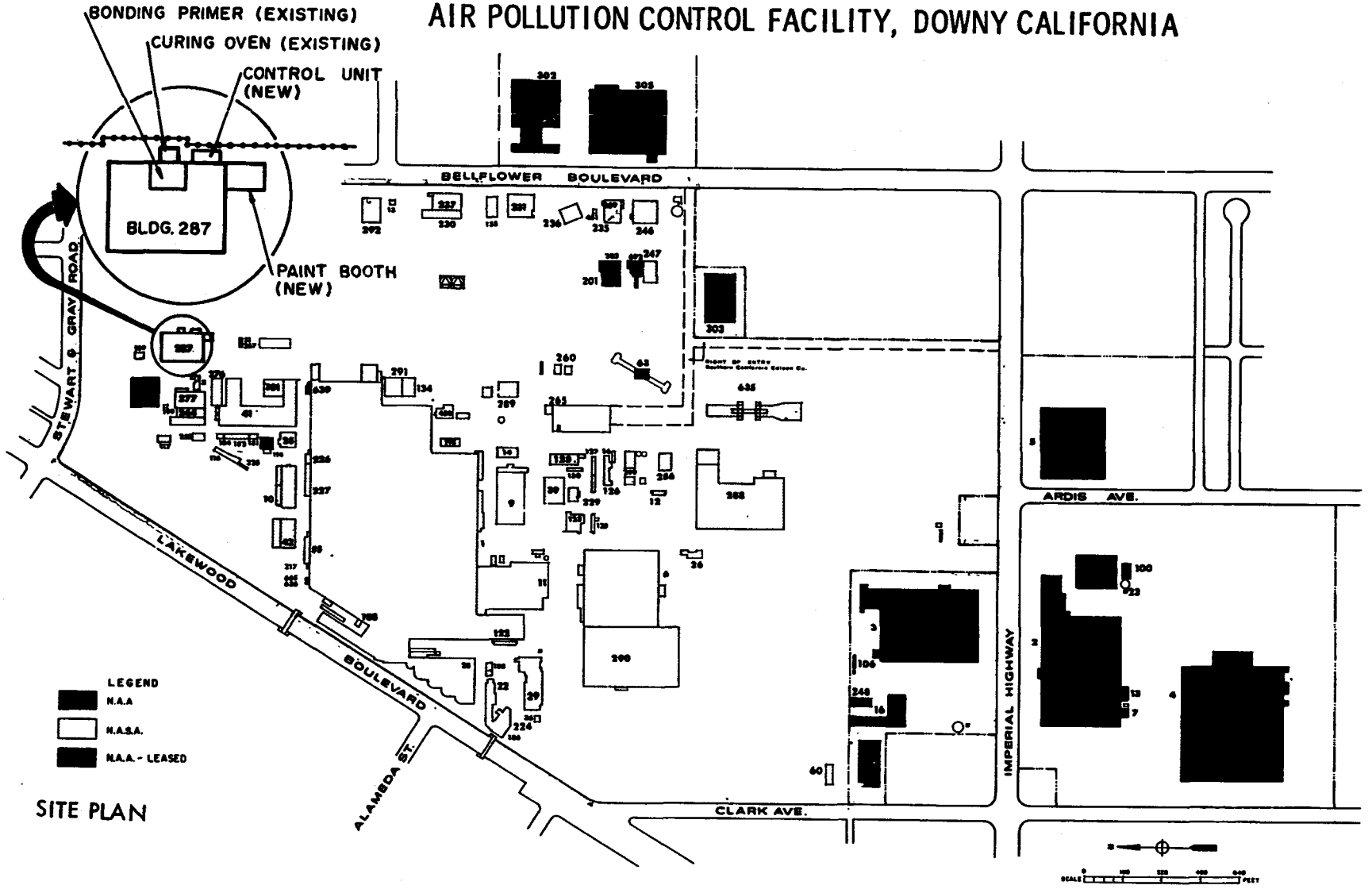
At the Downey plant, organic material is discharged into the atmosphere from oven baking and paint spraying operations associated with the manufacture of spacecraft. The organic discharge from these operations amounts to approximately 20 pounds and 50 pounds respectively, which exceeds the limits established by the Los Angeles County rule. All federal agencies have been called upon under Executive Order 11282, Prevention, Control and Abatement of Air Pollution by Federal Activities, for leadership in abating air pollution from their own operations and facilities. Therefore, compliance with the Los Angeles County rule is in consonance with the Executive Order.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

VARIOUS LOCATIONS

FISCAL YEAR 1969 ESTIMATES

AIR POLLUTION CONTROL FACILITY, DOWNY CALIFORNIA



SITE PLAN

CF 6-14

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

DEEP SPACE ANTENNA (210 FOOT) FACILITIES

AUTHORIZATION LINE ITEM: Various Locations

PROGRAM OFFICE FOR THE PROJECT: Office of Tracking and Data Acquisition

LOCATION OF PROJECT: Canberra Complex, Australia
Madrid Complex, Spain

COGNIZANT NASA INSTALLATION: Jet Propulsion Laboratory

TYPE OF CONSTRUCTION PROJECT: New

FUNDING:

	Canberra, Australia	Madrid, Spain	Total
FY 1968 and Prior Years	$280,000	$260,000	$540,000
FY 1969 Estimate	15,418,000	1,582,000	17,000,000
Total Funding Through FY 1969	$15,698,000	$1,842,000	$17,540,000
(Future Funding Required)	($1,629,000)	($15,371,000)	($17,000,000)

PROJECT COST ESTIMATE: Canberra, Australia

	Unit of Measure	Quantity	Unit Cost	Total Cost	Being Requested in FY 1969
Land Acquisition	---	---	---	---	
Construction				$14,761,000	$14,512,000
Operations building addition	Sq. Ft.	15,000	$39.47	592,000	592,000
Power plant addition	KW	1,500	456.67	685,000	685,000
Microwave laboratory building	Sq. Ft.	3,750	46.14	173,000	---
Antenna system	Each	1	13,202,000	13,202,000	13,126,000
Supporting features	LS	---	109,000	109,000	109,000

	Unit of Measure	Quantity	Unit Cost	Total Cost	Being Requested in FY 1969
Equipment				$2,286,000	$906,000
Antenna electronic equipment	LS	---	$1,936,000	1,936,000	686,000
Communication equipment	LS	---	67,000	67,000	67,000
Installation, integration and evaluation	LS	---	283,000	283,000	153,000
Design	---	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None	---
		TOTAL		$17,047,000	$15,418,000
PROJECT COST ESTIMATE: Madrid, Spain					
Land Acquisition	---	---	---	---	---
Construction				$14,663,000	$1,582,000
Operations building addition	Sq. Ft.	15,000	$37.60	564,000	---
Power plant addition	KW	1,500	454.00	681,000	---
Microwave laboratory building	Sq. Ft.	3,750	43.74	164,000	---
Antenna system	Each	1	13,128,000	13,128,000	1,456,000
Supporting features	LS	---	126,000	126,000	126,000
Equipment				$2,290,000	---
Antenna electronic equipment	LS	---	1,936,000	1,936,000	---
Communication equipment	LS	---	67,000	67,000	---
Installation, integration, and evaluation	LS	---	287,000	287,000	---
Design	---	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None	---
		TOTAL		$16,953,000	$1,582,000
		GRAND TOTAL		$34,000,000	$17,000,000

PROJECT PURPOSE:

To provide a required increase in the deep space ground antenna capability by completing in a timely and economical manner a three station network of deep space (210 foot) antenna facilities appropriately spaced around the earth.

PROJECT DESCRIPTION:

This project is for the construction of a 210 foot diameter advanced antenna system (AAS) for the NASA/JPL deep space instrumentation facility (DSIF) at both Canberra and Madrid.

The AAS installation of these projects, together with the AAS installation now nearly complete at Goldstone will provide a three station network with the increased performance required for planetary spacecraft projects of post 1970 flight dates. The three station network will be capable of continuous communication with deep space vehicles in the declination range 28.5° N to 28.5° S.

Each of the advanced antenna system facilities included under this project will consist of augmentation of the existing deep space network facilities located at Canberra, Australia and Madrid, Spain. This project will provide for: (1) the construction of a 15,000 square foot addition to each of the existing operations buildings; (2) increasing the output of the existing power plants to meet the requirements of the advanced antenna system; (3) fully steerable 210 foot diameter, paraboloid reflector type antennas complete with concrete pedestal, control room, machinery and equipment rooms at each site; and (4) 3,750 square foot microwave laboratory buildings. The project will also provide for all necessary supporting features including utilities, outside communications, roads, water storage, fuel storage, site development, and security features at each site. The project will further provide for the essential electronic equipment associated with the antenna system.

PROJECT JUSTIFICATION:

The installation of two overseas antenna (210 foot) facilities will complete the three station network necessary to support planetary spacecraft projects planned in the early 1970's.

This network is required for the continuous surveillance of the spacecraft during the complex planetary reconnoitering and atmospheric probe missions which are evolving from past successful early missions in the vicinity of the Moon, Mars, and Venus. These missions initiated by Ranger, Mariner/Venus, Mariner/Mars, and Lunar Orbiter all have demonstrated the important balanced performance required between the spacecraft and ground communications systems to obtain meaningful and sufficient amounts of data. Increased emphasis on visual imaging experiments by these future missions, particularly the reconnoitering or orbital types will be conducted over longer periods of time and will result in even more significant increases in the quantity of data to be transferred to the ground stations. Future orbital missions, as compared to past short time observation and long time data transfer flyby type

missions, will require extensive time sharing between the flight observational and the data transfer activity at much higher data bit rates. As an example, even a partial planetary survey of the Martian surface similar to that conducted by a single Lunar Orbiter mission acquires more than 1,000 times more data bits than that planned for even Mariner 1969--a task which becomes virtually impossible to accomplish by an 85 foot antenna network. The total support period afforded by a complete high performance 210 foot antenna communications network, however, influences directly the ability to receive these quantities of data in a reasonable period, thus the complete network availability becomes one of the pacing factors in orbital mission effectiveness.

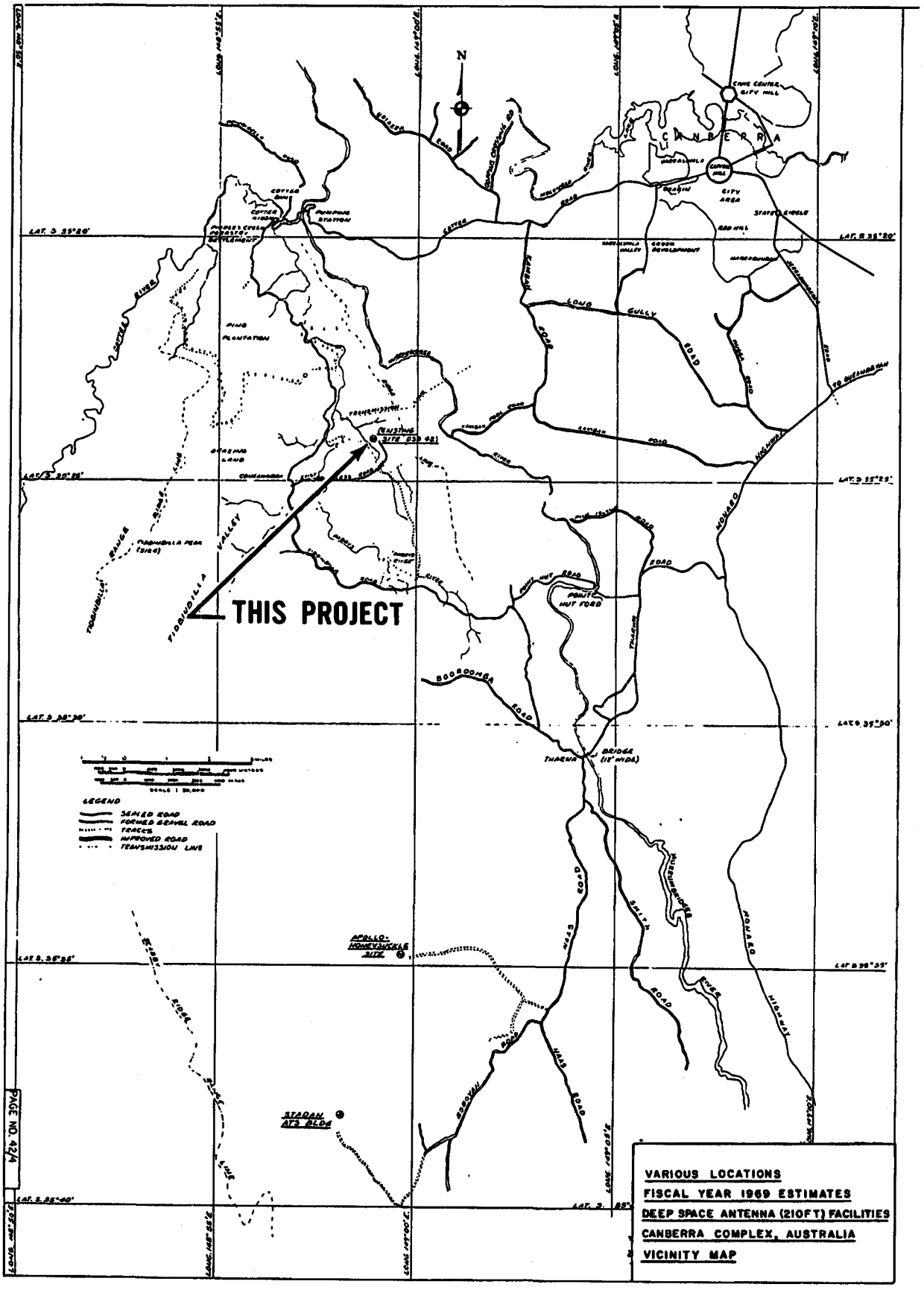
Secondly, but equally important, the AAS provides the required continuous and reliable high power positive command control for distant planetary spacecraft under all attitude conditions. This continuous coverage capability is vital to mission success when adverse spacecraft manuevers or anomalies result in poor onboard command reception.

Further, as demonstrated by the recent support by the Goldstone 210 foot AAS, the sixfold communication advantage over the 85 foot standard antenna permits an important extension to the useable life of such valuable spacecrafts as Pioneer and Mariner which have passed beyond the communication range of the 85 foot antenna. Based on the performance of the on going Pioneer spacecraft, support to these and future extended mission phases will utilize a large part of the AAS network available time in the post 1971 period.

The single 210 foot AAS at Goldstone having a limited viewing opportunity for all these various interplanetary and planetary missions cannot satisfy these broad requirements. Continued dependency on the existing 85 foot antenna network and single Goldstone 210 foot AAS will unduly constrain the already difficult design of planetary encounter, injection, launch, atmospheric probe, lander, and observation phases of future missions.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: $17,000,000

	FY 1970	FY 1971	TOTAL
Canberra, Australia	$1,250,000	$379,000	$1,629,000
Madrid, Spain	13,750,000	1,621,000	15,371,000
TOTAL	$15,000,000	$2,000,000	$17,000,000

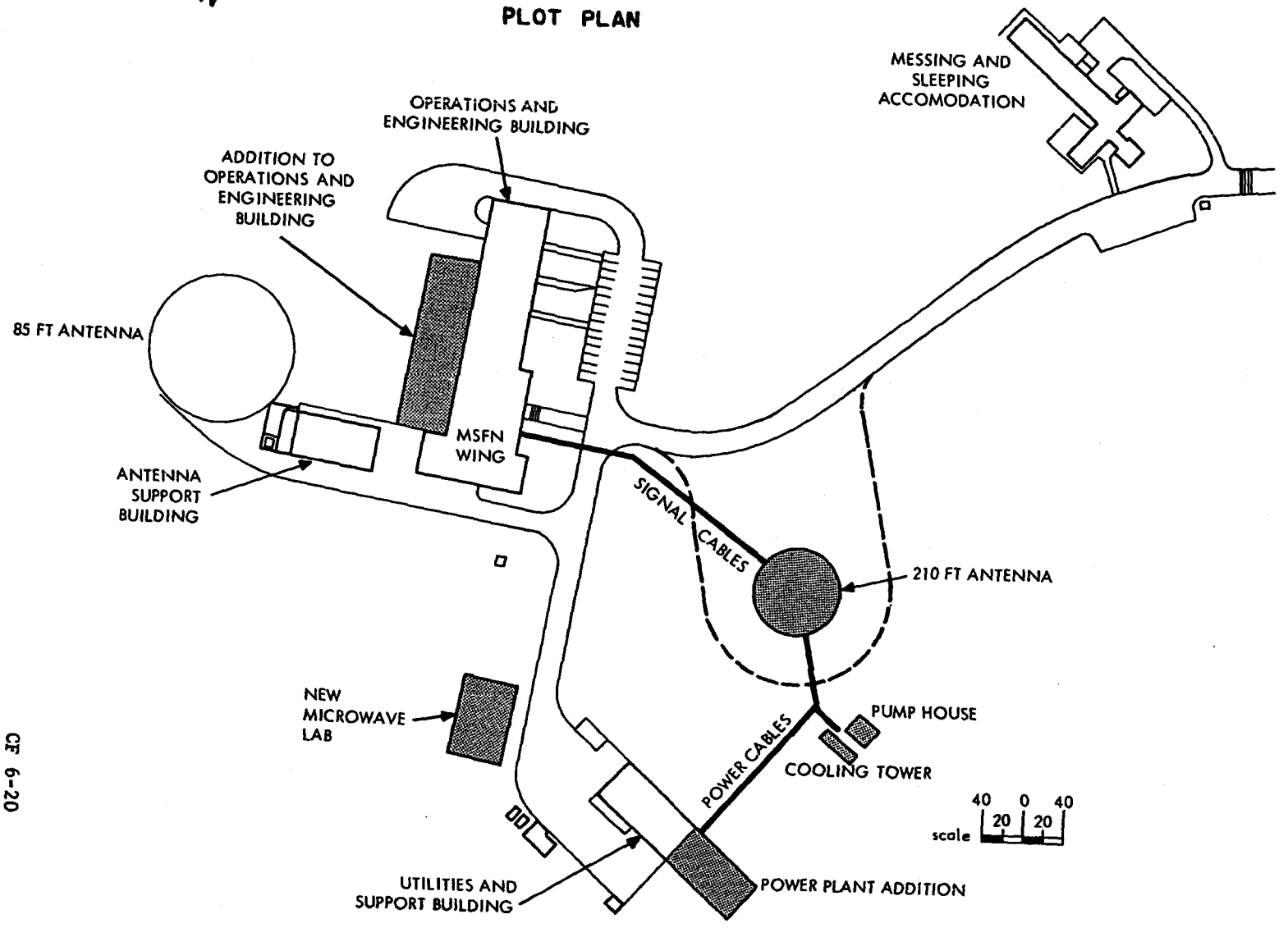


VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATES
DEEP SPACE ANTENNA (210FT) FACILITIES
CANBERRA COMPLEX, AUSTRALIA
VICINITY MAP

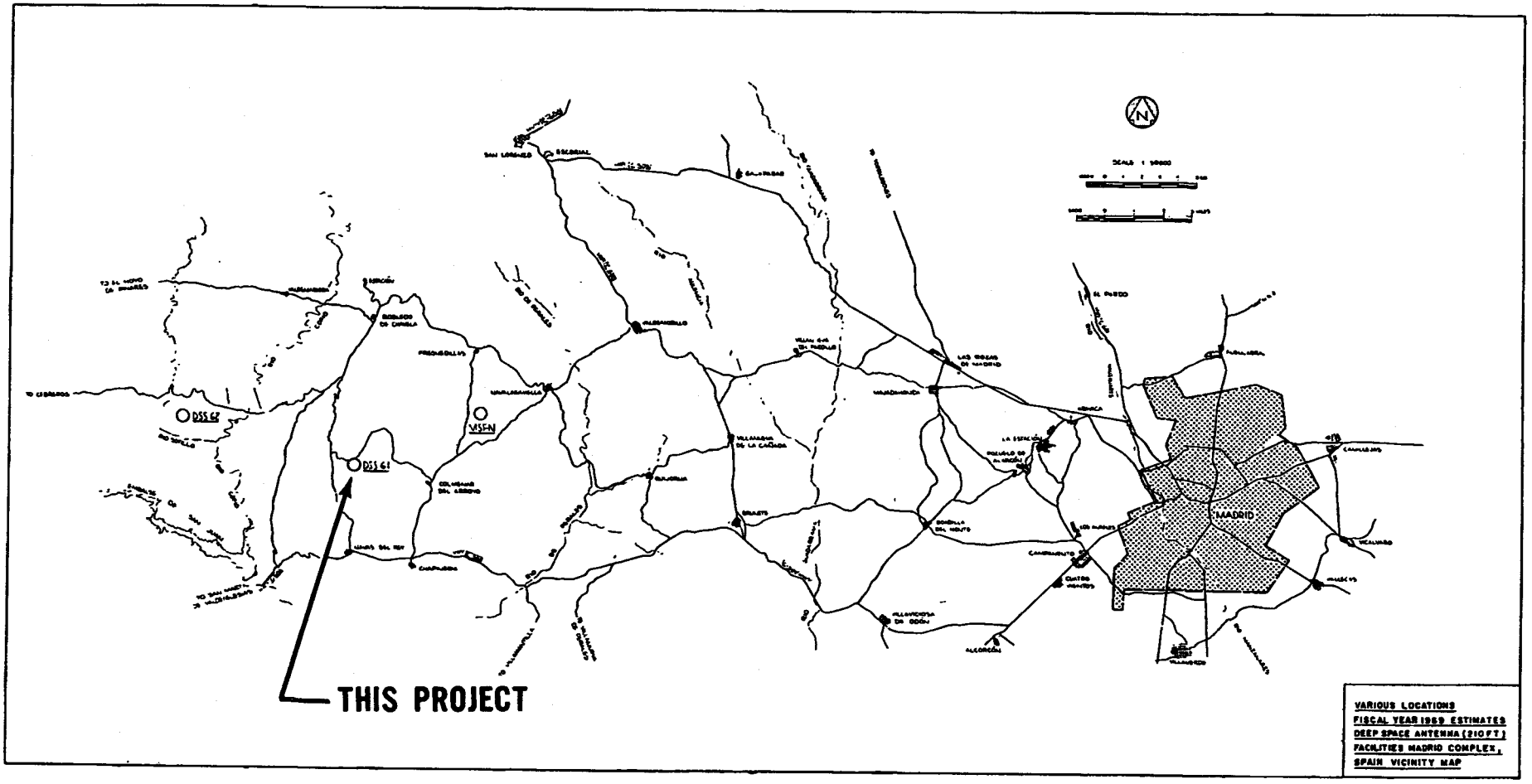
CF 6-19

VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATES
DEEP SPACE ANTENNA (210 FT) FACILITIES
CANBERRA COMPLEX, AUSTRALIA

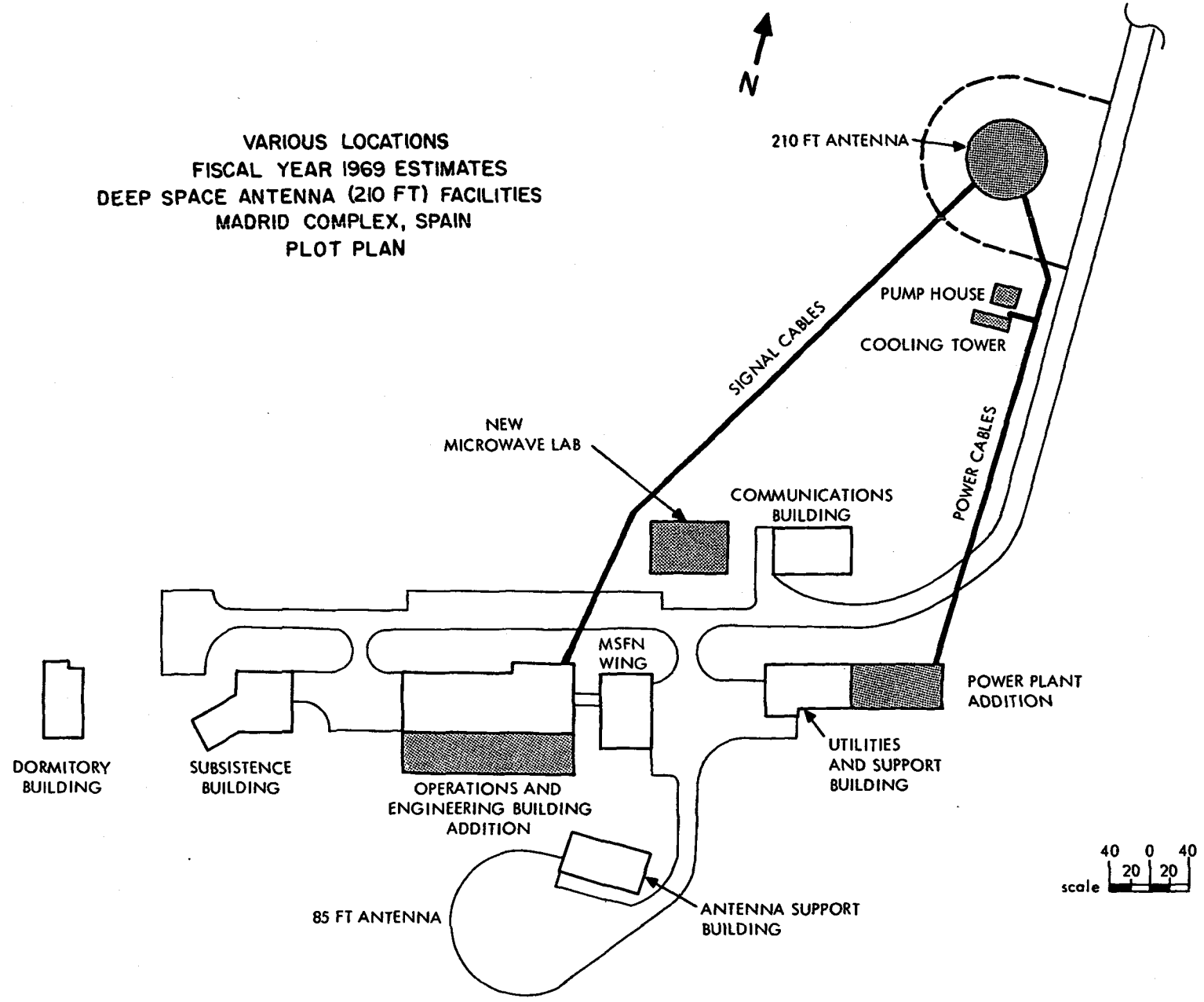
PLOT PLAN



CF 6-20


DSS 62
DSS 61
VSFN
MADRID
THIS PROJECT
VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATES
DEEP SPACE ANTENNA (210FT)
FACILITIES MADRID COMPLEX,
SPAIN VICINITY MAP

VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATES
DEEP SPACE ANTENNA (210 FT) FACILITIES
MADRID COMPLEX, SPAIN
PLOT PLAN



CF 6-22

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

PHASED ARRAY ANTENNA SYSTEM

AUTHORIZATION LINE ITEM: Various Locations

PROGRAM OFFICE FOR THE PROJECT: Office of Tracking and Data Acquisition

LOCATION OF PROJECT: Goldstone Complex, Fort Irwin, California

COGNIZANT NASA INSTALLATION: Goddard Space Flight Center

TYPE OF CONSTRUCTION PROJECT: New

FUNDING:

FY 1968 and Prior Years	$60,000
FY 1969 Estimate	2,880,000
Total Funding Through FY 1969	$2,940,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$263,000
Operations building	Sq. Ft.	2,000	$35.00	70,000
Electrical substation	KVA	3,125	34.88	109,000
Electrical distribution	LS	---	30,000	30,000
Antenna foundations	Each	12,000	1.67	20,000
Water and sanitary sewer	LS	---	4,000	4,000
Site preparation	LS	---	18,000	18,000
Access roads and walks	Sq. Yd.	2,400	5.00	12,000
Equipment				$2,617,000
Antennas	Each	12,000	109.50	1,314,000
Transmission line	LF	5,500,000	.07	385,000
Electronic equipment	LS	---	918,000	918,000

	Unit of Measure	Quantity	Unit Cost	Total Cost
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$2,880,000

PROJECT PURPOSE:

This project provides for a unique NASA antenna field with associated equipment and facilities required to support the Sunblazer project.

PROJECT DESCRIPTION:

The antenna field will consist of a fixed, three frequency (38.25, 74.9, and 224.7), planar array design on the basis of a nested cogeometric arrangement. Each frequency antenna element array will have 4,000 module units consisting of a crossed dipole, mounted on a stake and ancillary equipment such as transmitter, reflector, amplifier, and mixer. Supporting features consist of: an instrumentation and operations building (2,000 square feet) to house electronic equipment, electrical substation, transmission cabling connecting the arrays with the operations building and necessary roads, utilities, and site preparation to support the antenna arrays. Construction will conform to the existing NASA area facilities. The facilities will be located on 65 acres of existing government land.

PROJECT JUSTIFICATION:

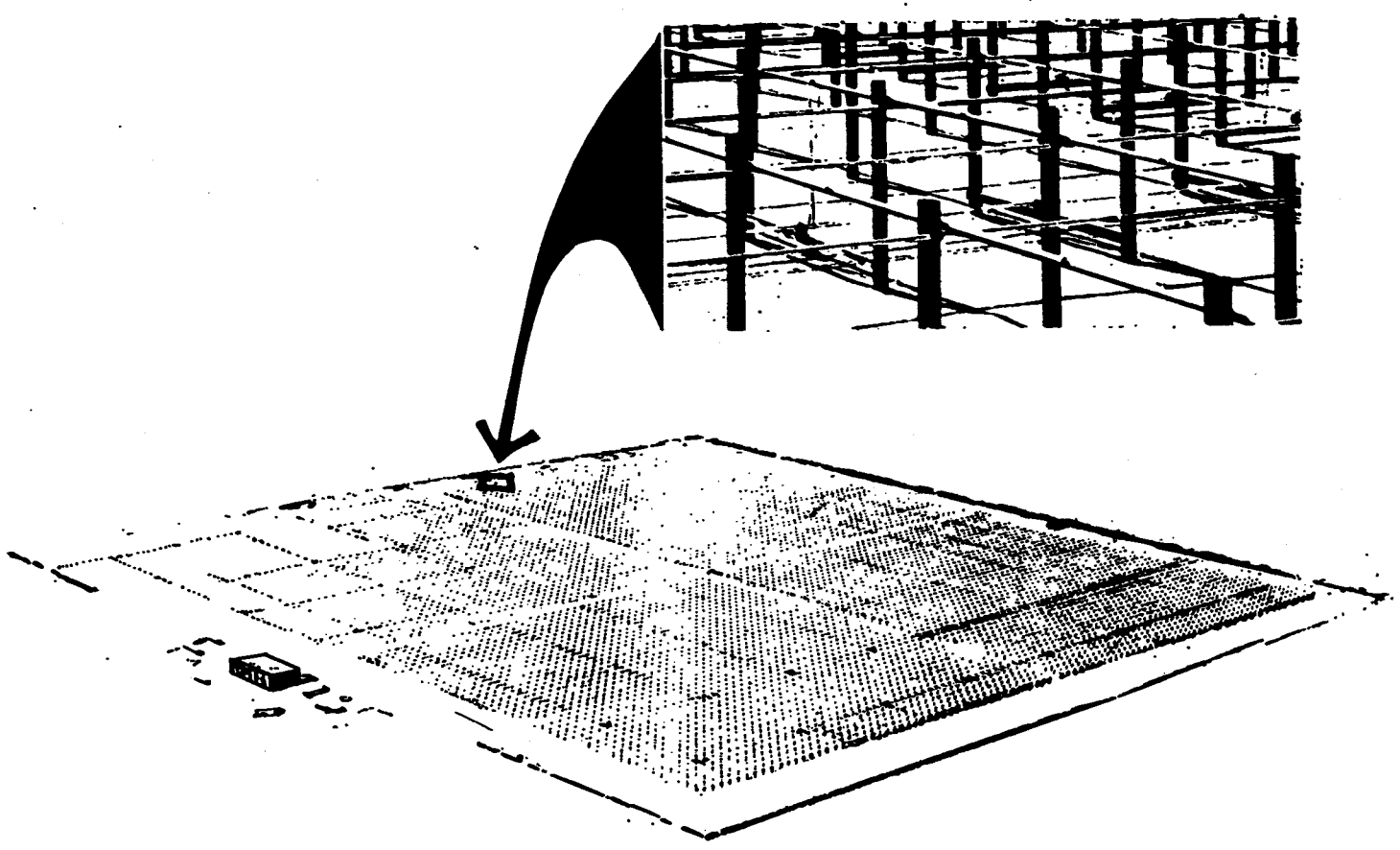
The Sunblazer project will launch a number of relatively small spacecraft into interplanetary space in order to obtain solar corona electron density data. Because of the spacecraft's size limitation, there is a limited payload weight for accommodating radio frequency instrumentation. In order to compensate for this equipment limitation and to accommodate the frequencies unique to the spacecraft, a large area ground antenna array is required. Existing antennas lack sufficient aperture, combined with beam steering mechanism, to provide this support. This project will provide an antenna system capable of receiving and transmitting with sufficient aperture to acquire the low power signals emitted by the Sunblazer spacecraft.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

VARIOUS LOCATIONS

FISCAL YEAR 1969 ESTIMATES

PHASED ARRAY ANTENNA SYSTEM



CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

POWER PLANT REPLACEMENT STADAN FACILITY - FAIRBANKS, ALASKA

AUTHORIZATION LINE ITEM: Various Locations

PROGRAM OFFICE FOR THE PROJECT: Office of Tracking and Data Acquisition

LOCATION OF PROJECT: Fairbanks, Alaska

COGNIZANT NASA INSTALLATION: Goddard Space Flight Center

TYPE OF CONSTRUCTION PROJECT: Replacement

FUNDING:

FY 1968 and Prior Years	$135,000
FY 1969 Estimate	1,875,000
Total Funding Through FY 1969	$2,010,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$675,000
Power plant building	Sq. Ft.	5,000	$45.00	225,000
Relocate and renovate three existing generators with switchgear	LS	---	100,000	100,000
Electrical distribution	LS	---	295,000	295,000
Utilities	LS	---	25,000	25,000
Site development	LS	---	30,000	30,000
Equipment				1,200,000
Generator sets with switchgear	KW	3,000	400.00	1,200,000

	Unit of Measure	Quantity	Unit Cost	Total Cost
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$1,875,000

PROJECT PURPOSE:

This project will provide an adequate and dependable power source for the Alaskan STADAN tracking station.

PROJECT DESCRIPTION:

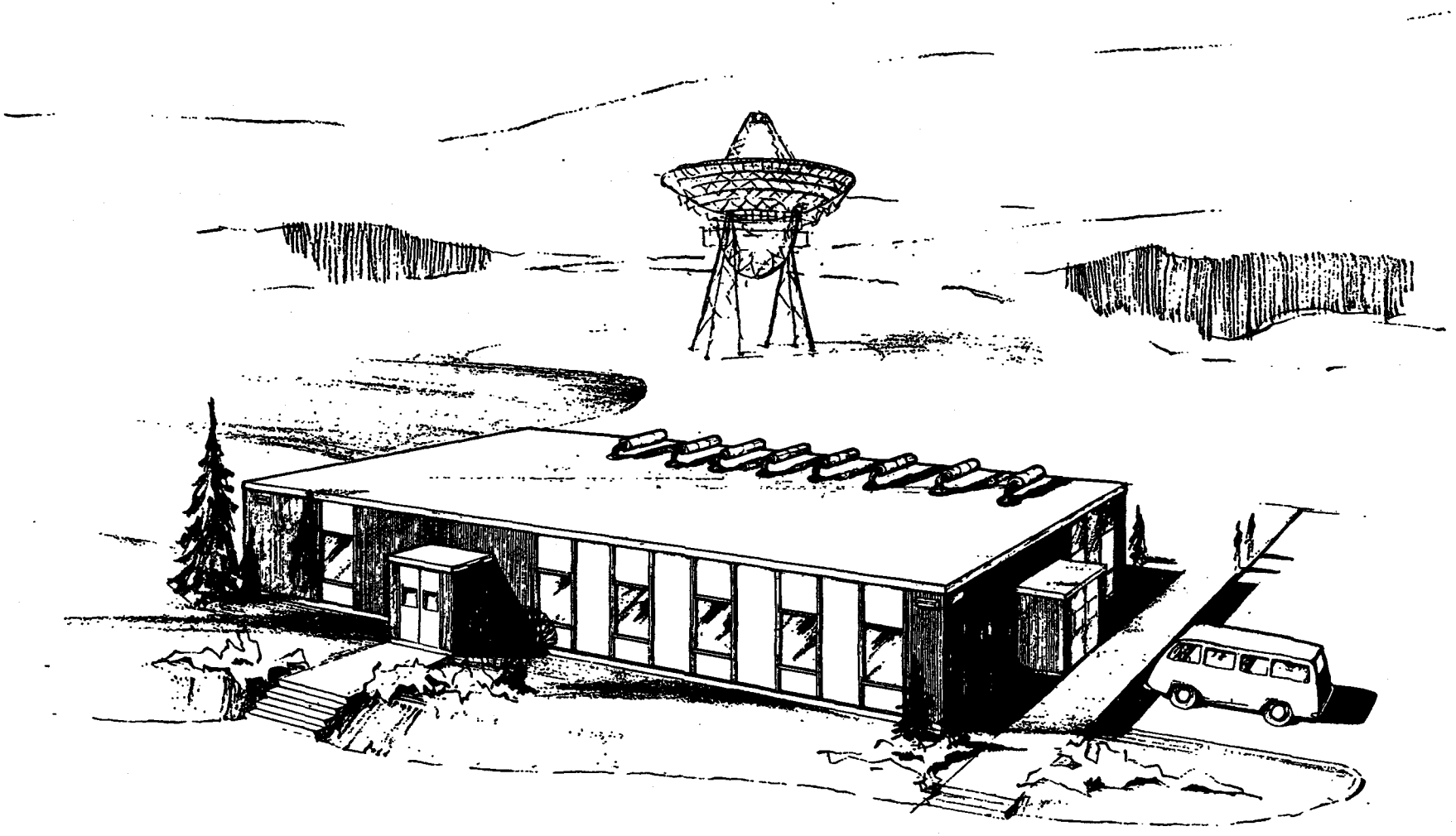
This project is for the construction of a 5,000 square foot, single story, 4,050 kilowatt (KW) power building at the STADAN facility at Fairbanks, Alaska. Three of the existing power generator units will be refurbished and relocated in the new power building. One existing power generator unit will be skid mounted to provide emergency transportable power for remote equipment within the complex, especially during the harsh winters. Additional new power generating units will be provided to replace wornout and obsolete units. After the power equipment is relocated, the existing power building will be modified and utilized for increased bulk storage and workshop area for this prime STADAN station.

PROJECT JUSTIFICATION:

The present power plant at the Alaska STADAN facility was constructed in 1960 and designed to provide power for a single 85 foot antenna system facility constructed to accommodate the scientific satellite program at that time. Since then, the station has been expanded by the addition of two satellite automatic tracking antenna (SATAN) receive and command systems, a range and range rate system, a Minitrack system, a 40 foot antenna system, and the ESSA 85 foot antenna. With the addition of each system, the power plant was augmented accordingly, to the extent that the present plant is inefficient and electrical distribution within the plant is below standards of an integrated electric power distribution system. In addition, the station does not have backup power for critical loads. Because of the large workload, 24 hours a day, each expansion or addition has been constrained to a point where the efficiency, economy and reliability of the power plant has been compromised. Since this is a key station in the STADAN, a new power plant is required to guarantee the uninterrupted support to the scientific and applications satellite programs. The proposed power building will provide an efficient generating system, with sufficient backup power to meet present and expanding operational requirements at the station.

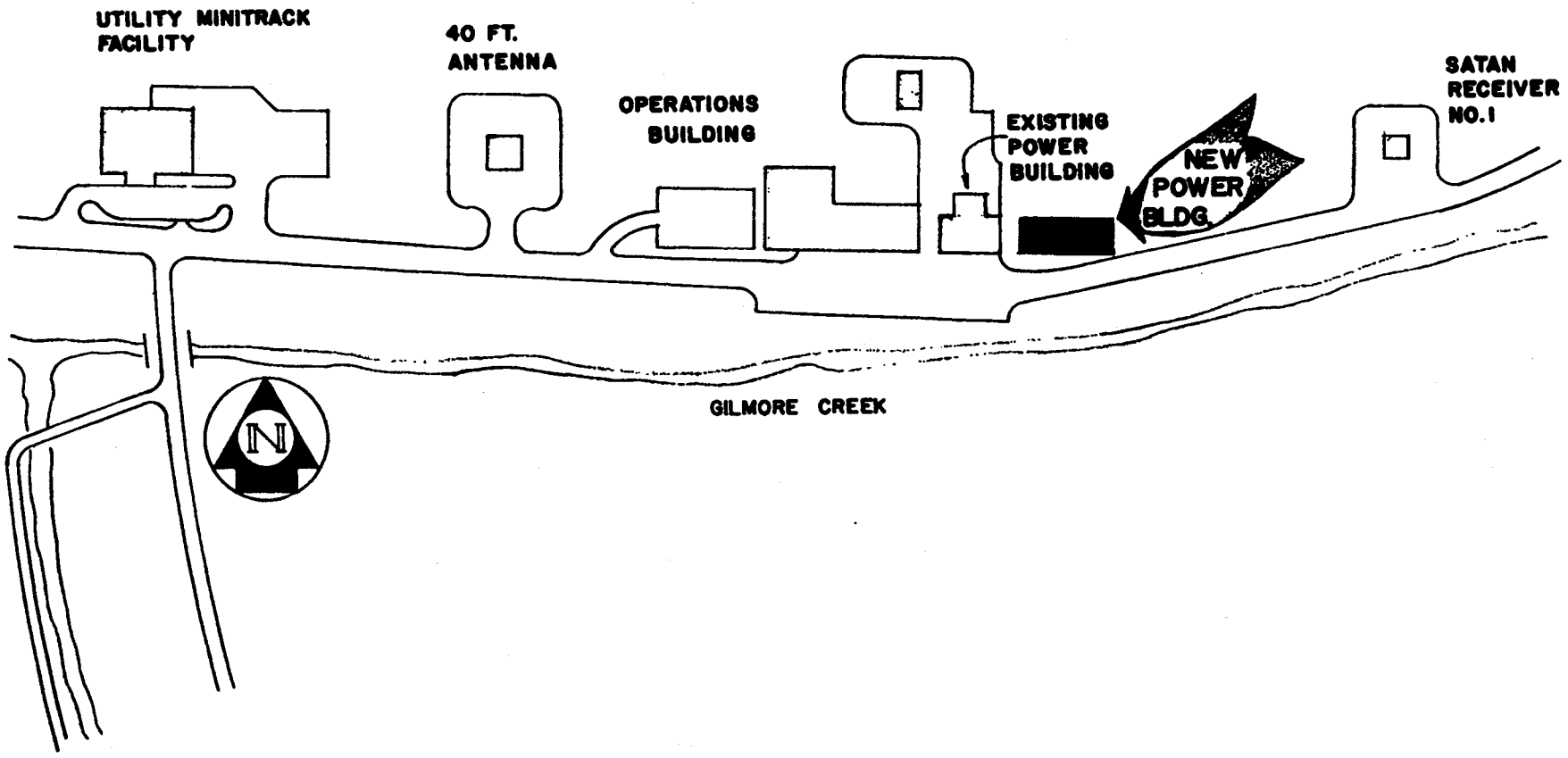
ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATES
POWER BUILDING, FAIRBANKS, ALASKA

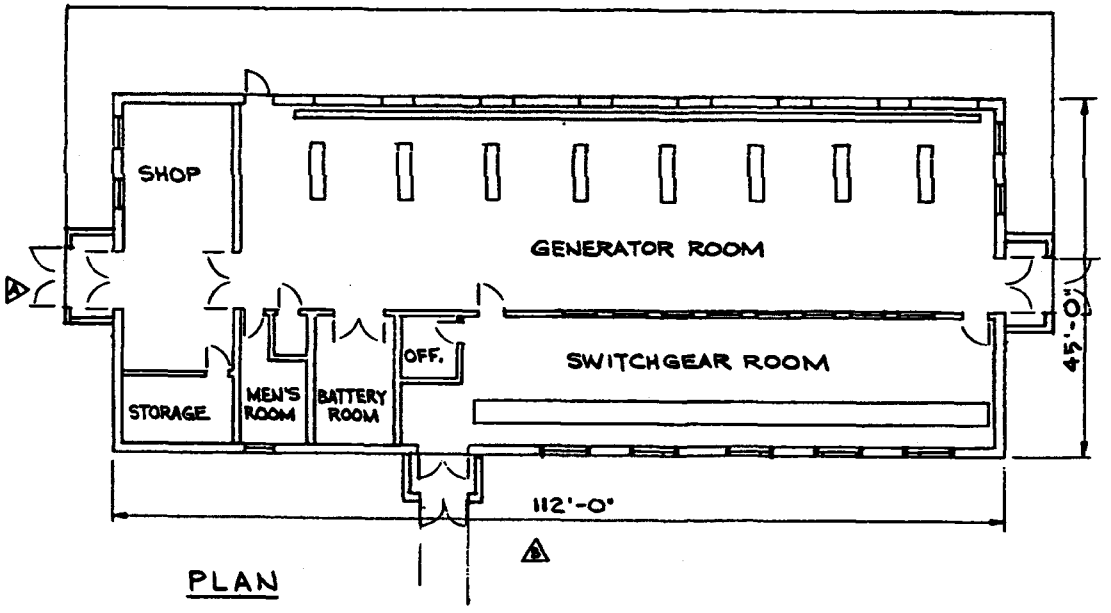


PERSPECTIVE OF POWER BUILDING
FAIRBANKS, ALASKA

VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATES
POWER BUILDING, FAIRBANKS, ALASKA

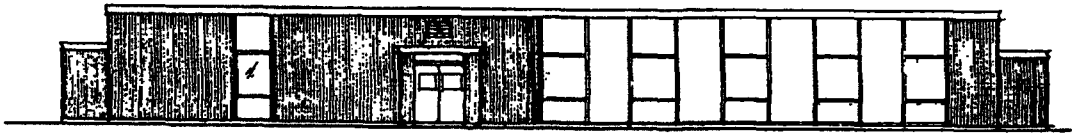


VARIOUS LOCATIONS
FISCAL YEAR 1969 ESTIMATES
POWER BUILDING, FAIRBANKS, ALASKA



PLAN

ELEVATION "A"



ELEVATION "B"

CF 6-30

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

FACILITY PLANNING AND DESIGN

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 19 69 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION		COGNIZANT PROGRAM OFFICE FOR INSTALLATION
All		Office of Deputy Administrator
LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
---	---	---

INSTALLATION MISSION

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 19 59 THRU CURRENT YR	FY 19 69 (Estimated)	FUTURE YEARS (Estimated)	TOTAL ALL YEARS (Estimated)
Facility Planning and Design	AD	52,865	3,000		Not Applicable
ALL OTHER PROJECTS		---			
TOTALS		52,865	3,000		

NASA FORM 1029 JUN 67 PREVIOUS EDITIONS ARE OBSOLETE.

GPO 923.682
CF 7-1

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1969 ESTIMATES

FACILITY PLANNING AND DESIGN

Facility planning and design involves activities which are carried on continuously at a level which is related to the overall magnitude of the construction program. The funds required to carry on these activities are included in the continuing Facility Planning and Design account which is separately authorized each year.

The funds requested are used to conduct advance planning and design activities on projects for which construction funds will be requested in subsequent budgets.

The $3.0 million request covers work in the following areas: (a) $1.0 million for preliminary designs and other special studies and (b) $2.0 million for the preparation of complete plans and specifications of those projects to be included in the FY 1970 construction program.

The $1.0 million for the first area covers the preparation and upgrading of master plans for the various NASA centers and other NASA installations, unforeseen construction studies, and the preparation of cost estimates and engineering studies which make up the preliminary designs for fiscal year 1971 construction program.

The $2.0 million for the second area covers the preparation of final and complete designs, plans, and specifications for an estimated FY 1970 facility construction activity amounting to a total of $50 to $60 million.

U.S. GOVERNMENT PRINTING OFFICE : 1968 O—286-389