NPS Form 10-900
(7-81)

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only
received
date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Saturn V Dynamic Test Stand

and/or common Dynamic Structural Test Facility

2. Location

street & number George C. Marshall Space Flight Center ___ **not for publication**

city, town Huntsville ___ **vicinity of** **congressional district**

state Alabama **code** 01 **county** Madison **code** 089

3. Classification

Category	Ownership	Status	Present Use	
___ district	_X_ public	___ occupied	___ agriculture	___ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
_X_ structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	_X_ yes: restricted	___ government	___ scientific
	___ being considered	___ yes: unrestricted	___ industrial	___ transportation
		___ no	___ military	_X_ other: Inactive

4. Owner of Property

name National Aeronautics and Space Administration (NASA)

street & number

city, town Washington ___ **vicinity of** **state** D.C. 20546

5. Location of Legal Description

courthouse, registry of deeds, etc. National Aeronautics and Space Administration (NASA)

street & number Real Property Management Office Code NXG

city, town Washington **state** D.C. 20546

6. Representation in Existing Surveys

title Historic Properties Report (Draft) **has this property been determined eligible?** ___ **yes** ___ **no**

date July 1983 _X_ **federal** ___ **state** ___ **county** ___ **local**

depository for survey records U.S. Army Redstone Arsenal

city, town Huntsville **state** Alabama

7. Description

Condition		Check one	Check one
X excellent	___ deteriorated	___ unaltered	X original site
___ good	___ ruins	X altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Dynamic Structural Test Facility was built in 1964 to conduct mechanical and vibrational tests on the fully assembled Saturn V rocket. The facility is 360 feet high and 122 feet by 98 feet at the base. It has a maximum center bay size of 74 feet by 74 feet, has a main derrick at the top of the structure capable of handling 200 tons at a 70 foot radius. The facility is connected by a cable tunnel to the East Test Area which provides instrumentation for testing. An elevator provides access to 15 of the 16 levels.

When in use the test vehicle rests on hydrodynamic supports which provide a maximum of 6 degrees of freedom of movement which is required when large space vehicles are dynamically tested. Vibration loads can be induced in the pitch, yaw, or longitudinal axis to obtain resonance frequencies and bending modes. Vertical mating procedures between stages can also be investigated and checked out.

After completion of testing for the Saturn V program the Dynamic Structural Test Facility was modified for testing the Space Shuttle. At the present time this facility is on a standby basis, but because of its unique capabilities to dynamically test large space vehicles, it will be retained for use in future NASA programs.

8. Significance

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion	
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science	
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture	
___ 1600–1699	___ architecture	___ education	___ military	___ social/ humanitarian	
___ 1700–1799	___ art	X engineering	___ music	___ theater	
___ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	X transportation	
X 1900–	___ communications	___ industry	___ politics/government	X other (specify) Space Exploration	
		___ invention			

Specific dates 1964-Present **Builder/Architect** NASA

Statement of Significance (in one paragraph)

The Dynamic Structural Test Facility is significant because of its connection with the testing and development of the Saturn V rocket.

The Saturn V rocket was one of the most reliable rockets ever built. Upon its success depended the fate of the Apollo program and the Skylab program. The success of the Saturn V was because of two factors: (1) the stringent reliability and quality assurance programs developed to oversee the manufacture of the Saturn V, and (2) exhaustive ground testing.

The ground testing program was crucial to the success of the Saturn V. Once launched a Saturn V could never be recovered for testing. Any flaw in the vehicle could result in the loss of the vehicle and the loss of the lives of the astronauts riding the Apollo Command Module.

The Saturn V had to work and perform its job successfully every time. There was no margin for error. Due to this fact as much as 50 percent of the total effort and money in the Saturn V program was devoted to ground testing the vehicle. Every component of the vehicle was tested again and again separately and in partial and full assembly.

The Dynamic Structural Test Facility at Marshall represented the last step in this testing process before a Saturn V was accepted for full flight status. Once all of the components were accepted and tested the Saturn V was assembled and brought to the Dynamic Structural Test Facility to test the entire vehicle under dynamic load conditions. Mechanical and vibrational tests on the flight vehicle and on separate flight configurations were conducted until the data indicated that the Saturn V was clean and ready for flight status. Testing conducted in this facility permitted NASA and industry engineers their last chance to detect and correct any problems or flaws in the fully assembled flight vehicle. The success of the Saturn V program and the fact that no Saturn V ever failed in flight is indicative of the contribution of this facility. Major problems capable of causing a failure of the vehicle were discovered and corrected before the Saturn V ever reached Launch Complex 39 at the Kennedy Space Center. When the Apollo 11 moon flight lifted off the pad in July 1969 the astonauts and NASA were confident that the Saturn V would complete its job and launch the Command and Lunar Landing Module into a safe moon-bound trajectory.

9. Major Bibliographical References

See continuation sheets

10. Geographical Data

Acreage of nominated property Less than 1 acre

Quadrangle name Madison **Quadrangle scale** 1:24,000

UMT References

	Zone	Easting	Northing
A	16	531060	3831960
B			
C			
D			
E			
F			
G			
H			

Verbal boundary description and justification

The boundary of the Saturn V Dynamic Test Stand is defined by the outside perimeter of Building 4550 at the Marshall Space Flight Center.

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Harry A. Butowsky

organization National Park Service **date** May 15, 1984

street & number Division of History **telephone** (202) 343-8168

city or town Washington, D.C. 20240 **state**

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national ___ state ___ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature

title **date**

For NPS use only

I hereby certify that this property is included in the National Register

date

Keeper of the National Register

Attest: **date**

Chief of Registration

Bibliography

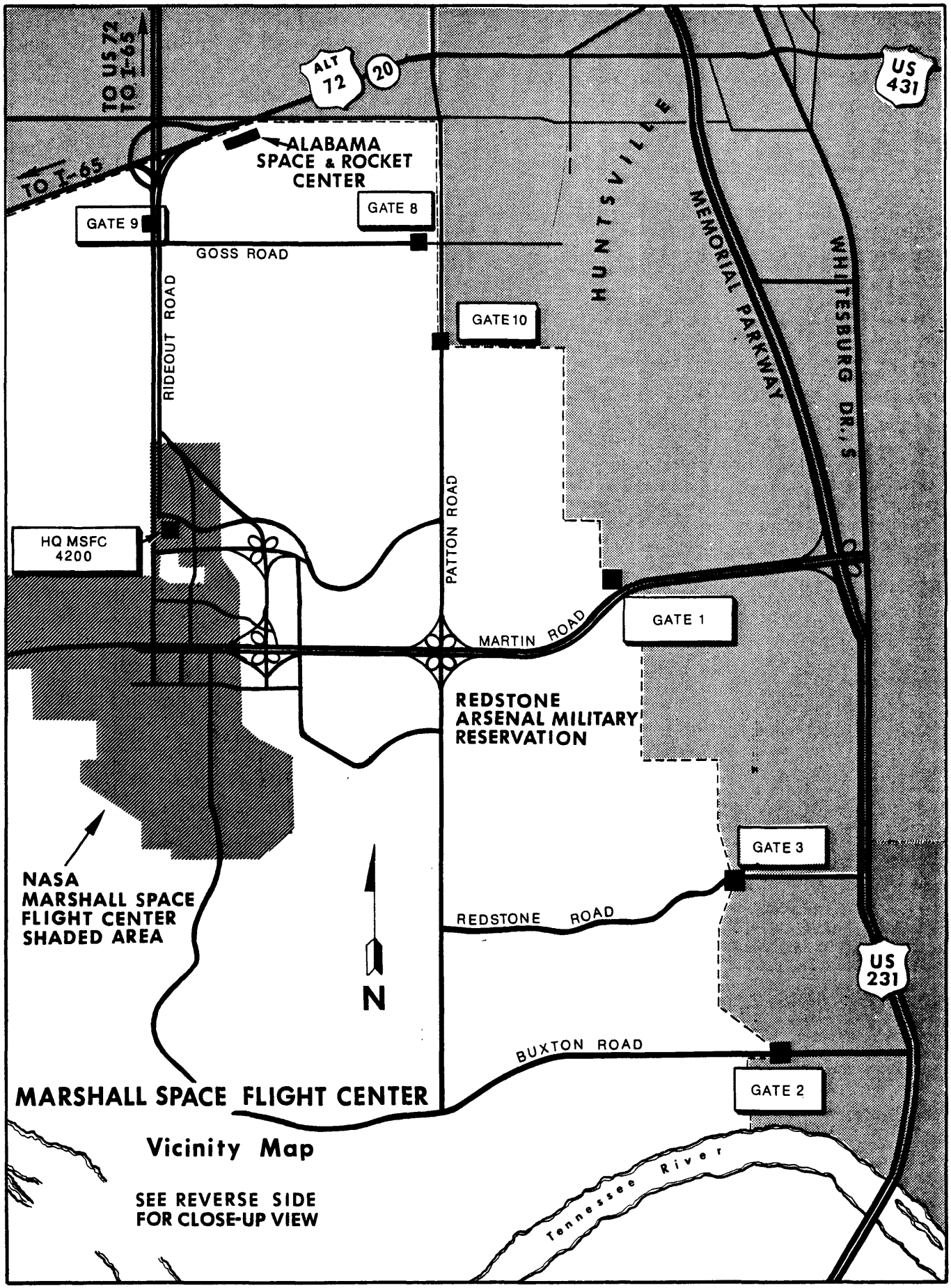
Bilstein, Roger B. Stages to Saturn: A Technological History of the Apollo/Saturn Launch Vehicles. Washington, D.C.: National Aeronautics and Space Administration, 1980.

Brooks, Courtney G., Grimwood, James M. and Swenson, Loyd S. Chariots for Apollo: A History of Manned Lunar Spacecraft. Washington, D.C.: National Aeronautics and Space Administration, 1979.

Draft Historic Properties Report: Redstone Arsenal, Alabama with the George C. Marshall Space Flight Center. Silver Spring, Maryland: Building Technology Incorporated, 1983.

Master Plan George C. Marshall Space Flight Center. Washington, D.C.: National Aeronautics and Space Administration, 1980.

Technical Facilities Catalog Vol. lll. Washington, D.C.: National Aeronautics and Space Administration, 1974.

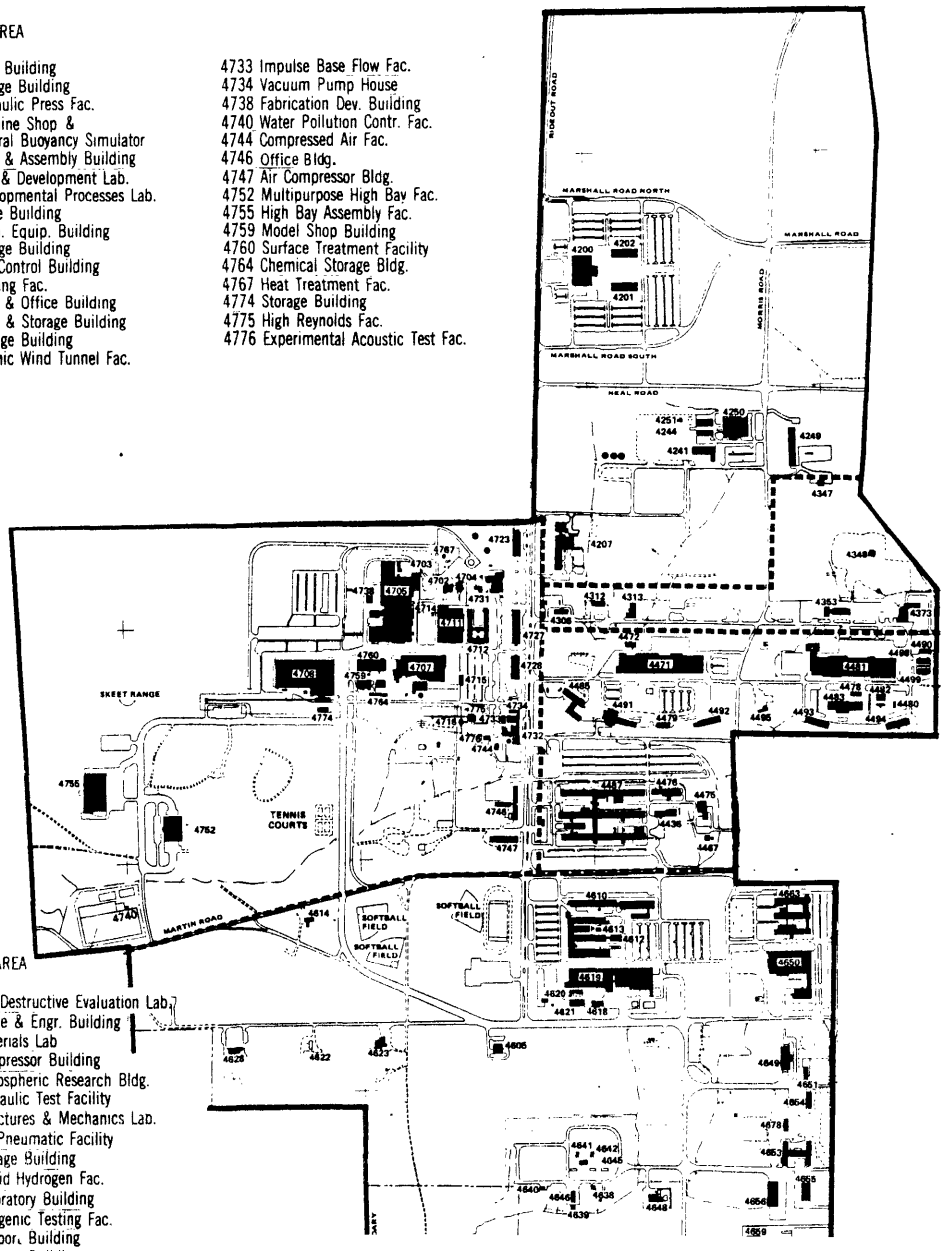

TO US 72
TO I-65
ALT 72
20
US 431
TO I-65
ALABAMA SPACE & ROCKET CENTER
GATE 8
GATE 9
GOSS ROAD
RIDEOUT ROAD
GATE 10
HUNTSVILLE
MEMORIAL PARKWAY
WHITESBURG DR.'S
PATTON ROAD
HQ MSFC 4200
MARTIN ROAD
GATE 1
REDSTONE ARSENAL MILITARY RESERVATION
GATE 3
NASA MARSHALL SPACE FLIGHT CENTER SHADED AREA
N
REDSTONE ROAD
US 231
BUXTON ROAD
GATE 2
MARSHALL SPACE FLIGHT CENTER
Vicinity Map
SEE REVERSE SIDE FOR CLOSE-UP VIEW
Tennessee River

MARSHALL SPACE FLIGHT CENTER, ALABAMA

FACILITIES SITE MAP

4700 AREA

4702 Shop Building
4703 Storage Building
4704 Hydraulic Press Fac.
4705 Machine Shop & Neutral Buoyancy Simulator
4707 Shop & Assembly Building
4708 Engr & Development Lab.
4711 Developmental Processes Lab.
4712 Office Building
4714 Mech. Equip. Building
4715 Storage Building
4716 Test Control Building
4723 Training Fac.
4727 Shop & Office Building
4728 Shop & Storage Building
4731 Storage Building
4732 Bisonic Wind Tunnel Fac.
4733 Impulse Base Flow Fac.
4734 Vacuum Pump House
4738 Fabrication Dev. Building
4740 Water Pollution Contr. Fac.
4744 Compressed Air Fac.
4746 Office Bldg.
4747 Air Compressor Bldg.
4752 Multipurpose High Bay Fac.
4755 High Bay Assembly Fac.
4759 Model Shop Building
4760 Surface Treatment Facility
4764 Chemical Storage Bldg.
4767 Heat Treatment Fac.
4774 Storage Building
4775 High Reynolds Fac.
4776 Experimental Acoustic Test Fac.



4600 AREA

4605 Non-Destructive Evaluation Lab.
4610 Office & Engr. Building
4612 Materials Lab
4613 Compressor Building
4614 Atmospheric Research Bldg.
4618 Hydraulic Test Facility
4619 Structures & Mechanics Lab.
4620 HP Pneumatic Facility
4621 Storage Building
4622 Liquid Hydrogen Fac.
4623 Laboratory Building
4628 Cryogenic Testing Fac.
4638 Support Building
4639 Support Building
4640 Support Building
4641 Support Building
4642 Support Building
4645 Hydraulic Equip. Support Bldg.
4646 Blockhouse
4647 Compressor Bldg.
4648 HP Test Facility
4649 Multipurpose High Bay Fac.
4650 Shop & Calibration Lab
4651 Shop Bldg.
4653 Components Service Bldg.
4654 Office Building
4655 Multipurpose High Bay Fac
4656 Hydraulic Equip. Dev. Fac.
4657 LH2 Vaporization Fac.
4659 HP GN2 Facility
4660 Boiler Plant
4663 Computer Fac.
4665 Historic Redstone Test Site
4666 Office Building
4667 Pump House
4668 Water Reservoir
4669 Water Reservoir
4670 Propulsion & Struct. Test Fac.
4671 Test Facility Support Bldg.
4672 Cryogenics Storage Fac.
4673 Fuel Tank
4674 Blockhouse
4678 Office & Storage Bldg.
4692 Cross-Connect Bldg (Assigned To Army)
4696 Propulsion Test Fac.
4697 Observation Bunker
4699 Structural Test Fac.

4200 AREA

4200 Office Building
4201 Office Building
4202 Office Building
4207 Communications Facility
4241 Shop & Storage Bldg.
4244 Storage Building
4249 Office Building
4250 Office & Shop Bldg.
4251 Equipment Shed

4300 AREA

4306 Office Building
4312 MSFC Security Hq
4313 Shop Building
4347 Solar Magnetograph Fac.
4348 Storage Building
4353 Photo Lab.
4373 Laboratory Building (Assigned to Army)

4400 ARFA

4436 Storage
4467 Celestial & Optical Sensors Fac.
4471 Storage & Office Bldg.
4472 Shop Building
4475 Hazardous Operations Lab.
4476 Environmental Test Fac.
4478 Equipment Shed
4479 Storage Shed
4480 Paint Shop
4481 Space Sciences Lab.
4482 Transportation Support Bldg.
4483 Vehicle Maint. Shop
4485 Office Building
4487 Laboratory & Ofc. Bldg.
4490 Storage Shed
4491 Documentation Repository
4492 Elec. Sys. Lab Bldg. (On Loan to Army)
4493 Shop & Storage Bldg.
4494 Center Activities Bldg.
4495 Shop Bldg.
4498 Storage Building
4499 Storage Building

4500 AREA

4514 Propulsion Sys. Test Std.
4516 LOX Storage Fac.
4517 LH_2 Storage Facility
4518 Hydrogen Transfer Control House
4519 LOX Transfer Control House
4522 Propulsion Sys. Component Test Std.
4523 Test Stand Terminal Bldg.
4525 LOX Transfer Control House
4526 LH_2 Transfer Control House
4527 LH_2 Storage Tank
4530 Propulsion Sys. Component Test Std.
4540 Model Propulsion Sys. Test (Acoustic)
4541 Test Stand Control Bldg.
4549 Deionized Water Plant
4550 Structural Test Fac.
4551 Struct. Test Fac. Terminal Bldg.
4552 Water Reservoir
4553 Test Fac. Terminal Bldg.
4554 Test Fac. Support Bldg.
4557 Structural Test Fac.
4558 Structural Test Fac. Terminal Bldg.
4561 Shop & Lab Bldg.
4562 Water Reservoir
4566 Office Building (On Loan to Army)
Pump and Boiler House
Blockhouse and Cable Tunnels
Propulsion & Struct. Test Fac.
Test & Data Recording Fac.
Cold Calibration Test Stand
Boiler

Saturn V Dynamic Test Stand
Building 4550
16/531060/3331960