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B-52 MAIN AND SATELLITE BASE INSTALLATIONS COST:
WARM AND COLD CLIMATE

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**B-52 MAIN AND SATELLITE BASE INSTALLATIONS COST:
WARM AND COLD CLIMATE**

This paper presents installation costs for use in the satellite base studies being made by the Cost Analysis Section.¹ The initial installation facilities costs are given for both warm and cold climates on Table I, page 2, for a main base (fully operational) and a satellite base (a base dependent upon the main base for periodic and field maintenance support, including armament and electronic field maintenance) at each of which are stationed 15 B-52's, with 15 refueling tankers (KC-135's). The rule of thumb for the determination of climate as stated by HqSAC is that any base above Little Rock, Arkansas, is cold, below, is warm. It is assumed that this will be a three-base complex with the main base a SAC base, and the satellite bases either SAC bases or civilian airfields. The costs are based on facility requirements estimates obtained from Lt. Colonel G. H. Ludwig, Chief, Planning Section, made by HqSAC, DCS/Materiel, Installation Division, and unit costs are as given in A. Weifenbach's "Installations Facility Requirements and Cost Estimating Procedures," D-2197-2, 26 April 1954, unless otherwise stated.

Manpower requirements for the main and satellite bases are given on Table II, page 8. These, and the following assumptions, were furnished for planning purposes by HqSAC in their document entitled "Estimated Manpower Requirements Dispersal Concept," dated December 20, 1954

¹ See D(L)-2648, "Preliminary Estimates of Operational and Satellite Dispersal Bases for SAC's Strategic Bombers," 22 December 1954, and D(L)-2595, "Rough Estimates of SAC Dispersal Costs," 24 November 1954, both by L. R. Sanchez.

Table I

SUMMARY OF INSTALLATION COSTS
15 B-52's/15 KC-135's on each base
(Millions of Dollars)

Category	Main Base		Satellite Base	
	Warm	Cold	Warm	Cold
A Airfield Requirements	12.366	12.301	12.366	12.301
B Liquid Fuel Storage, Dispensing & Supplying	1.229	1.229	1.224	1.224
C Communication, Nav aids, and Airfield Lighting	1.000	1.000	.917	.917
D Operational Facilities	.991	.991	.807	.807
E Maintenance Facilities	5.126	25.848	.909	13.483
F Training Facilities	.606	.606	.149	.149
G Troop Housing and Messing	3.218	3.218	1.442	1.442
H Family Housing	3.745	3.745	1.885	1.885
J Utilities	3.616	3.995	1.520	1.690
K Land	2.100	2.100	2.000	2.000
M Medical Facilities	.996	.996	.017	.017
N Storage Facilities	1.728	1.728	1.205	1.205
P Personnel Facilities	1.658	1.967	1.022	1.199
R Administrative Facilities	1.258	2.086	1.258	2.086
S Shops	.517	.517	.327	.327
	<hr/>	<hr/>	<hr/>	<hr/>
TOTAL COST	40.154	62.327	27.048	40.732
	<hr/>	<hr/>	<hr/>	<hr/>

- Assumptions:
- (a) The main base will furnish staff assistance to the satellite bases in Air Base Group functions.
 - (b) The primary ground training facilities will be at the main base.
 - (c) Each base will have operational capability to include "on base storage" of nuclear weapons with a loading and unloading capability.

The remainder of this document discusses deviations from the "typical" heavy bomber base,² and those requirements and costs published in the 4th revision of "Installations Facility Requirements Manual" too late for incorporation into A. Weifenbach's D-2197-2.

Stub apron parking of 180,210 square yards for the B-52's, mass apron parking of 66,112 square yards for tankers in cold climate, and mass apron parking of 223,360 square yards in warm climates are provided for both main and satellite bases. Stub apron parking is normally used to accommodate heavy bomber aircraft at a "typical" airfield. Paved shoulders, 50 feet wide, which hitherto have not been included in any B-52 heavy bomber estimates, are necessary for the taxiway and apron for not only jet blast protection but for essential support of aircraft outrigger gear and for snow removal equipment and emergency vehicles. The total yardage of paved shoulders at each base is 120,555 square yards, and is priced at \$1.00 a square yard.³

SAC Plan 1000 is programmed for the main base transmitter and receiver buildings. This allows 629 additional square feet to each building

² As given in "USAF Installations Facility Requirements Manual," August 1954, p. 1

³ Cost estimate made by J. J. O'Sullivan.

(normally 1,023 square feet) to provide space for additional equipment. The communications nav aids for the main and satellite bases are one each of the following:⁴ AACS Direction Finding, UHF/DF (AN/CRD-6 or AN/FRD-2), \$7,000; Tacan facility, permanent, (AN/URN-3) \$152,000; GSA Mobile (AN/CPN-4) \$49,000; and an Instrument Landing System Facility \$68,000. These, or similar facilities, are normally provided for on a "typical" airfield.

Field maintenance hangars of 151,982 square feet and an engine build-up shop of 40,144 square feet are planned for the main base to take care of the periodic and field maintenance needs of its own and its satellite bases. Nose-wing multi-purpose hangars at a million dollars each are provided, 22 for the main, 13 for the satellite in cold climates. These structures provide shelter for the forward portion of the aircraft and were developed to be used for organizational maintenance and periodic maintenance activities in lieu of maintenance hangars. Each standard nose/wing hangar, 28,270 square feet, will accommodate one heavy bomber. In temperate climates, 18 portable maintenance docks (9 for B-52's, 9 for KC-135's) at the main base and 6 (3 for B-52's, 3 for KC-135's) at the satellite bases are planned at a cost of \$71,000 each.

The facility requirements as given to us by HqSAC do not contain the utility specifications except for a five-mile railroad spur at the main base (which was listed under Category N, Storage Facilities). By using A. Weffenbach's factors (D-2197-2) expressed in terms of per man costs estimates for the main and satellite base were computed.

⁴ Cost of the nav aids are from the "Standard Facilities Equipment List."

From the scale diagrams, "Preliminary Plans, B-52 Dispersal Base," an estimate of 2854 acres for land requirements was calculated; however, in comparing the land requirements of 4200 acres for the heavy bomber air base given in A. Weifenbach's "Installations Facilities and Cost Estimating Procedures" (D-2197-2) this requirement appeared much too low. It was decided to use 4200 and 4000 acres for the main and satellite bases, respectively, at \$500 an acre.⁵

The 6000 square feet for flyaway kit storage provided at both the main and satellite bases is 57.9 per cent higher than the usual one squadron heavy bomber storage area requirement. Items that ordinarily are not included in storage facilities but which are stated in the SAC specifications include:

	Cost per Sq. Ft. ⁶	Main (Sq. ft.)	Satellite (Sq. ft.)
Ordnance Service and Inspection Plant	\$11	6,180	
Loading and Unloading Platform	5	2,500	2,500
Air Freight Terminal	8	1,200	500
Air Freight Storage	6.75	5,000	1,200
LOX Generator and Storage	8	2,500	2,500

With no description of these facilities, costs were estimated by using the cost per square foot of what was assumed to be analogous structures and applying this factor to the square footage as given above. The Ordnance Service and Inspection Plant which will take care of the

⁵ Average of acreage for Biggs, Carswell, Castle, Limestone, and Walker. Figures obtained from 3rd Supplemental to FY 53 budget, Land Acquisition.

⁶ Cost estimates made by J. J. O'Sullivan.

nuclear weapons was thought to be similar to the Armament and Electronics Shop included under Category E, Aircraft Maintenance, and this was costed in like manner at \$11 a square foot. The Air Freight Storage was considered comparable to an all-purpose warehouse which is estimated at \$6.75 a square foot.

Within Category R, Administration Facilities, facilities which effect personnel welfare have not been listed in the requirements of the SAC proposal, nor in the 4th Revision, "USAF Installation Facility Requirements Manual" summary of the installations of a one-heavy jet bomb wing, B-52. The cost of constructing these buildings, however, are within Category R, on Table II. An itemized list of the cost of these are as follows:

	<u>Main</u>	<u>Satellite</u>
	(Millions of Dollars)	(Millions of Dollars)
Laundry	.304	.304
Commissary Food Sales Store	.166	.080
Bakery	.098	.098
Post Office	.028	.015
Dependent School	.250	.125















The first three structures, according to the 4th Revision, would be constructed where commercial facilities are not available at a reasonable cost. The Post Office is "normally required for each installation" and the dependents school is provided when the "need for such facilities is justified."

An Ammunition shop, a facility containing, 2,370 square feet having concrete foundation walls, piers, floors and masonry walls with a blow-off type roof for use "in processing, surveillance, maintenance, modification, salvage, assembly and disassembly of ammunition and explosives" is provided for in Category S, Shops. This facility has not been required before, but the 4th Revision now states it is authorized for specified missions.

It will be noticed on Table I that the main and satellite bases' Airfield Requirements, Category A, in the warm climate are higher than those for the cold climate. The reason for this is that the apron hangar access yardage is about 47 per cent higher in the warm climates to accommodate the portable maintenance docks. Cold climates do not need this excess apron space as maintenance is performed in the nose/wing hangars.

Table II

MANPOWER REQUIREMENTS
(15 B-52 and 15 KC-135's on each base)

<u>Unit</u>	<u>Main Base</u>			<u>Satellite Base</u>		
	<u>Officer</u>	<u>Airmen</u>	<u>Civilian</u>	<u>Officer</u>	<u>Airmen</u>	<u>Civilian</u>
Wing Hq	47	120	3	21	75	1
B-52 Hq	109	267	--	109	267	--
Air Rescue Sq	79	185	--	79	185	--
Field Maintenance Sq	5	836	--	1	165	--
Periodic Maintenance	5	462	--	--	--	--
Armament-Electronics Maintenance Sq	10	239	--	5	116	--
						
Air Base Gp Hq	32	163	--	14	54	1
Installations Sq	5	47	--	2	23	248
Air Police Sq	10	317	--	5	194	--
Field Service Sq	1	85	--	1	42	--
Motor Vehicle Sq	2	186	--	2	96	--
Supply Sq	14	217	--	3	138	--
Operations Sq	15	117	--	8	82	--
Medical	42	119	--	19	60	11
TDA	15	175	400	--	--	--
						
TOTAL	391	3535	403	269	1497	261
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