

TITLE I REPORT
ON
ELECTRONICS AND STORES BUILDING
AND
FABRICATION BUILDING

REPORT TO STANFORD LINEAR ACCELERATOR CENTER- NO. ABA-44
STANFORD UNIVERSITY - ABA SUBCONTRACT S-128
UNDER STANFORD - AEC CONTRACT AT(04-3)-363

SLAC AHO 1991-012B14

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I. INTRODUCTION

This report presents the Title I work performed in regard to Electronics & Stores Building (Building #524) and Fabrication Building (Building #525). The work includes preliminary drawings depicting the buildings, plot plan, and process and utilities piping; outline specifications; schedule; and preliminary cost estimate.

The facilities covered herein are: Electronics & Stores Building, and Fabrication Building with all utilities wiring, piping, valves, controls and connections within 5 feet from building or foundations. Utilities distribution wiring, piping and associated equipment outside the 5 foot limit are not part of this submittal.

The buildings will be located on SLAC site, south from the Test Laboratory and north of the accelerator housing - klystron gallery extending from accelerator station 91 to station 95.

II. BASIS FOR DESIGN

A. GENERAL

The shop buildings as described herein are the result of extensive planning studies considering the laboratory overall requirements in regard to support shops.

The buildings will be designed to house, initially, the accelerator fabrication facilities, and eventually, the laboratory central shops for support of research and maintenance.

Several arrangements of the buildings were studied; the layout shown herein is considered to be most suitable, access to the buildings will be unrestricted and approximately 30,000 sq.ft. of contiguous clear yard area will be available for work outdoors, and capability for buildings expansion was maintained.

The buildings will be designed with some of the normal elements of the approved architectural vocabulary. The design utilizes pressed metal decking over a non fireproofed simple steel frame. Stacks and other elements on roof will be held to low profile configurations and will be positioned within the limits of a low sight screen. Roof overhangs will provide protection from sun and rain.

B. DESCRIPTION

1. Site - The topography of the site is gently sloping allowing run-off of rain and permitting easy access for service vehicles to the buildings and yard areas. The site will be screened by plantings as much as possible. The yard area paving, fencing, landscaping, etc. will be performed under a separate contract.

2. Buildings - The buildings will be conventional industrial type, one story, with mezzanine spaces for offices. Floors will be concrete slab. Walls will be metal siding on steel framing with concrete shear panels at ends of exterior column lines. Roofs will be built-up type over metal decking.

Pertinent Data

Fabrication Building	
Length (exterior)	200 ft.
Width (exterior)	120 ft.
Height	25 ft.
Gross area, ground floor	24,000 sq.ft.
Gross area, mezzanine floor	3,000 sq.ft.
Building volume	600,000 sq.ft.
Air conditioned areas (10 ft.ht.)	2,000 sq.ft.
Cranes	2 - 5 ton each

Electronics & Stores Building

Length (exterior)	200 ft.
Width (exterior)	120 ft.
Height	25 ft.
Gross area, ground floor	24,000 sq.ft.
Gross area, mezzanine floor	2,000 sq.ft.
Building volume	600,000 cu.ft.
Air conditioned areas (10 ft.ht)	1,000 sq.ft.
Cranes	1 - 5 ton

3. Utilities - Water and natural gas will be supplied from mains running parallel to road north of Shops Complex. Sewer lines will be connected to the main north of the Shop Complex. Low conductivity cooling water, compressed air, and hot water for heating will be supplied from Utility Building A. Electrical power will be supplied from the 60 kv substation. Local substation (Fabrication Building) will supply 480 volts, three phase and 208 y/120 volts.

4. Health and Safety - The buildings will be conventional industrial type facilities and the attendant health and safety hazards can be considered ordinary and typical to working environment. All applicable codes such as the Uniform Building Code and AEC Design Criteria will be followed in regard to health and safety and fire protection. The buildings will be constructed of non-combustible materials and will be sprinklered (except in Electronics Shop) throughout.

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III. OUTLINE SPECIFICATIONS

A. GENERAL

1. Occupancy - All shops Group F-2
Stores Group G
2. Type of Construction - IV (N)
3. Number of Stories - 1 with mezzanine
4. Location of Property - Fabrication Building separated on four sides.

Electronics & Stores Building - with the fire wall separation dividing the building, each portion is considered a building separated on three sides.

5. Area Limitations (UBC)

Type IV (N), Fire Zone III, all areas sprinklered except Electronics Lab. Sprinklered buildings of this Group are allowed unlimited area if separated on four sides.

UBC allows 9,000 sq.ft. for Group F-2. Type IV (N) increased by 33.3% for Fire Zone III = 12,000 sq.ft.

UBC also allows 2.5% increase in area for each foot beyond 20 foot side yard width for a building separated on three sides. 60' side yard, $60' - 20' = 40' \times 2.5\% = 100\%$ allowable increase or 24,000 sq.ft. allowable area.

Unsprinklered Electronics Lab = 13,000 sq.ft.

Group F-2 and G occupancies may be tripled in area for one story buildings if sprinklered.

$24,000 \text{ sq.ft.} \times 3 = 72,000 \text{ sq.ft.}$ allowable area.

Sprinklered Stores and Warehouse = 13,000 sq.ft.

6. Area Limitations (AEC)

AEC criteria limits non-combustible separated areas to 15,000 sq.ft. unsprinklered; and 40,000 sq.ft. sprinklered.

Gross area of Fabrication Building is 27,000 sq.ft. sprinklered.

The Warehouse portion of the Electronics & Stores Building contains 13,000 sq. ft. of sprinklered space and is separated by a 2 hour fire wall from the Electronics Lab portion of 13,000 sq.ft. of unsprinklered space.

B. FOUNDATIONS

Reinforced concrete spread footings. Concrete slab on grade designed for 250 lbs./sq.ft.

C. STRUCTURAL FRAME

Steel frame braced laterally by concrete shear panels at exterior column lines.

Mezzanine to be steel frame with floor of concrete over metal decking.

Basic frame to be designed to accommodate various bridge cranes: one of 5 ton capacity in the Electronics Lab; three of 5 ton capacity in the Fabrication Building.

D. ROOF

Built up tar and gravel roof on 1 inch rigid insulation over pressed metal decking.

E. EXTERIOR WALLS

Pressed metal painted.

Walls at exterior offices and air conditioned spaces will have additional insulation, vapor barriers and drywall finished surface, painted.

Certain exterior walls will be reinforced concrete for seismic shear panels and will be painted.

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Windows - Architectural projected aluminum sash with minimum operating panel.

Structural columns are exposed rolled steel sections,, painted.

F. INTERIOR WALLS AND PARTITIONS

2 hour fire wall between Electronics Lab and Stores will be one inch plaster both sides of metal studs. Offices and air conditioned spaces will be non-combustible construction. Toilet rooms, shower and locker rooms to have ceramic tile walls, bases, and wainscot over cement plaster.

G. FLOORS

Exposed concrete in shop areas.

Medium grade vinyl asbestos in office areas.

Ceramic tile in portions of toilet-shower-locker rooms.

H. CEILINGS

No finish in shop areas and utility rooms.

Suspended acoustic tile in office areas.

Suspended plaster in toilet-locker rooms.

I. DOORS

Interior - Hollow core wood with solid core wood in 1 hour corridor walls.

Exterior - Metal and glass and solid core wood doors.
Metal rolling doors in shop areas.

J. WINDOWS

See exterior walls

DS-B clear with tinted 7/32" sheet on west exposures.

K. ELECTRICAL

75 foot candle illumination in general shop areas.

100 foot candle illumination in offices and special shop areas.

25 foot candle illumination in Stores area.

General equipment power requirement in all shop areas: 10 VA/sq.ft.

Fabrication Building, one 750 kva substation.

L. MECHANICAL

Shop areas - Filtered, heated air, providing positive pressure in buildings, will be supplied by roof mounted heating and ventilating units. Precision fabrication and assembly shops will be air conditioned. Stores area will be provided with gravity ventilation and hot water unit heaters.

M. FIRE PROTECTION

The fire protection system will be designed to provide sufficient building equipment protection and still maintain optimum safety to personnel working around electronic equipment. The fire protection system includes an alarm system, hand extinguishers, hose racks, and automatic sprinklers.

N. COMMUNICATION SYSTEMS

The communications will consist of telephone, public address, and intercom systems.

O. UTILITIES

Shop air and hot water will be provided from Utility Building A. Cooling water (low conductivity) will be provided from the Laboratory area facilities. Domestic water and natural gas will be supplied from area mains. Compressed air, cooling water and domestic water will be distributed overhead throughout shops and fabrication area with provisions for drops at each column. Sufficient drops will be provided to satisfy immediate requirements. Two-inch natural gas lines will be brought into the buildings with a plugged valve. Distribution of gas will depend on equipment installation in future.

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O. UTILITIES Continued

Low conductivity water piping 3 inches and larger shall be aluminum with butt weld fittings and aluminum valves. Piping less than 3 inches shall be copper with solder joint fittings and brass valves.

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IV. SCHEDULE

	<u>Time</u>	<u>Date</u>
Title I Submittal		4-16-62
Revisions	--	--
Review and Approval by SLAC and AEC	2 weeks	4-27-62
Start of Title II work		4-30-62
Title II 50% Submittal	5 weeks	6-1-62
Title II 90% Submittal	4 weeks	7-6-62
Review and Approval by SLAC and AEC	3 weeks	7-20-62
Corrections and Reproduction of Contract Documents	2 weeks	8-3-62
Bidding Period	4 weeks	8-31-62
Analysis of Bids and Award of Contract	2 weeks	9-14-62
*Construction Period	8 months	5-17-63

*Based on assumption that structural steel contract will be awarded by August 17, 1962.

V. LIST OF DRAWINGS

<u>Drawing Number</u>	<u>Date</u>	<u>Title</u>
D-524/525-001	4-13-62	Site Location & Site Plans
D-524/525-000	4-13-62	Floor Plans
D-524/525-101	4-13-62	Exterior Elevations & Sections
D-524/525-500	4-13-62	Mechanical & Electrical Plan

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VI. COST ESTIMATE, PRELIMINARYSUMMARY

Electronics & Store Building	<u>Cost, Dollars</u>	<u>Total Cost, Dollars</u>
Architectural - Structural	274,200	
HVAC & PLUMBING	60,250	
Electrical	52,800	
Fire Alarm & Commun. System	2,600	
Fire Protection Systems	<u>8,000</u>	
Total		<u>\$397,850</u>

Fabrication Building		
Architectural - Structural	281,900	
Mechanical Heat-Transfer	14,000	
HVAC & Plumbing	81,300	
Electrical	83,250	
Fire Alarm & Commun. System	1,400	
Fire Protection Systems	<u>11,000</u>	
Total		<u>\$472,850</u>

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COST ESTIMATE DETAILS

ITEM	UNIT	UNIT COST	COST	TOTAL COST
Electronics & Stores Building				
Architectural - Structural				
Earthwork and rock fill	970 c.y.	\$4.85	\$ 4,700	
Concrete - Reinf. steel -forms	835 c.y.	61.00	51,000	
Structural Steel - Misc. iron	300 tons	366.00	110,000	
Metal Siding and Decking	41,000 sq.ft.	.85	35,000	
Roofing and 1" rigid insul.	28,000 sq.ft.	.41	11,500	
Sheet metal	LS	-	4,700	
Carpentry insulation	LS	-	5,000	
Ceramic Tile -	1,000 sq.ft.	3.00	3,000	
Toilet partitions-Screens	14 ea.	100.00	1,400	
Doors-Frames-Hardware	30 ea.	110.00	3,300	
Metal Sash - Glazed	2,500 sq.ft.	3.00	7,500	
Gypboard	7,000 sq.ft.	.85	6,000	
Rolling Doors	800 sq.ft.	6.00	4,800	
Lath & Plaster (2 hr.fire wall)	2,700 sq.ft.	1.75	4,700	
Painting	LS	-	12,300	
Resilient Floors -Base-Caulking	3,000 sq.ft.	.70	2,100	
Acoustical Ceiling	2,700 sq.ft.	.60	1,600	
Miscellaneous Items	LS	-	5,600	
			277,400	\$ 274,200

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HVAC & PLUMBING

	<u>COST</u>	<u>TOTAL COST</u>
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Air Conditioning, Precision Shop	6,250	
Heat. & Ventilating, Pressur.	16,500	
Heat. & Ventilating, Wash Room	750	
Heat. & Ventilating, Offices	2,850	
Hot Water, S & R	6,250	
Heat. & Ventilating, Stores	6,900	
Plumbing	12,500	
Process Piping	8,250	
		\$ 60,250

ELECTRICAL

House Loads (166 kva)	37,050	
Equipment Loads (180 kva)	15,750	
		\$ 52,800

FIRE ALARM & COMMUNICATIONS SYSTEM

Fire Alarm System	2,500	
Communications	100	
		\$ 2,600

FIRE PROTECTION

Sprinkler System	8,000	
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FABRICATION BUILDING	UNIT	UNIT COST	COST	TOTAL COST
Architectural - Structural				
Earthwork and Rock Fill	970 c.y.	4.85	4,700	
Concrete - Reinf.Steel-Forms	850 c.y.	61.00	52,000	
Structural Steel-Misc.Iron	311 tons	366.00	114,000	
Metal Siding and Decking	42,000 sq.ft.	.85	35,700	
Roofing and 1" rigid insul.	28,000 sq.ft.	.41	11,500	
Sheet Metal	LS	-	4,700	
Carpentry - Insulation	LS	-	5,000	
Ceramic Tile -	1,000 sq.ft.	3.00	3,000	
Toilet Partitions - Screens	14 ea.	100.00	1,400	
Doors - Frames - Hardware	35 ea.	110.00	3,850	
Metal Sash - Glazed	2,700 sq.it.	3.00	8,100	
Gyp.Board Partitions	100,000 sq.ft.	.85	8,500	
Rolling Doors	800 sq.ft.	6.00	4,800	
Painting	LS	-	12,000	
Resilient Floors - Base-Caulk.	5,400 sq.ft.	.70	3,800	
Accoustical Ceiling	5,400 sq.ft.	.60	3,250	
Miscellaneous Items	LS		<u>5,600</u>	
			281,900	

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	<u>COST</u>	<u>TOTAL COST</u>
MECHANICAL HEAT-TRANSFER		
Piping, Low Cond. Cooling Water	\$7,420	
Valves & Fittings	5,980	
Compression Tank	600	
		<hr/> \$14,000

HVAC & PLUMBING

Air Conditioning, Precision & Ass'y Shop	12,500	
Heat & Ventilating, Pressurized	30,000	
Heat & Ventilating Offices	2,800	
Heat & Ventilating, Wash Room	750	
Vent., Mech. Eq. Room	450	
Hot water, S & R	6,250	
Plumbing	20,250	
Process Piping	8,300	
		<hr/> \$81,300

ELECTRICAL

House Loads (²⁵⁷ 257 kva)	52,250	
Equipment Loads (440 kva)	31,000	
		<hr/> \$83,250

FIRE ALARM & COMMUNICATION SYSTEM

Fire Alarm System	1,300	
Communications	100	
		<hr/> \$ 1,400

FIRE PROTECTION

Sprinkler System	\$11,000
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