


TITLE I REPORT
FOR
FOUNDATION GRADING AND CROSS DRAINAGE
STA. -(2+25) TO STA. 30+50
FOR THE
ACCELERATOR HOUSING

REPORT TO STANFORD LINEAR ACCELERATOR CENTER - NO. ABA-46
STANFORD UNIVERSITY SUBCONTRACT S-128
UNDER AEC CONTRACT AT(04+0)-363

SLAC AHO 1991-012B14

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I INTRODUCTION

This report presents results of Title I work for providing the Accelerator Housing foundation from Station -(2+25) to Station 30+50. The construction will consist of excavation to a suitable foundation, the placement of foundation fill, and the installation of the cross drainage culvert at Station 21+00.

In addition the general plan (preliminary study) and design and construction schedule for the entire length of Accelerator Housing and Klystron Gallery are included as an appendix to this report.

II PURPOSE AND SCOPE

The purpose of this report is to present the plan, cost estimates, and design and construction schedule for constructing the first increment of foundation for the Accelerator Housing including the culvert at Station 21+00. This initial work has been separated from the remaining foundation work for the following reasons:

1. The excavations will expose, at an early date, foundations that may not be satisfactory for the Accelerator Housing unless special remedial measures are made. Presently available soils and geologic data indicate that, in the vicinity of Station 12+00. the foundation material may be somewhat unstable with a maximum of differential settlement, rebound, and lateral movement. Early exposure of this foundation will give adequate time to make necessary studies, prepare specifications, and to do what additional work might be needed.

2. The completion of a portion of the construction at an early date will help ensure that the whole construction phase for the Accelerator Housing and Klystron Gallery will be completed on schedule.

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III DESCRIPTION OF WORK

The foundation construction will involve trench excavation for practically the full length from the west end to Station 30+50. A slight amount of fill will be required to establish the grade across the draw at Station 21+00. A 54-inch culvert will be installed in this draw to carry the drainage under the Accelerator Housing. The bottom width of trench will be a maximum of 46 feet, however this width is being reviewed and may be reduced depending on the results of studies presently being concluded. The trench sideslopes which will be temporarily exposed are expected to be stable at 1 to 1 for the most part with flatter slopes at $1\frac{1}{2}$ to 1 in less stable material. Slopes of $\frac{1}{2}$ to 1 will be provided if sound rock is encountered. Benches, 10 feet wide, will be provided at 30-foot vertical intervals. Permanently exposed cut slopes are assumed to be stable at 2 to 1 in over-burden and 1 to 1 in rock. Erosion will be minimized on the permanently exposed cut slope by roughening the surface, covering with straw, and rolling with a special roller or covering with wire netting.

Topsoil will be stripped and neatly stockpiled in all areas where excavation occurs or where embankment will be placed. Excavation will be made to the foundation grade in all locations where a suitable foundation material exists. Objectionable materials such as clays, claystones, and badly sheared materials, where encountered at foundation level, that exhibit severe rebound characteristics and which would undergo excessive consolidation under the proposed fill loads, will be removed and will be replaced with a select material compacted to approximately 95 per cent of the maximum density determined by the Modified AASHO method of compaction testing. Slope rounding will be performed on the tops of all slopes.

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The Claystone formations which occur in the area may undergo excessive volume changes due to slaking when exposed to air after excavation. Tests are planned on samples obtained from the present drilling operation to determine if this is the case and if chemical treatment will be required to prevent this.

At the draw, Station 21+00. where the grade will be above the original ground for a short distance, the original ground will be excavated to a suitable foundation material and a select fill will be placed and compacted up to grade.

The excavated materials will be separated into three classes according to their use in the shielding fill and stockpiled. The three classes are (1) topsoil, (2) select materials for use in the central core of the shielding fill and under the Klystron Gallery where minimum settlements are required and (3) materials for use in the embankment where settlements are not as critical. The stockpiles will be neat, graded to prevent erosion, will not block drainage, and will be easily accessible for removal.

IV BASIS FOR DESIGN

Alignment, Elevations and Grade

The alignment, elevations, and grade for the Accelerator Housing were determined from a total earthwork study involving excavation and placement of shielding fill along the Accelerator Housing, Beam Switchyard, and End Stations. Cut and fill quantities were balanced. Shielding fill to a depth of 25 feet (including concrete) was provided over the Accelerator. Top width of the embankment at Klystron Gallery level will be approximately 90 feet and the longitudinal centerline of the embankment will be 6'-10" south of the accelerator housing centerline. The top of the embankment will be above the maximum water surface (El. 297) in the reservoir impounded by the proposed San Francisquito Creek Flood Control Dam.

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Bottom Width of Trench

The bottom width of trench will be a width which will result in economical working space when considering construction procedures for trench excavation (practically all of which is expected to be capable of being ripped with heavy equipment), concrete placement, and backfill placement and compaction with heavy equipment. The optimum width of trench is under study and at the present time and for purposes of this report it was assumed to be 46 feet.

If sound rock is found to occur for any substantial length along the Accelerator Housing (which present data does not indicate), the trench width will be narrowed to provide only sufficient space for concrete form installation and removal and installing the longitudinal open joint or perforated pipe subsurface drains. The side slopes would probably be cut on a $\frac{1}{2}$ to 1 slope and a wide working bench for concreting operations would be provided on both sides of the housing at about top of housing level.

Trench Sideslopes

The trench sideslopes for temporary construction cuts and for permanently exposed cuts were based on providing the necessary slope stability as determined from available soils and geologic information. Slopes will be adjusted to suit if subsequent soils and geologic information show materials to be different from what is now known.

54-inch Culvert

Corrugated metal pipe has been selected for culverts because of their flexibility and also their low initial cost. This selection is based on the assumption that the installation of metal pipes close to the Accelerator Housing presents no problems in regard to radiation contamination. The 54-inch C. M. P. culvert under the accelerator housing at Station 21+00. is larger than is required to pass the design storm. This is to permit concrete lining to insure watertightness in the event the Ladera Dam is built and the culvert serves as a pressure conduit during flood stages. The oversizing of culverts in connection with this project is further justified since they may serve as conduits for utility crossings at some future date.

V TIME SCHEDULE

<u>Event</u>	<u>Date</u>	<u>Time</u>
<u>Title I</u>		
Submittal Rev. #1	6/8/62	
Review and approval by SLAC	6/8/62 - 6/15/62	1 week
 <u>Title II</u>		
Design	6/15-8/10/62	8 weeks
Submittal	8/10/62	
Review and approval by SLAC	8/10-8/17/62	1 week
Revisions per SLAC's comments	8/17-8/24/62	1 week
Reproduction of contract documents	8/10-8/31/62	1 week
Bidding	8/31-9/14/62	2 weeks
Review of bids	9/14-9/21/62	1 week
Award Contract	9/21/62	
Construction		3 months

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VI DRAWING LIST

Accelerator Housing - Earthwork 1st Increment, Grading and Cross Drainage General Plan, Stockpile Areas and Profile	D 501 001 Rev.
Accelerator Housing - Earthwork 1st Increment, Grading and Cross Drainage Plan, Profile and Sections	D 501 002 Rev. 1

VII COST ESTIMATES

<u>Acct. No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Amount</u>
501	Clear and Grub	1	Job	\$10,000.00	\$10,000.00
501	Stripping	8,000	Cu.Yd.	.30	2,400.00
501	Excavation, housing trench	437,000	Cu.Yd.	0.50	218,500.00
501	Foundation fill	3,000	Cu.Yd.	1.00	3,000.00
501	Embankment, yard	15,000	Cu.Yd.	0.20	3,000.00
501	Overhaul	5,600,000	Sta.Yd.	0.003	16,800.00
501	Slope Protection	4	Ac.	900.00	<u>3,600.00</u>
501	Subtotal				\$257,300.00
410	Excavation, drainage structures	2,000	Cu.Yd.	2.50	5,000.00
410	Excavation, ditch & channel	9,000	Cu.Yd.	1.50	13,500.00
410	Backfill around structures	1,700	Cu.Yd.	4.50	7,650.00
410	54-inch CMP	400	L.F.	45.00	<u>18,000.00</u>
410	Subtotal				\$ 44,150.00
	Total Construction Cost				\$301,450.00
	Contingency Item				
501	Chemical treatment to Prevent Air				
	Slaking of Shales	225,000	S.F.	0.04	\$ 9,000.00
	Engineering, Design &				
	Inspection (Titles I, II & III)				\$25,000.00

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