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Preliminary planning for permafrost research at the Resources and Development School and Teacherage Construction Project, Aklavik, N.W.T.

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NATIONAL RESEARCH COUNCIL OF CANADA

DIVISION OF BUILDING RESEARCH

No.
143

TECHNICAL NOTE

NOT FOR PUBLICATION

FOR INTERNAL USE

PREPARED BY J. A. Pihlainen CHECKED BY

APPROVED BY *RK*

PREPARED FOR Robert F. Legget

DATE March, 1953.

SUBJECT Preliminary Planning for Permafrost
Research at the Resources and Development
School and Teacherage Construction Project,
Aklavik, N.W.T.

TECHNICAL NOTE

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PREPARED BY J. A. Finlaiden

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March, 1953.

SUBJECT Preliminary Planning for Permafrost
Research at the Resources and Development
School and Teachers' Construction Project,
Arivik, N.W.T.

MAILED

General:

The Department of Resources and Development will construct a ten room school and an eight apartment teacherage at Aklavik, N.W.T. during 1953 and 1954. This Division of the National Research Council has been offered the opportunity to study the effect of the structures on permafrost conditions and has been assured the cooperation of all government departments engaged in the design and construction of the structures.

The purpose of this note is to review the general details of permafrost research which could be carried out. At this point I would like to record the kind cooperation of Mr. C.V.F. Weir, Chief, Engineering and Architectural Section, and Mr. Robinson, Architectural Section, Department of Resources and Development for details on the design of the structures.

Aim:

The primary aim of this project will be to record data on the effects of buildings with pile foundations on permafrost conditions. The project will also yield valuable information on permafrost and soil conditions at Aklavik.

Work Schedule:

The following work schedule is recommended for installation of the 14 thermocouple strings:

The portable drill rig and other equipment will be shipped to Aklavik from Norman Wells by the first boat during the summer of 1953. With the arrival of this equipment at Aklavik, the Resident Research Officer at the Permafrost Research Station, Norman Wells, will fly to Aklavik. It is estimated that approximately three weeks will be required to drill the exploratory and thermocouple bore holes. Making and initial installation of the thermocouple strings will take approximately two weeks. The equipment and the Research Officer will then return to Norman Wells. The final installation of switch equipment will be made when the building has been completed in 1954. Thermocouple readings will then be taken monthly.

Thermocouple Installations:

Eight thermocouple strings (averaging five thermocouples per string) are proposed for the ten room school and

six strings for the teacherage. At first glance this may seem to be a large number of installations since significant differences in soil temperatures are not expected. All, and even more, of the proposed installations are recommended since installation before the structures are built is relatively simple and inexpensive. Discontinuing readings of a thermocouple string if significant temperature differences are not indicated, amounts to a loss in materials of approximately fifteen dollars.

Several details of the installations are shown in sketches at the end of this report as follows:

- Sketch #1 -- Lot plan and location of buildings
- Sketch #2 -- School - location of thermocouple strings
- Sketch #3 -- Teacherage - location of thermocouple strings
- Sketch #4 -- Typical thermocouple string.

Cost Estimates:

The following notes record approximate estimates on the costs of the project. The breakdown suggests the cost which, if approved, could be borne by the Division and the Department of Resources and Development.

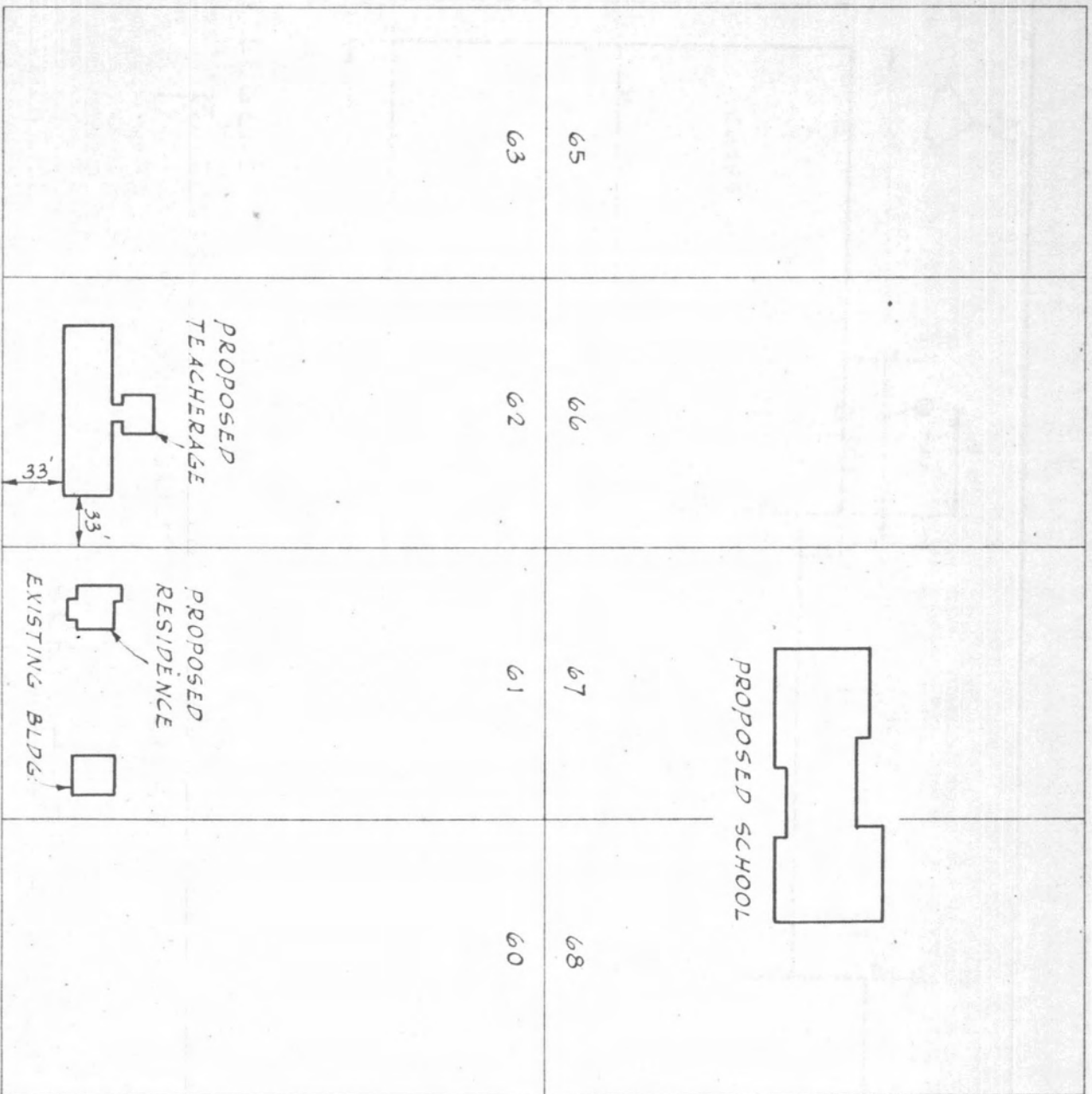
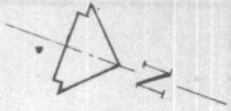
Division of Building Research Costs:

<u>Item</u>	<u>Description</u>	<u>Cost</u>
1.	Transportation - C.P.A. Norman Wells, Aklavik and return: 1 person summer 1953 1 person summer 1954	\$200 200
2.	Shipping - Soil Samples from Aklavik to Norman Wells Drill rig and equipment by boat from Norman Wells to Aklavik and return (1,000 lbs. at \$15/100 lbs.)	100 150
3.	Room and board - 1 person (N.R.C.) 5 weeks (1 week at \$45.00)	225
4.	Thermocouple wire - 3,500 ft. copper-constantan #20 (\$0.11 /ft.)	385
5.	Switches - 4 - 28 pt. Lewis switches at \$90.00 each	360
6.	Miscellaneous	100
	TOTAL (N.R.C.)	<u>\$1,720</u>

Resources and Development Costs:

7.	Drill rig shelter - Wooden shed approx. 10 ft. X 18 ft.	300
8.	1 Driller Helper - 5 weeks, 300 hrs. at \$1.50	450
9.	Miscellaneous (scrap lumber, electricity etc.)	100
	TOTAL (Res. & Dev.)	<u>\$850</u>

TOTAL N.R.C. and R.D. \$2,570



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SKETCH NO 1

PLAN - LOCATION of BUILDINGS

SCALE: 1" = 100'



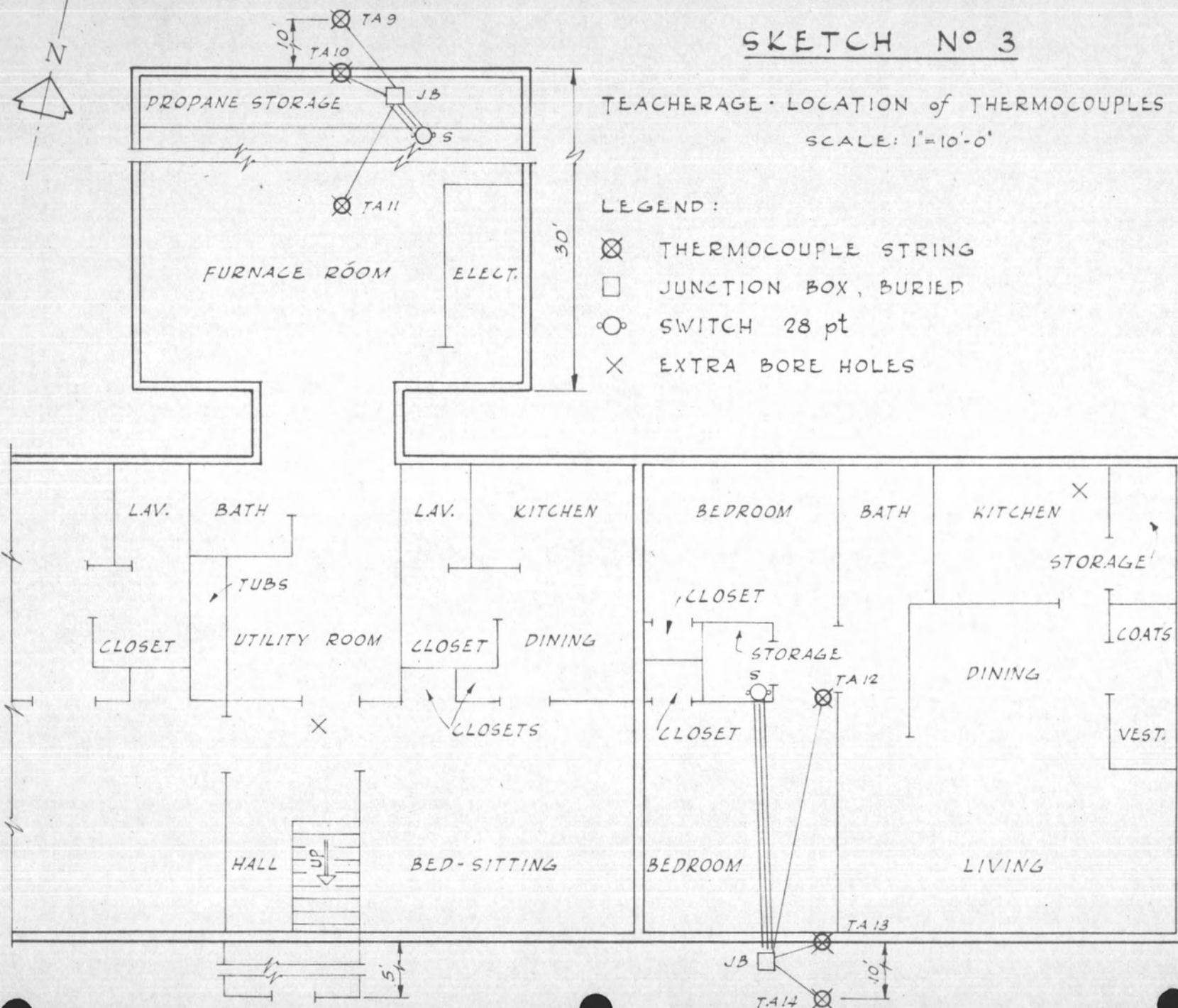
SKETCH NO 3

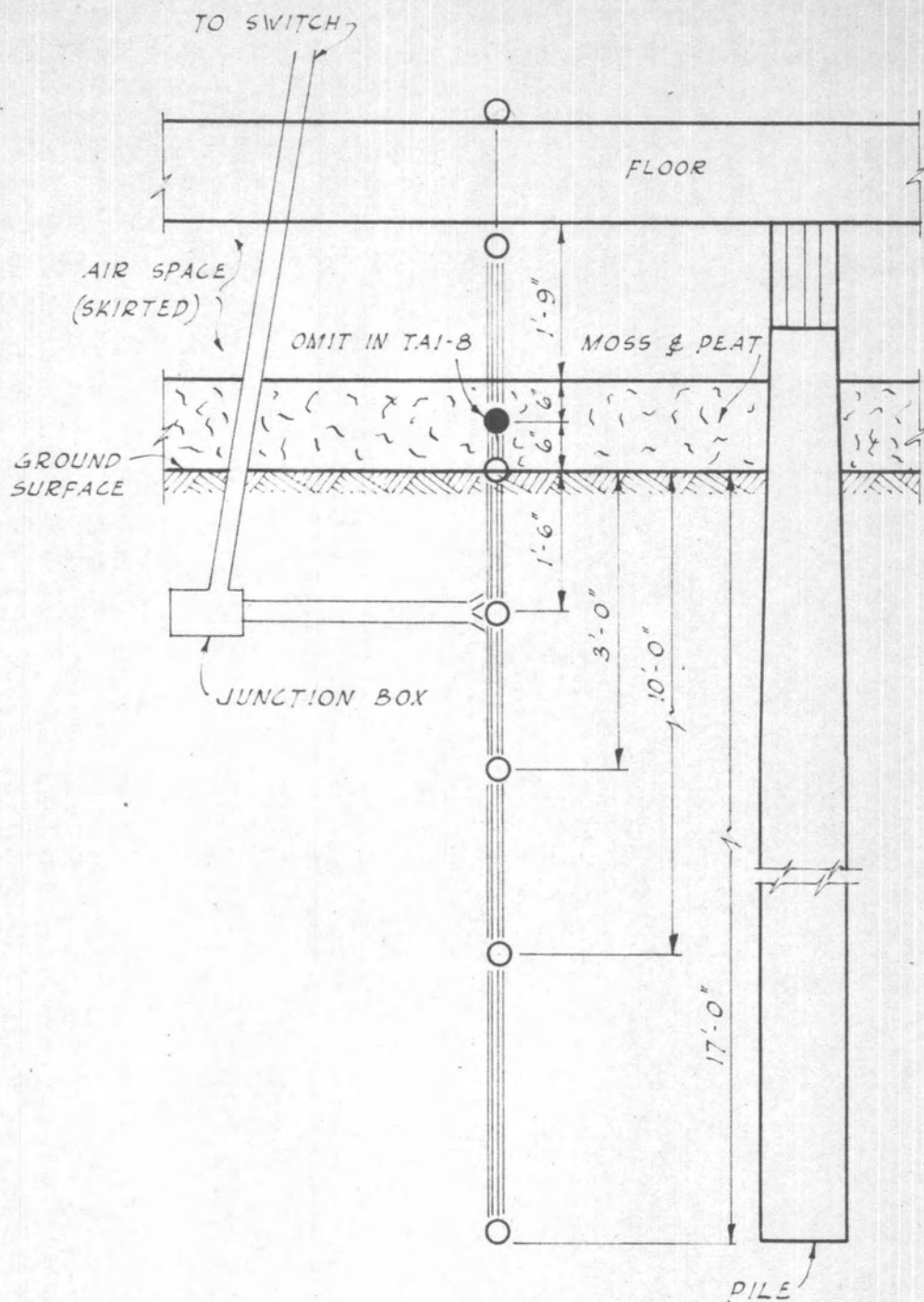
TEACHERAGE · LOCATION of THERMOCOUPLES

SCALE: 1"=10'-0"

LEGEND:

- ⊗ THERMOCOUPLE STRING
- JUNCTION BOX, BURIED
- SWITCH 28 pt
- × EXTRA BORE HOLES





SKETCH NO. 4

TYPICAL THERMOCOUPLE STRING

SCALE: $\frac{1}{2}" = 1'-0"$