DETERMINATION OF COASTLINE VARIATIONS USING AERIAL PHOTOS

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ABSTRACT

Haeundae beach, one of the largest resorts located in the sourthern part of Korea, has been faced with serious erosion problems since the past decades. Aerial photographs and photomaps of this coast line (about 1.8km) have been made since 1972 to study the changes in the coast line due to erosion.

In this study, the trend of erosion was analyzed and the direction and amount of erosion were anticipated for effective control and management of coast line facilities.

I. INTRODUCTION

1.1 Background

In 1972, first aerial photos of Pusan were taken. Seawall was constructed in Haeundae beach 20 years ago. From 1972 to now, aerial photos were regularly taken, twice a year, in spring and fall.

The purpose of aerial photos was to check out the construction of unauthorized housing. Recently, aerial photos are used in various fields, for exemple, solving local problems. Erosion of coastline in Pusan is very serious.

1.2 Aim of study

Traditionally, for determining amount of erosion in the coast line, a direct method using leveling was applied to Haeundae beach. At this time, coast line variation was checked by using regular aerial photos.

Authors thought that variation of coast line could be anticipated by aerial photogrammetric techniques.

The aim of this study is to use aerial photogrammetric method for environmental assessment.

1.3 Scope of study

Model site is a Haeundae beach in the southern part of Korea. Length of this beach is about 1.8 killometers, and photo scale is 1 : 6,000 . Also, map scale is 1 : 1,200.

II. BASIC THEORY

The meaning of coast line is a marginal line between sea water and land, where sea water level is an approximate highest high water level. The sea depth represents a level line of the lowest low water level.

2.1 Traditional method

Leveling and plane table method are very commonly used to determine the coast line. Surveying is done by trangulation and auxiliary points can be determined by the intersection, resection, and deflection angle method.

This traditional direct method is time-sparing surveying and very tedious. Instruments of traditional method include level, staff, and transit , etc.

2.2 Aerial photogrammetric method

Aerial photogrammetry is very simple to acquire data. But, after taking photographs correction of tidal height should made. The tidal height on the point of photograph should be corrected according to H.H.W.(FIG.1). Also, determination of minimum contour line is subject the precision of plotter.

$$h = \frac{m}{c/f}$$

where,
- h : interval of minimum contour line
- m : number of scale dinominator
- c : c - factor
- f : focal length

III. DISCUSSIONS

The degree of erosion was found to be A,B,C with decadent order in terms of width of coast line. Also, beach area can be determined by aerial photos. Because incomplete model in beach area often occurs, the flight schedule should be planned very carefully. These photos have to be taken so as to include much portion of land than that of sea as possible. If flight height is constant, photo scale is equal (FIG.2, FIG.3, FIG.4-A,B,C)

The aerial photos are used in various fields. Therefore, same flight height should be maintained in each every photo-taking. It is necessary to keep negative films very carefully.

Aerial photogrammetric technique was more effective than traditional method leveling and plane table method.

IV. CONCLUSIONS

From this study, authors found that aerial photogrammetric method was more economic than traditional method for determining variation in coast line. It was evident that aerial photogrammetric method was powerful in environmental assessment of coastal erosion problems. Because it is very easy to result in a incomplete in coastal photographing, the flight plan should be undertaken more carefully in the beach area than in the land.

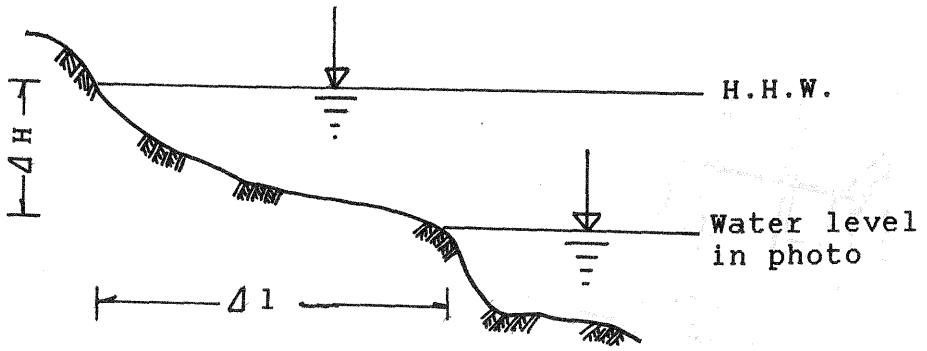

FIG.1

$$\Delta 1 = \Delta H \cot$$

where, $\Delta 1$: difference of horizontal distance in H.H.W. and water line in photo

ΔH : difference of height in H.H.W. and water line in photos

: inclined angle of beach

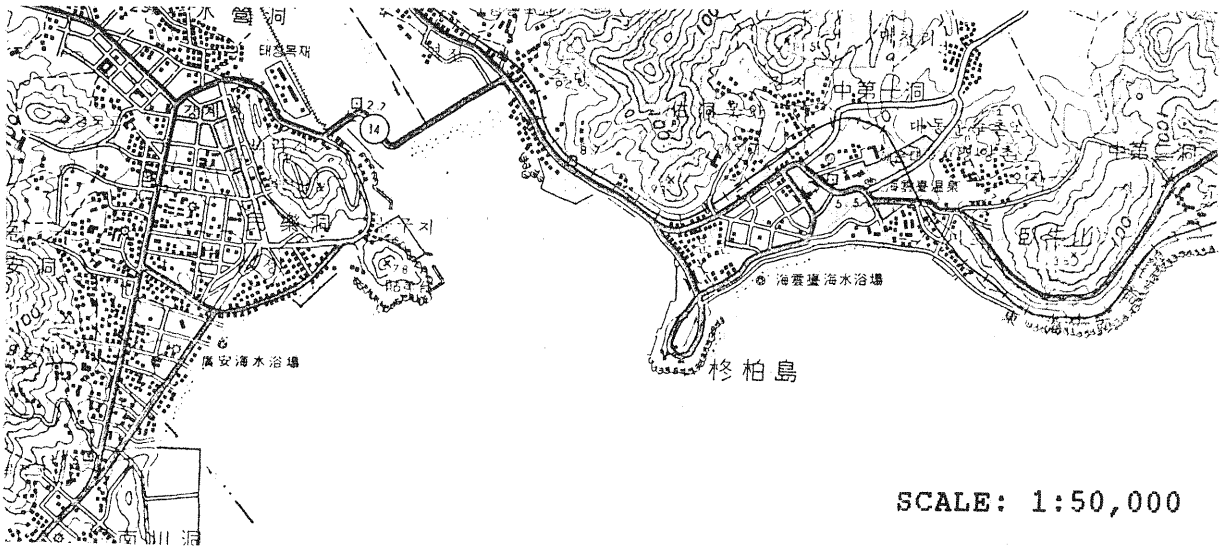

FIG.2

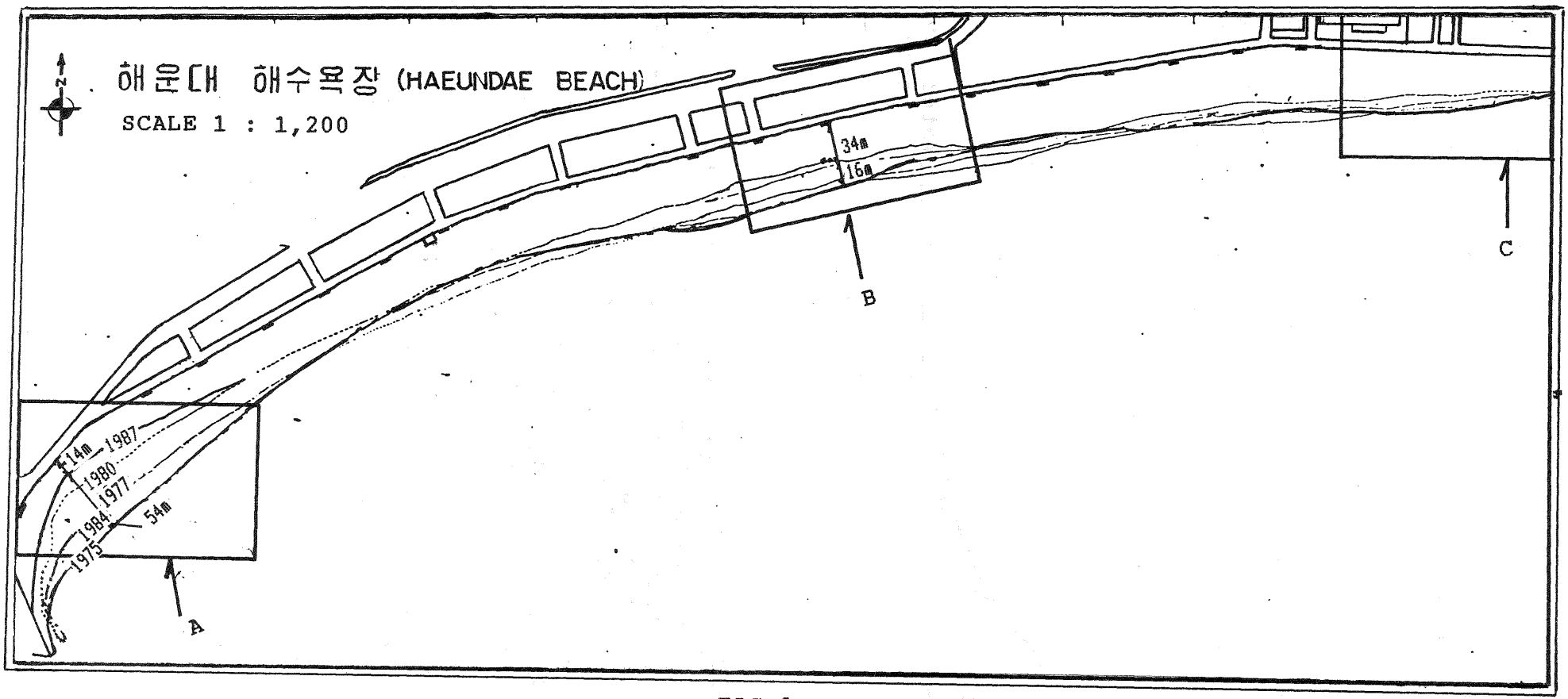
해운대 해수욕장 (HAEUNDAE BEACH)
SCALE 1 : 1,200
N
34m
16m
14m
1987
1980
1977
1984
54m
1975
A
B
C

FIG.3

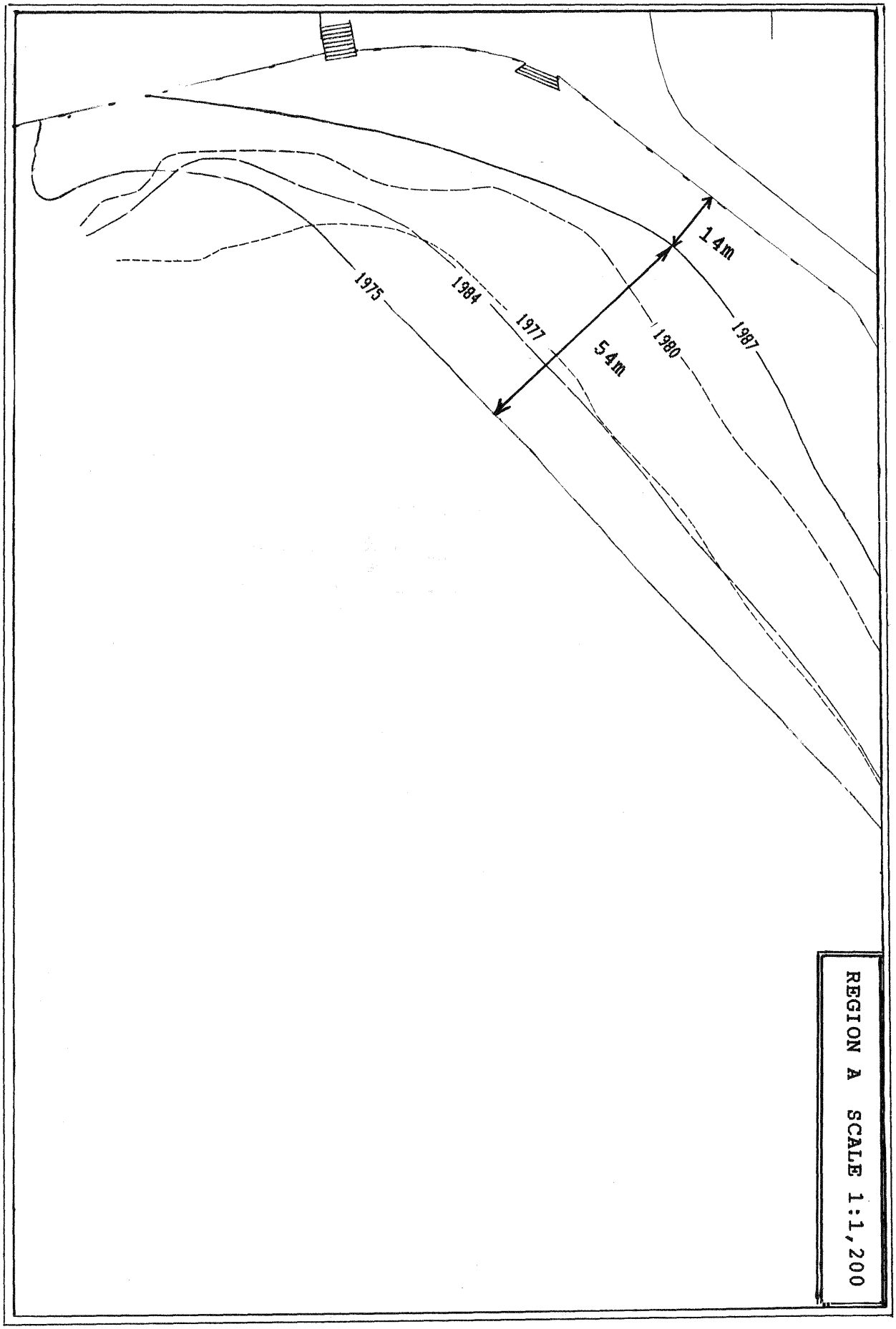

FIG.4-A

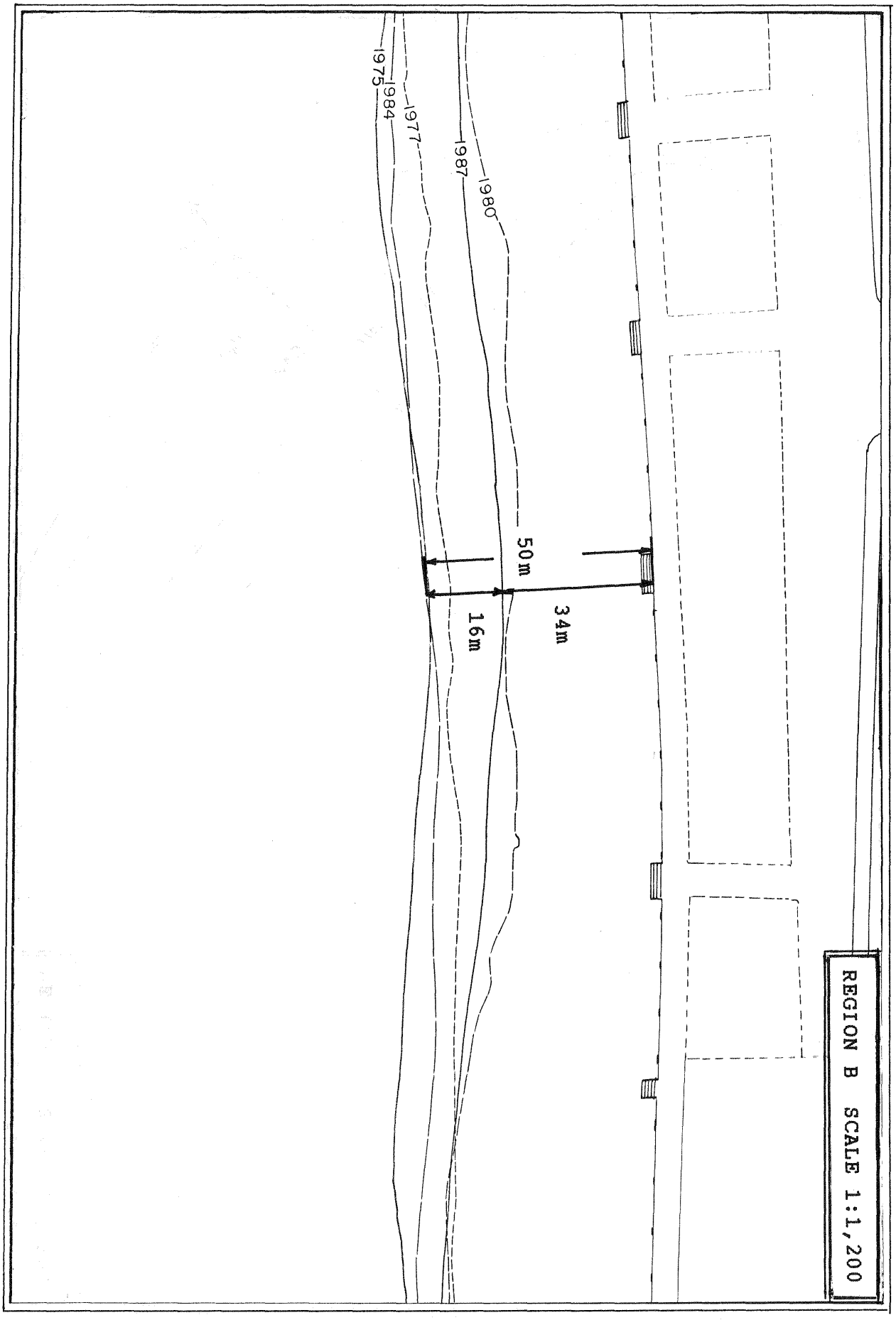

FIG.4-B

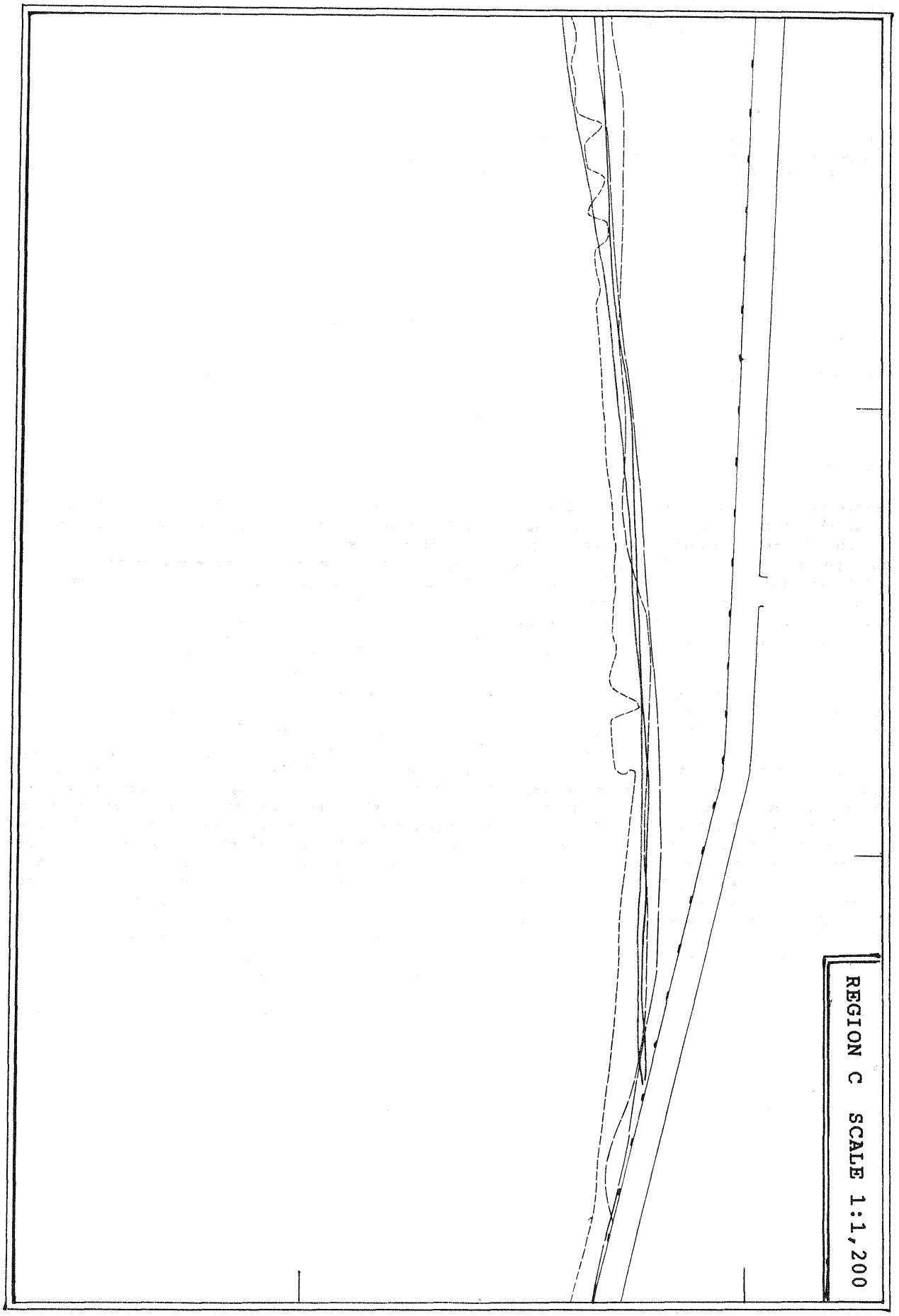

FIG.4-C