- [x] City box number B-1
- [x] Title/cover page w/the following info:
  - [x] Company (author) name
  - [x] Report Date
  - [x] Project name
  - [ ] Company's job number
  - [x] City DCLU project number (7-digit number)
  - [x] City Permit number (6-digit number)
  - [ ] Kroll map index number (3-digit number, w?/E,W,N,S)
  - [ ] Green label
  - [x] Site address (may be on 1st or 2nd page of text)
- [ ] Executive Summary and associated figures
- [ ] Table of Contents
- [ ] Project Location Plan/Map or Vicinity Map
- [ ] Site Plans, Boring Location Plans, or Exploration Plans
- [ ] Survey
- [ ] Geologic Maps
- [x] Cross Sections/Subsurface Profiles
- [ ] Fill or Peat Thickness Maps and Contour Maps
- [ ] Boring Logs
- [x] Geology Text (if no logs)
- [ ] Soil Classification Key/Boring Log Key
- [ ] Probe Logs
- [ ] Test Pit Logs
- [ ] Monitoring Well Logs
- [ ] Cone Penetrometer Logs
- [ ] Shear Wave Velocity Measurements
- [ ] Groundwater Maps
- [ ] GW Elevation Tables/Data
- [ ] Soils Lab Testing (Geotechnical) Summary Tables
  - [ ] Grain Size Analyses/Hydrometer Analyses
  - [ ] Atterberg Limits
  - [ ] Strength tests: Triaxial, Unconfined, Direct Shear
  - [ ] Organic Content
  - [ ] ^{14}C or Radiocarbon Testing
  - [ ] Other_____
- [ ] Soil Chemical Analytical Testing Summary Tables
- [ ] Water/Groundwater Chemical Analytical Summary Tables
- [ ] Comments_____

1711

- [x] Date Copied 2/11 By [illegible]

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(517363 ORIGINAL)

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Letter Report

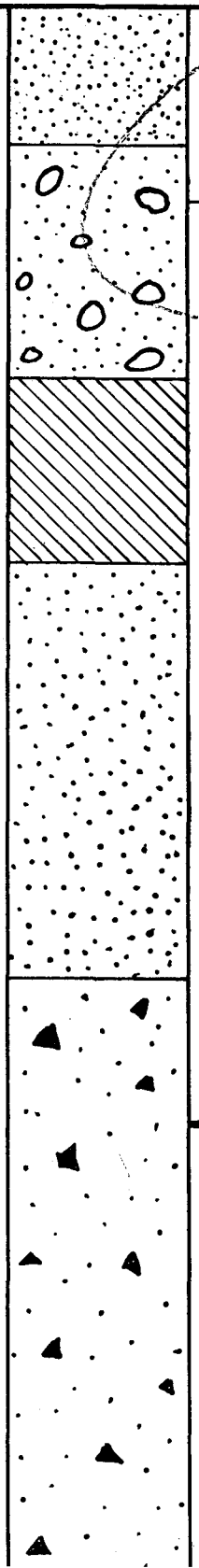
BILL GARRETT
1000 Union St.
Seattle, Wash.

ALKI APARTMENT PROJECT

FOUNDATION INVESTIGATION

4/4

November 8, 1965



3717 BEACH DR. SW
521802

NEIL H. TWELKER & ASSOCIATES

CONSULTING SOILS ENGINEERS

TEL: ONE MAIN 4-3046

NEIL H. TWELKER & ASSOCIATES

CONSULTING SOILS ENGINEERS

ALASKA TRADE BUILDING
SEATTLE 1, WASHINGTON

November 4, 1965

Bill Garrett
1000 Union Street
Room 106
Seattle, Washington

Re: Soils and Foundation Investigation for Proposed 50 Unit Apartment Building, 3700 Block, Beach Drive SW

Dear Mr. Garrett:

At your request we have performed a soils and foundation investigation on the beach in the 3700 block of Beach Drive SW. At two different times during the course of this investigation we advised you of our findings and current conclusions regarding foundation conditions at this site. We confirm this information in the present report, together with additional comments and recommendations regarding selection of a foundation system for the proposed structure.

Site Description The property is located on Beach Drive approximately one-half mile southeast of Alki Point on Puget Sound. The site measures approximately 180 ft in width by 500 ft in depth. At the present time the property is occupied by a number of very small multiple unit cottages and by a larger residential structure on the south side. The existing dwelling structures occupy only the east portion of the property between the street and a large rockery and retaining wall which fronts on the beach. Soils exposed throughout the site consist of loose beach sand (probably deposited as fill) east of the rockery and retaining wall, and of medium to course sand and gravel beach materials to the west of the rockery. We understand the proposed structure will extend over the present beach for a distance of approximately 200 ft.

Field Investigation consisted of the drilling of 4 borings by means of a truck-mounted, hollow-stem power auger. Locations of subsurface explorations are shown in Fig. 1, attached. Because of the restrictions of the stage of tide on the time available

for the conduct of the subsurface exploration, this work was performed on two different dates (October 5 and October 20, 1965). The character of foundation soils was determined by means of the Standard Penetration Test, in which a 140 lb pin-guided weight is dropped 30 inches to drive a 2 inch OD split spoon sampler into the undisturbed formation at the bottom of the boring. The number of blows to drive the sampler a given distance into the formation is a measure of the relative density of granular materials encountered. The sample recovered in the spoon is representative of the material penetrated by the borings.

Three principal soil formations were encountered in these subsurface explorations. These are described as (1) a surface layer of "active" beach sands and gravels, approximately 2.5 ft in thickness; (2) a layer of dense gravelly sand ranging in thickness from 6 to 20 ft; and (3) an underlying unit of very firm sandy and clayey silt containing interbedded lenses or lamina of coarser materials. Bedrock is believed to underlie the site at comparatively moderate depths but was not encountered in the explorations.

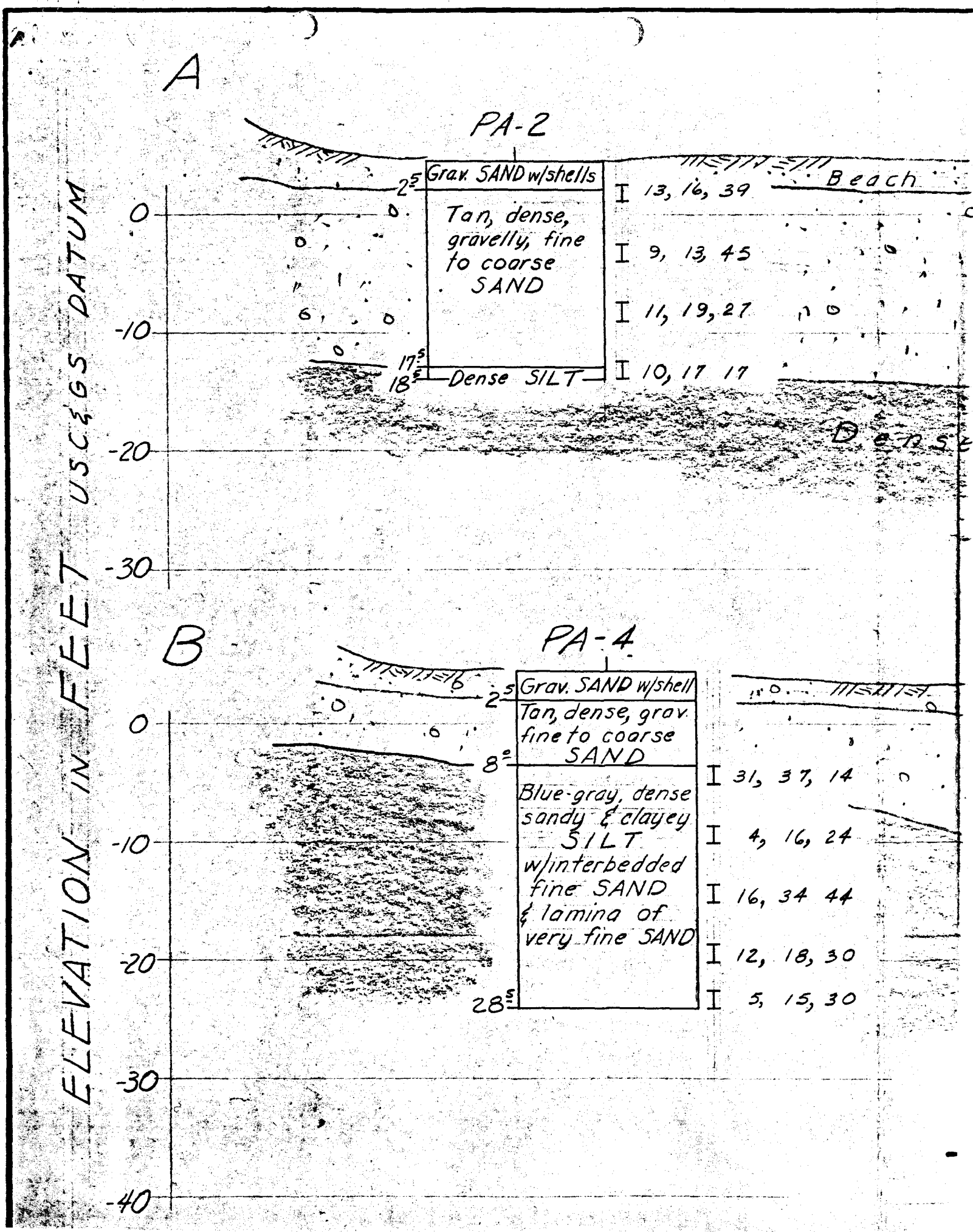
The lowermost unit of soil encountered in these explorations was identified as the clay member of the Lawton formation, a glacio-lacustrine sequence which occurs throughout the greater Seattle area. This formation has been compressed by the continental ice sheet which occupied the Puget lowlands during the most recent glaciation; consequently, it occurs in a very dense state and constitutes an excellent supporting horizon for any and all structures.

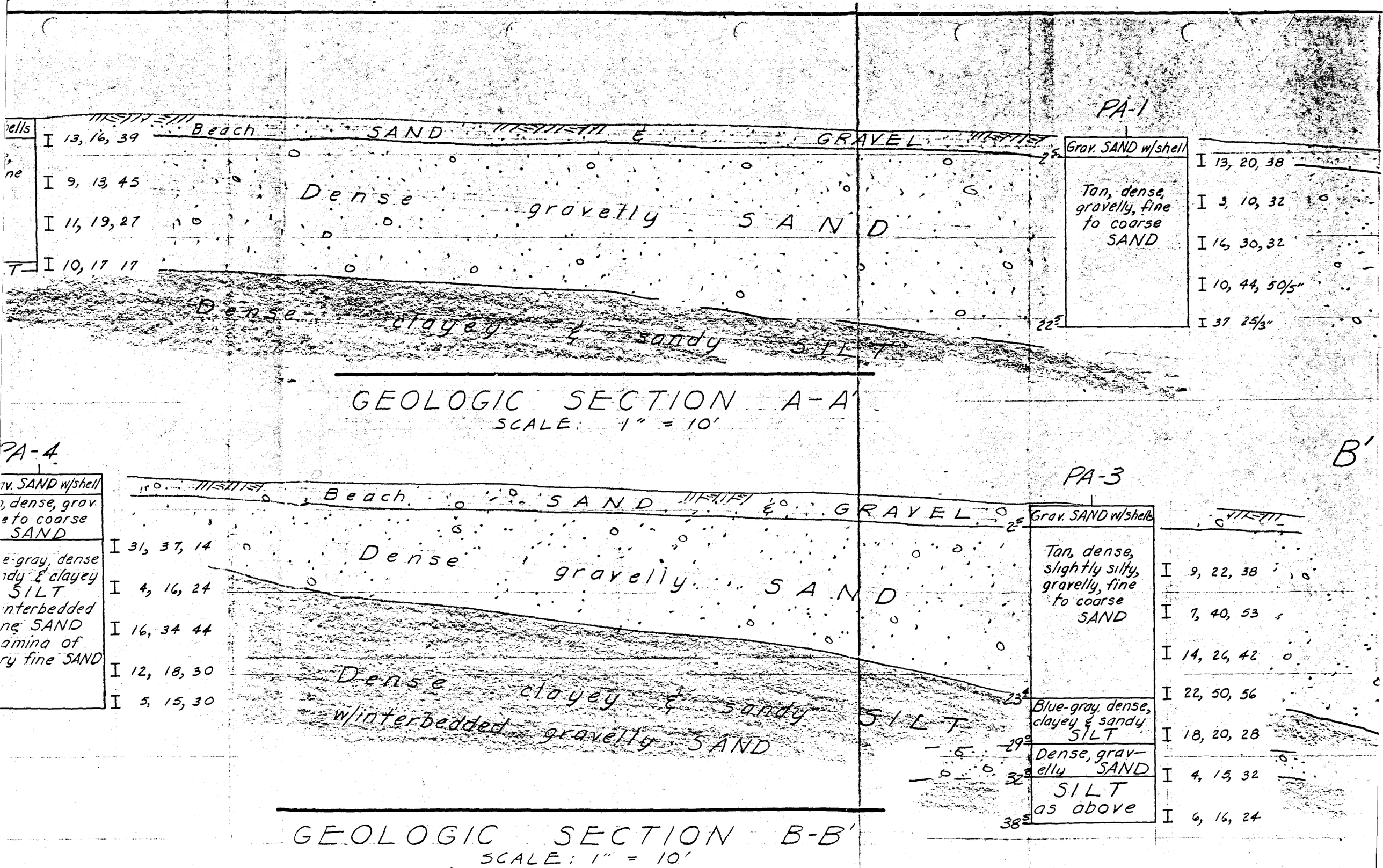
The layer of dense gravelly sand between the active beach layer and the underlying silt formation appears to consist of ancient beach deposits, dating from a period in which the relative level of Puget Sound was somewhat lower than at present. The contact surface between the dense silt formation and the overlying ancient gravelly beach sands is presumed to be of erosional origin; its position may not be readily predictable throughout the building area.

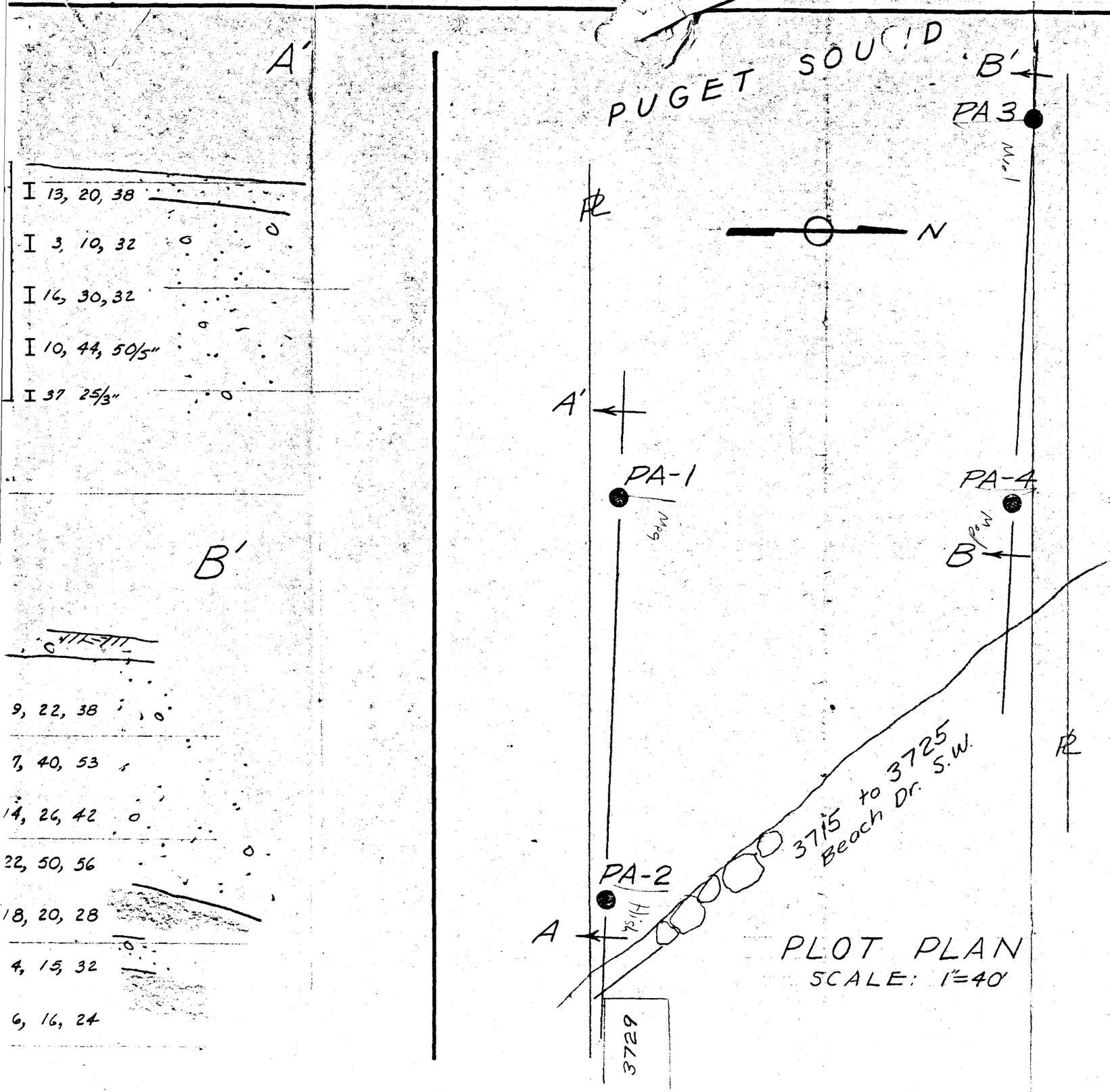
<u>Conclusions and Recommendations</u> On the basis of the investigations conducted at this site, we are able to offer the following general conclusions:

1. The soil formations present at the site will offer excellent bearing for any and all proposed structures, at comparatively shallow depths beneath existing beach surface.

2. A comparatively wide selection of foundation systems and materials is available for consideration in the development of this project.


A
PA-2
Grav. SAND w/shells
Tan, dense, gravelly, fine to coarse SAND
Dense SILT
2.5
17.5
18.5
13, 16, 39
9, 13, 45
11, 19, 27
10, 17 17
Beach
0
-10
-20
-30
B
PA-4
Grav. SAND w/shell
Tan, dense, grav. fine to coarse SAND
Blue-gray, dense sandy & clayey SILT w/interbedded fine SAND & lamina of very fine SAND
2.5
8.0
28.5
31, 37, 14
4, 16, 24
16, 34 44
12, 18, 30
5, 15, 30
0
-10
-20
-30
-40
ELEVATION IN FEET USC&GS DATUM


PA-1
Beach SAND & GRAVEL
Dense gravelly SAND
Dense clayey & sandy SILT
Grav. SAND w/shell
Tan, dense, gravelly, fine to coarse SAND
I 13, 16, 39
I 9, 13, 45
I 11, 19, 27
I 10, 17 17
I 13, 20, 38
I 3, 10, 32
I 16, 30, 32
I 10, 44, 50/5"
I 37 25/3"
2.5
22.5
GEOLOGIC SECTION A-A'
SCALE: 1" = 10'
PA-4
Grav. SAND w/shell
n, dense, grav. e to coarse SAND
e-gray, dense ndy & clayey SILT nterbedded ne SAND amina of ry fine SAND
I 31, 37, 14
I 4, 16, 24
I 16, 34 44
I 12, 18, 30
I 5, 15, 30
Beach SAND & GRAVEL
Dense gravelly SAND
Dense clayey & sandy SILT w/interbedded gravelly SAND
PA-3
B'
Grav. SAND w/shell
Tan, dense, slightly silty, gravelly, fine to coarse SAND
Blue-gray, dense, clayey & sandy SILT
Dense, gravelly SAND
SILT as above
2.5
23.5
29.5
32.5
38.5
I 9, 22, 38
I 7, 40, 53
I 14, 26, 42
I 22, 50, 56
I 18, 20, 28
I 4, 15, 32
I 6, 16, 24
GEOLOGIC SECTION B-B'
SCALE: 1" = 10'



PLOT PLAN
SCALE: 1"=40'

LEGEND

PA-1 Power Auger Test Boring

4, 7, 11 Standard Penetration Test - Number blows w/140# wt. dropping 30 in. to drive split-tube sampler (2" O.D.) 18" w/blows recorded/6" increment unless otherwise noted.

A A' Geologic Section

BILL GARRETT
ALKI APARTMENT DEVELOPMENT
SITE INVESTIGATION
NEIL H. TWELKER & ASSOCIATES
SCALE: AS SHOWN
10-21-65
521802

FIG. 1