

**FOUNDATION AND EXCAVATION CONDITIONS**

This map interprets the geologic map units shown on the generalized geologic map (Map I-7874-A) in terms of foundation and excavation conditions inferred from the materials represented by those map units. Additional data from an established standard geologic map and from the published slope map (Map I-7874-B) have also been used in compiling this map. The map is necessarily very general, and presents representative conditions that may be expected rather than precisely defined conditions that may be expected. Because there is a wide range both of variability of the distribution of the various geologic materials within each geologic unit as indicated on the generalized geologic map, and of engineering characteristics of these materials even when their distribution is well known, neither of these aspects has been investigated in detail sufficient for specific site use.

The map units are arranged in a relative sequence from excellent to poor foundation and excavation conditions. These map units were made by combining three categories based on relative ease of excavation and four categories of foundation conditions based on relative load-bearing capacity of the material independent of the response to earthquake shock (Area in which the materials are particularly subject to loss of bearing capacity in response to earthquakes as shown on the slopeability map, I-7874-C). Three of the five map units represent generally favorable conditions that pose few major problems; the other two units represent generally unfavorable conditions that require particular engineering solutions. A red line pattern is used on parts of these two units to indicate areas of generally identifiable soil deposits that present one specific type of problem.

**DESCRIPTION OF MAP UNITS**

**FOUNDATION CONDITIONS EXCELLENT** - Hard bedrock at the surface or at shallow depth and can support very heavy loads. Excavation difficult, requires blasting. In many places slopes range from steep to vertical, and deposition of heavy equipment may be restricted. In some places cliffs and canyon walls preclude use as foundation sites for buildings.

**FOUNDATION CONDITIONS GOOD** - Chiefly homogeneous gravel and sand that is generally 20 feet or more thick and can accommodate heavy loads. Excavation by power equipment generally easy except in isolated places where large boulders are present.

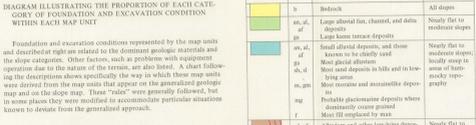
**FOUNDATION CONDITIONS GENERALLY GOOD TO FAIR, BUT LOCALLY POOR** - Good in most of map area where various materials, including gravel, sand, and fine-grained material, are present. In some places, heavy to moderately heavy loads, but in some places, fine-grained material may have lower bearing strength, and on some steep slopes of limited width, stability problems are likely. Excavation by power equipment generally easy, but may be moderately difficult where materials are very compact or where boulders are present. The material varies widely in texture; in places where fine-grained, clay may be present.

**FOUNDATION CONDITIONS GENERALLY FAIR TO POOR** - Soil and clay may lack sufficient bearing strength for heavy loads; moderate to very steep slopes are potentially unstable. In places, indicated by red line pattern, peat is present at the surface and the water table may be high in some of these places peat can be removed, the water table lowered relatively easily, and foundation conditions thereby improved. Excavation hindered where slopes pose difficult operating problems and where fine-grained materials cause soil slopes to be unstable; boulders may be encountered at shallow depth in the mountainous part of this map unit.

**FOUNDATION CONDITIONS POOR** - Chiefly fine-grained materials with soil and clay that lack bearing capacity; small areas of active sand dunes, and sea and river bluffs, and other exposed fronts of eroded, fine-grained material or that are now being eroded. In places, indicated by red line pattern, considerable thickness of peat may be present, and (or) marsh conditions may prevail; the peat is generally indicated by blue and green colors. These areas are more difficult to modify for suitable foundation conditions than the peat areas of the preceding map unit. Excavation is hindered by unstable materials and high water table.

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The diagram below gives a crude approximation of the proportion of various conditions inferred to be present within materials represented by each map unit. Three of the map units, the upper two units, represent more uniform foundation and excavation conditions, and thus allowing more reliable predictions. The other two units represent a greater variety of conditions and the reliability of prediction is therefore less.



**CHART SHOWING THE GENERAL RELATIONS BETWEEN UNITS ON THIS MAP AND UNITS ON THE GENERALIZED GEOLOGIC MAP AND ON THE SLOPE MAP.**

Most of the geologic map units have been subdivided on the basis of slopes and on the basis of a few minor details not shown on the generalized geologic map.

| Foundation and excavation conditions map (I-7874-D) | Generalized geologic map (I-7874-A) | Description  | Slope map (I-7874-B)           |
|---|-------------------------------------|--|--------------------------------|
| 1   | 1                                   | Bedrock  | All slopes                     |
| 2   | 2                                   | Large alluvial fan, channel, and delta deposits  | Nearly flat to moderate slopes |
| 3   | 3                                   | Small alluvial deposits, and those between the channel and fan                                 | Nearly flat to moderate slopes |
| 4   | 4                                   | Most glacial alluvium  | Nearly flat to moderate slopes |
| 5   | 5                                   | Most recent and recent deposits  | Nearly flat to moderate slopes |
| 6   | 6                                   | Probable glaciolacustrine deposits where dominantly coarse grained                             | Nearly flat to moderate slopes |
| 7   | 7                                   | Most fill employed by man  | Nearly flat to moderate slopes |
| 8   | 8                                   | Alluvium and other low-lying deposits covered by peat (indicated by red line pattern)          | Nearly flat to moderate slopes |
| 9   | 9                                   | Soil and clay deposits where relatively well sorted  | Nearly flat to moderate slopes |
| 10  | 10                                  | Probable glaciolacustrine deposits where dominantly fine grained                               | Nearly flat to moderate slopes |
| 11  | 11                                  | Beach deposits   | Nearly flat to moderate slopes |
| 12  | 12                                  | Glaciolacustrine deposits where dominantly well sorted   | Nearly flat to moderate slopes |
| 13  | 13                                  | Some old landable deposits   | Nearly flat to moderate slopes |
| 14  | 14                                  | Fill employed on tidal flats   | Nearly flat to moderate slopes |
| 15  | 15                                  | Most alluvium  | Steep to very steep slopes     |
| 16  | 16                                  | Mountain deposits and glacial alluvium   | Steep to very steep slopes     |
| 17  | 17                                  | Scattered sand dunes   | Steep to very steep slopes     |
| 18  | 18                                  | Peat and lake deposits chiefly clay and silt   | Nearly flat to steep slopes    |
| 19  | 19                                  | Tidal deposits   | Nearly flat to steep slopes    |
| 20  | 20                                  | Beachline Coes Clay where poorly sorted  | Nearly flat to steep slopes    |
| 21  | 21                                  | Most landable deposits   | Nearly flat to steep slopes    |
| 22  | 22                                  | Areas of peat that display patterned ground or that are indicated by red and blue line pattern | Nearly flat to steep slopes    |
| 23  | 23                                  | Beachline Coes Clay where relatively well sorted   | Nearly flat to steep slopes    |
| 24  | 24                                  | Coastal areas where dominantly clay and silt, all marsh areas (indicated by red line pattern)  | Nearly flat to steep slopes    |
| 25  | 25                                  | Fill composed chiefly of clay and silt   | Nearly flat to steep slopes    |
| 26  | 26                                  | Beachline Coes Clay where relatively well sorted   | Steep to precipitous slopes    |
| 27  | 27                                  | Coastal areas where dominantly clay and silt, all marsh areas (indicated by red line pattern)  | Steep to precipitous slopes    |
| 28  | 28                                  | Active sand dunes  | Steep to precipitous slopes    |

**EXPLANATION**

**CATEGORIES OF RELATIVE FOUNDATION CONDITIONS**

- Excellent - Very high bearing capacity
- Good - High bearing capacity
- Fair - Moderate bearing capacity
- Poor - Low bearing capacity

**CATEGORIES OF RELATIVE EXCAVATION CONDITIONS**

- Excellent - Problem for power equipment negligible
- Good - Some local problems for power equipment negligible
- Fair - Requires handling post to remove

**DIAGRAM ILLUSTRATING THE PROPORTION OF EACH CATEGORY OF FOUNDATION AND EXCAVATION CONDITION WITHIN EACH MAP UNIT**

Foundation and excavation conditions represented by the map units and described right on related to the dominant geologic materials and the slope category. Other factors, such as problems with equipment due to the state of the terrain, are also listed. A chart following the descriptions shows specifically the way in which these map units were derived from the map units that appear on the generalized geologic map and on the slope map. These "units" were generally followed, but in some places they were modified to accommodate particular situations known to deviate from the generalized approach.

Base from U.S. Geological Survey, 1962, modified in 1971. 100-foot grid based on Alaska coordinate system, and a 1000-foot Universal Transverse Mercator grid (UTM), zone 6, shown in blue.



**FOUNDATION AND EXCAVATION CONDITIONS MAP OF ANCHORAGE AND VICINITY, ALASKA**  
By Henry R. Schmal and Ernest Dobrovoiny 1974