



**Municipality of Anchorage  
Geotechnical Advisory Commission**

**A G E N D A**

**Tuesday, October 29 2024  
12:00 Noon – 1:30 p.m.**

**Work Session**

**via Microsoft Teams**

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**Meeting ID: 292 774 560 545, Passcode: KpVBwg**

**Or call in (audio only): +1 907-519-0237**

**Conference ID: 892 877 712#**

- I. GAC Resolution 2024-02: Recommending Minimum On-Site Testing for Geotechnical Reports**
  - A. Draft Resolution**
  - B. Sources**
    - 1. Seattle Code**
    - 2. 2018 IBC Section 1803 Commentary**
    - 3. Los Angeles Reference – (Note pages 27-32, attached)**  
**<http://dpw.lacounty.gov/gmed/permits/docs/manual.pdf>**
    - 4. Las Vegas Building Code Amendment**
- II. Special Limitations in High Slope/High Seismic Risk Areas**
- III. November Meeting Date - 19th or 26th?**



MUNICIPALITY OF ANCHORAGE  
GEOTECHNICAL ADVISORY COMMISSION RESOLUTION NO. 2024-02

A RESOLUTION RECOMMENDING MINIMUM ON-SITE EXPLORATION FOR  
REQUIRED GEOTECHNICAL REPORTS.

(GAC Case No. 2024-02)

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1 WHEREAS, the Municipality of Anchorage (MOA) Geotechnical Advisory Commission (GAC)  
2 is established in the Anchorage Municipal Code (AMC) to act in an advisory capacity to the  
3 Assembly, the Mayor, boards, commissions, and heads of municipal departments and agencies on  
4 geotechnical engineering issues and natural hazards risk mitigation (AMC 21.02.080); and  
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6 WHEREAS, the Anchorage area has a complex geological setting; and  
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8 WHEREAS, decades of development and demolition in the Anchorage area with minimal and  
9 inconsistent oversight have allowed for conditions where past dumping, poor quality fill, and other  
10 site issues that are not readily observable from the surface; and  
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12 WHEREAS, site-specific geotechnical exploration provides a higher level of awareness of the  
13 possibility for risks due to subsurface conditions; and  
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15 WHEREAS, geotechnical reports are required for residential construction in seismic zones 4 and  
16 5 per AMC 23.85.401.4 and International Building Code (IBC) section 1803; and  
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18 WHEREAS, historical geotechnical data can be used to provide context on subsurface conditions;  
19 and  
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21 NOW, THEREFORE, BE IT RESOLVED that the Geotechnical Advisory Commission:  
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23 A. Makes the following findings of fact:  
24

25 1. Historical data should not be solely relied upon, and further site-  
26 specific exploration is required to support design recommendations.  
27 Verification language- EXPAND FINDING  
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29 2.  
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31 B. Recommends that the Municipality update its policy to require site-specific  
32 geotechnical exploration where geotechnical reports are required.  
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34 1.

1 PASSED AND APPROVED unanimously by the Geotechnical Advisory Commission on this \_\_th  
2 day of November 2024.

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Mélisa R. K. Babb  
Secretary

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John D. Thornley, Ph.D., P.E., BC.GE  
Chair

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DRAFT

**COMMENTER:** I have several concerns about the recommendation to prohibit use of historical data in favor of new, site-specific data. Depending on the project type, age of historic boreholes, and their proximity to a project it's not unreasonable to conduct a desktop study and rely on adjacent historic data for design (even more reasonable if you have the full geotechnical data report from the historic investigation). The purpose of the desktop study, which should be the initial step of any geotechnical investigation and a part of every design process, you should be able to identify previous use of the site including potential for old landfills and buried debris. The desktop study also helps identify geohazards and quantify seismic risks. It's fairly common for geotechnical engineers to utilize adjacent geotechnical information for a design if they have reason to believe the soil conditions in the area are similar.

A qualified and experienced geotechnical engineer who conducts a desktop study can identify the need for supplementary information for design. At a minimum, assumed soil conditions should be verified during construction by the geotech or their representative. But ultimately, if the geotechnical engineer of record does their due diligence and determines no additional information is required, that falls under their engineering judgement and their PE license. Requiring a new site investigation for all projects, especially small residential ones, is a big and comparatively expensive ask. New commercial projects or multi-family housing (aka bigger projects) should be held to a higher standard and I could be convinced that requiring some level of new site investigation is appropriate.

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**COMMENTER:** In the discussion at the last meeting, I offered that there are jurisdictions that have developed rules for geotechnical investigations on sites with possible geohazards. Attached is the City of Seattle rule governing geotechnical investigative work in Environmentally Critical Areas (ECA) for reference. Seattle Director's Rule 5-2016 should be considered as being at the most restrictive and conservative end of the regulation spectrum. I am not advocating that the MOA's rules/regulations be anywhere near this detailed, but the Rule could serve as a guide to crafting the GAC resolution and eventually revising or replacing Handout AG.18. I leave it to you to pass it on to the GAC or not.

You will note that Rule 5-2016 does not include any quantifiable information as to the nature and extent of the subsurface exploration program because the City and their geotechnical engineering community recognize that the geology and topography in Seattle are too varied to establish any minimum number and depth of explorations. Instead, the Rule includes minimum qualifications to be a geotechnical engineer, and expects that the report will be prepared “in accordance with generally accepted geotechnical practices and the General Geotechnical Report Guidelines”. The

9/24/2024 GAC Meeting info for “GAC Resolution No. 2024-02 Recommending Minimum On-site Testing for Geotechnical Reports”

closest Seattle comes to specific requirements is the second paragraph under Contents of the Geotechnical Report on page 2:

*The opinions and recommendations contained in the report **shall be supported** by field observations and testing, e.g. site reconnaissance, appropriate explorations such as borings or test pits, literature review, and laboratory testing of soil characteristics conducted by or under the supervision of the geotechnical engineer in accordance with the American Society of Testing and Materials or other applicable standards. (emphasis added)*

The typical geotechnical engineering work product is mostly narrative with graphical representations of site conditions, and little to no calculation sheets provided. This is different from most other engineering disciplines where numeric data and extensive calculations are a predominate component of the work product. For work in an ECA, the geotechnical engineer can't just provide recommendations without tying them to site-specific soils information and without showing the work behind the recommendations. I also direct your attention to Section VII – Plan Review and Minimum Risk Statements on page 6 in the General Geotechnical Report Guidelines where the Geotechnical Engineer must state that “the risk of damage to the proposed development and from the development to adjacent properties from soil instability will be minimal.” It's not much help to a property owner suffering a loss due to soil movement, but it will go a long way towards revoking the license of the engineer in charge.

<b>Applicant:</b>  City of Seattle Department of Construction and Inspections	<b>Page:</b>  1 of 6	<b>Supersedes:</b>  18-2011
	<b>Publication:</b>  April 4, 2016	<b>Effective:</b>  May 2, 2016
<b>Subject:</b>  General Duties And Responsibilities Of Geotechnical Engineers	<b>Code and Section Reference:</b>  SMC 22.170 and 25.09; Seattle Building Code	
	<b>Type of Rule:</b>  Code Interpretation	
	<b>Ordinance Authority:</b>  SMC 3.06.040	
<b>Index:</b>  Building/Grading - Technical	<b>Approved</b>  (signature on file)	<b>Date</b>  5/2/2016
	_____ Nathan Torgelson, Director, SDCI	

**PURPOSE**

The purpose of this rule is to define the Department's requirements for geotechnical engineers who are hired by permit applicants to analyze surface and subsurface conditions on a site.

Whenever development is proposed in a landslide-prone area as defined in the Regulations for Environmentally Critical Areas (Seattle Municipal Code Chapter 25.09) or when the Director determines that additional soils analysis is appropriate on a particular site, the applicant is required to submit a geotechnical report that evaluates the surface and subsurface conditions on the site. The geotechnical engineer hired to perform this work must comply with the duties and responsibilities included in this rule.

**RULE**

## **GENERAL REQUIREMENTS**

A geotechnical engineer who is a licensed Professional Engineer (Civil) in the state of Washington shall prepare the geotechnical report in accordance with generally accepted geotechnical practices and the General Geotechnical Report Guidelines contained in this rule. The geotechnical engineer must have at least four years of professional experience under the direction of a licensed Professional Engineer (Civil) with demonstrated expertise in geotechnical engineering. The report must be signed and stamped by the geotechnical engineer.

The geotechnical engineer shall attend a pre-construction conference when requested by the Director. The geotechnical engineer is also responsible for developing a program for monitoring the site during construction (to ensure compliance with the recommendations in the geotechnical report and conditions of the permit) and for performing such monitoring.

## **EXPLORATIONS**

The geotechnical engineer shall conduct or direct all subsurface explorations. Explorations conducted in Environmentally Critical Areas shall meet the requirements of Director's Rule 20-90: Regulation and Enforcement of Investigative Field Work Performed in Environmentally Sensitive Areas and Shorelines or subsequent rules.

## **CONTENTS OF GEOTECHNICAL REPORT**

The geotechnical report shall discuss all applicable items listed in the General Geotechnical Report Guidelines contained in this rule. Specific recommendations concerning stability of the site shall be made, if applicable.

The opinions and recommendations contained in the report shall be supported by field observations and testing, e.g. site reconnaissance, appropriate explorations such as borings or test pits, literature review, and laboratory testing of soil characteristics conducted by or under the supervision of the geotechnical engineer in accordance with the American Society of Testing and Materials or other applicable standards.

If required by the Director, evaluation involving significant geologic issues shall be reviewed and approved by a Washington State licensed geologist.

The geotechnical engineer shall submit a statement that in the engineer's judgment all portions of the site and adjacent properties that are disturbed or impacted by the proposed development will be stable or stabilized during construction and will continue to be stable after construction.

## **POTENTIALLY CONTAMINATED SOILS**

In cases where the Director determines or the geotechnical engineer recognizes that a site has been used for manufacturing or industrial purposes or is otherwise potentially contaminated, the geotechnical report shall contain information regarding past treatment, disposal or storage of hazardous materials on the site. Analytical test results of site soils to determine concentration of pollutants shall be presented when required by the Director or when the geotechnical engineer encounters or suspects the presence of ground contamination by hazardous materials. The geotechnical engineer shall provide information concerning the level of contamination, direction of contamination migration, and the approximate extent of the plume. If contamination by hazardous materials is detected, the report shall indicate that the appropriate regulatory agencies have been contacted and provide appropriate discussion concerning reporting obligations of the property owner(s).



## **ADDITIONAL REQUIREMENTS FOR A GEOTECHNICAL REPORT IN LANDSLIDE-PRONE AREAS**

When a report is required for a site located within a landslide-prone area, it shall comply with the following additional submittal requirements.

1. An evaluation of the erosion potential on the site during and after construction shall be submitted. It shall include recommendations for mitigation including retention of vegetation buffers and a revegetation program (see SMC 25.09.320). The geotechnical engineer shall provide a statement identifying buffer areas at the top or toe of a slope based on geotechnical site constraints and the impacts of proposed construction methods on the stability of the slope. SMC 25.09.180C outlines minimum buffers required in steep slope areas.
2. The geotechnical engineer shall submit a statement in the soils report that the geotechnical elements of seismic design have been evaluated in accordance with the criteria and ground motions prescribed by the current version of the Seattle Building Code for new structures or ASCE-31/41 for existing buildings.

Slope stability analyses for landslide prone areas shall be evaluated in accordance with Chapter 18 of the Seattle Building Code.

The plan set for the project shall be reviewed by the geotechnical engineer for consistency with these design criteria.

3. The geotechnical engineer shall make a recommendation as to which portion of the site is the most naturally stable and the preferred location of the structure. The limits of the area of grading activity shall be identified in the recommendations.
4. In general, no excavation will be permitted in landslide-prone areas during the typically wet winter months. When excavation is proposed, including the maintenance of open temporary slopes between November 1 and March 31, technical analysis shall be provided to assure that no environmental harm or safety issues would result. The technical analysis shall be submitted for approval by the Director and shall, at a minimum, consist of plans showing mitigation techniques and a letter from the geotechnical engineer. See Director's Rule 26-2015 [Grading Season Extension] or subsequent rules.

A Plan Review and Minimum Risk Statement as described in the General Geotechnical Report Guidelines contained in this rule shall be included.

Reports prepared for master use permit applications and projects in landslide-prone areas shall address comments received from the public and governmental agencies concerning the geotechnical aspects of the proposed development.

The Director may require supplements or amendments to the report when needed to develop a reasonably comprehensive understanding of the soil conditions on the site.

## **PRE-CONSTRUCTION CONFERENCE**

The geotechnical engineer shall attend a pre-construction conference with the applicant, the lead design professional, the contractor, and SDCI representatives when requested by the Director. The purpose of this conference is to discuss the most difficult, challenging, or important aspects of the construction that may pose particular risks or need special attention. The conference may include discussions of excavation and shoring plans, phasing of work, monitoring requirements, geotechnical recommendations, stability risks, weather considerations, disposal of excavated soils, surface and groundwater conditions,

fill materials, erosion control, non-disturbance areas, and other matters the Director deems relevant. The geotechnical engineer shall highlight the most critical geotechnical issues during the pre-construction conference.

## **CONSTRUCTION MONITORING**

The geotechnical engineer shall monitor the site and provide special inspection as required by the Director during the construction phase to ensure compliance with the recommendations of the geotechnical report and the geotechnical aspects of the SDCI-approved plans. The construction monitoring shall meet the general requirements for special inspections as found in Director's Rule 6-2016 or subsequent rules.

Unless otherwise approved by the Director, the specific recommendations contained in the geotechnical report shall be implemented by the owner. When site visits are made, the geotechnical engineer shall provide a daily field report on the progress of the construction. The daily field reports shall be provided to the SDCI Geotechnical Engineering Section on a weekly basis at a minimum or at such timely intervals as shall be specified by the Director. Written reports may be submitted to SDCI via e-mail to: [SDCI\\_geo@seattle.gov](mailto:SDCI_geo@seattle.gov). Written reports on the progress of the construction with Seattle Department of Transportation (SDOT) as well as SDCI approvals shall be submitted by the geotechnical engineer to both SDOT and SDCI.

***Omissions or deviations from the approved plans and specifications and significant geotechnical construction issues shall be immediately reported to the Geotechnical Section of SDCI at 206-684-8860 or via e-mail to the SDCI geotechnical reviewer. The geotechnical reviewer will discuss the issues with the geotechnical engineer and provide additional SDCI requirements, if necessary. It is not sufficient to notify only the SDCI Building Inspector and/or Site Inspector or to provide notification of significant geotechnical issues only via field report.***

The final construction monitoring report shall contain a statement from the geotechnical engineer that based upon his or her professional opinion, site observations, and testing during the monitoring of the construction, the completed development substantially complies with the recommendations in the geotechnical report, SDCI-approved plans, and all permit requirements. The final report shall be stamped by the geotechnical engineer and emailed to [scigeofinalletter@seattle.gov](mailto:scigeofinalletter@seattle.gov). Occupancy of the project will not be approved until the final report has been reviewed and accepted by the Director.

## **CHANGE OF GEOTECHNICAL ENGINEER/SPECIAL INSPECTION AGENCY**

If a new geotechnical engineer/special inspection agency is retained by the owner, the owner shall notify the Geotechnical Section of SDCI of the change in writing. The notification shall be accompanied by a letter to the Geotechnical Section of SDCI, signed and sealed by the new geotechnical engineer, expressing his or her agreement or disagreement with the recommendations of the original geotechnical engineer and stating whether existing plans and specifications conform to his or her recommendations. The letter shall also contain any further recommendations, as well as additional exploration, analysis and testing as applicable, should there be additions or exceptions to the original recommendations. Work relating to the further recommendations shall not proceed until the SDCI Geotechnical Section has approved them; in some cases, revised plans may be required. Review and approval of any further recommendations will not be granted during the pre-construction conference. SDCI will mail a revised special inspection authorization letter to the owner and the new special inspector.

## **GENERAL GEOTECHNICAL REPORT GUIDELINES**

The following are general geotechnical report guidelines<sup>1</sup>. These guidelines are not intended to be all-inclusive. Depending on the scope and scale of the project, some of the information below may not be required. It is the responsibility of the geotechnical engineer to address all factors, which in their opinion, are relevant to the site.

<sup>1</sup> Based upon "Geotechnical Report Guidelines," prepared by ASCE Seattle Section Geotechnical Group and City of Seattle DPD, November 2007.

### **I. PROJECT INFORMATION AND REPORT PURPOSE**

- A. Site Address
- B. Vicinity map
- C. DPD Project Number, if known
- D. Purpose (e.g., feasibility, permit application, ECA exemption, final design)

### **II. SITE AND PROJECT DESCRIPTION**

- A. Site plan showing existing and proposed structures and site improvements, property lines, and existing contour lines if available
- B. Surface conditions, including adjacent properties, structures, and rights-of-way
- C. Description of existing and/or proposed sewer drainage facilities (sanitary and stormwater) on or adjacent to site when these facilities affect or are affected by the proposed work
- D. Description of proposed structural and site improvements
- E. Floor and foundation grades
- F. Anticipated excavation depths

### **III. GEOLOGY AND GEOLOGIC HAZARDS**

- A. Review of available literature, geologic maps
- B. Preliminary geologic hazard assessment (e.g. landslide-prone areas, peat settlement prone areas, liquefaction hazard areas)
- C. Landslide history, including review of GeoMap NW or City files and the Seattle Landslide Study

### **IV. FIELD EXPLORATIONS AND LABORATORY TESTING**

- A. Exploration logs
- B. Field and laboratory testing results

### **V. SUBSURFACE DESCRIPTION**

- A. Subsurface conditions
- B. Geologic profile and site development cross-sections
- C. Groundwater evaluation and levels

### **VI. ANALYSES**

- A. Include soil properties, layering, and geometry

- B. Describe assumptions, analysis methods, results and interpretation.

## VII. CONCLUSIONS AND RECOMMENDATIONS

- A. Conceptual siting of structures and general recommendations
- B. Earthquake engineering (e.g. Seattle Building Code seismic parameters)
- C. Slope stability assessment including (1) existing conditions, construction phase, and post-construction phase and (2) global and local stability
- D. Foundation support recommendations (e.g. type, allowable bearing pressures, deep foundation capacities, settlement estimates)
- E. Temporary excavation and/or shoring recommendations, impacts on adjacent properties including utilities and ROW
- F. Lateral earth pressure and resistance recommendations
- G. Grading and earthwork including site preparation, compaction requirements, fill specifications, sequencing of earthwork operations, wet weather considerations
- H. Temporary and permanent surface and subsurface drainage requirements, temporary and permanent dewatering, off site effects
- I. Temporary and permanent erosion control as required by the 2016 Seattle Stormwater Code and Manual.
- J. Other recommendations as needed

## VII. PLAN REVIEW AND MINIMUM RISK STATEMENTS

- A. In landslide-prone critical areas, the following will be **required** with all permit applications:

A statement that the most recent plans and specifications submitted to SDCI have been reviewed and conform to the recommendations of the analysis and report and, provided that those conditions and recommendations are satisfied during the construction and use, the areas disturbed by construction will be stabilized and remain stable and will not increase the potential for soil movement; and the risk of damage to the proposed development and from the development to adjacent properties from soil instability will be minimal.
- B. In other areas designated by the Director as having high risk potential, the following shall be submitted:

A statement that the most recent plans and specifications submitted to SDCI have been reviewed and conform to the recommendations of the analysis and report, and provided that the conditions and recommendations are satisfied, the construction and development will not increase the potential for soil movement; and the risk of damage to the proposed development and from the development to adjacent properties from soil instability will be minimal.
- C. In liquefaction-prone critical areas, the statement required under section B will be required when the Director determines the risks are still sufficiently high after consideration of any proposed mitigation.

## Discussion in 2018 IBC 1803 Commentary:

## SOILS AND FOUNDATIONS

SECTION 1801  
GENERAL

**1801.1 Scope.** The provisions of this chapter shall apply to building and foundation systems.

- ❖ The provisions contained in this chapter for foundation design and construction apply to all structures.

SECTION 1802  
DESIGN BASIS

**1802.1 General.** Allowable bearing pressures, allowable stresses and design formulas provided in this chapter shall be used with the *allowable stress design* load combinations specified in ASCE 7, Section 2.4 or the alternative allowable stress design load combinations of Section 1605.2. The quality and design of materials used structurally in excavations and foundations shall comply with the requirements specified in Chapters 16, 19, 21, 22 and 23. Excavations and fills shall comply with Chapter 33.

- ❖ Design requirements in Chapter 18 are generally based on an allowable stress design (ASD) approach. Allowable stresses and service loads should not be used with the load combinations for strength design, and vice versa. This section clarifies the applicable load combinations that are to be used for the design of foundations.

SECTION 1803  
GEOTECHNICAL INVESTIGATIONS

**1803.1 General.** Geotechnical investigations shall be conducted in accordance with Section 1803.2 and reported in accordance with Section 1803.6. Where required by the *building official* or where geotechnical investigations involve in-situ testing, laboratory testing or engineering calculations, such investigations shall be conducted by a *registered design professional*.

- ❖ This section addresses the conditions that mandate a geotechnical investigation, as well as the information that must be included in the report. That the investigation of soils must be done by a registered design professional recognizes that testing and calculations require individuals with expertise in soil and foundation analysis. The field of soil mechanics and foundation engineering is diverse and complicated, and since it is not an exact science, its application requires specialized knowledge and judgment based on experience. Where subsurface conditions are found or suspected to be of a critical nature, the building official is encouraged to seek the professional advice of experienced foundation engineers.

**1803.2 Investigations required.** Geotechnical investigations shall be conducted in accordance with Sections 1803.3 through 1803.5.

**Exception:** The *building official* shall be permitted to waive the requirement for a geotechnical investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the

conditions in Sections 1803.5.1 through 1803.5.6 and Sections 1803.5.10 and 1803.5.11.

- ❖ Soils investigations to determine subsurface conditions should be made prior to the design and construction of new buildings and other structures. Such investigations should also be conducted when additions to existing facilities are considered and are of such a scope that would significantly increase or change the distribution of foundation loads.

There are two main objectives for conducting a soils investigation. The first is of a confirmatory nature. Its purpose is to obtain information already known from adjacent structures, such as soil-boring records, field test results, laboratory test data and analyses and any other knowledge useful in the design of the foundation system. The second objective is of an exploratory nature. It is warranted where soils information does not exist or is insufficient or unsatisfactory for use in the design of the foundation system.

Regardless of the objective of the soils investigation, the information generally required includes one or more of the following items for determining subsurface conditions:

1. The depth, thickness and composition of each soil stratum.
2. For rock, the characteristics of the rock stratum (or strata), including the thickness of the rock to a reasonable depth.
3. The depth of ground water below the site surface.
4. The engineering properties of the soil and rock strata that are pertinent for the proper design and performance of the foundation system.

For shallow foundations, the soils investigation should yield sufficient information to establish the character and load-bearing capacity of the soil (or rock) at depths that will receive the foundations.

Foundation problems are not uncommon and may vary greatly, ranging from very simple and manageable problems to very complex situations that may be either manageable or without practical remedy.

As indicated in the exception, where geotechnical data from adjacent areas are well known, the building official can accept the use of local engineering practices for the design of foundations.

**1803.3 Basis of investigation.** Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. Additional studies shall be made as necessary to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.

- ❖ When soils are required to be classified, the classification must be based on observations and tests, such as borings or test pits. In addition to the situations speci-



### 3.0 SOILS ENGINEERING & GEOTECHNICAL REPORTS

The following guidelines are the minimum requirements for the preparation of geotechnical reports for regulatory compliance. Geotechnical reports shall be prepared by a civil engineer, licensed in the State of California, experienced in the field of soil mechanics, or a geotechnical engineer licensed in the State of California (soils engineer). These guidelines are intended to supplement County Codes and policies and when possible provide clarifications for report requirements. Pertinent GMED Directives are provided in the Appendix. The [Additional Resources](#) section of this manual provides reference to documents and internet links that may be used to support the report preparation and research. The standards discussed in this section may not cover all proposed site developments and additional guidance and more conservative standards may be required.

Geotechnical reports must include recommendations and conclusions based on soil data, records, geologic conditions, and analyses of geotechnical hazards in relation to the proposed site developments or remediation. Geologic hazards must be identified, analyzed, and remedial measures recommended.

The Soils Engineer of record must acknowledge all pertinent previous geotechnical reports and make a statement that he/she agrees with their findings, conclusions, and recommendations or provide appropriate modifications. Modifications should be supported with discussions and may need to be substantiated with additional data as necessary.

When both an engineering geology and soils engineering report are required for the evaluation of the safety of a building site, the two reports shall be coordinated before submission to the building official. Engineering geology reports shall be prepared by an engineering geologist licensed in the State of California.

#### 3.1 GENERAL GUIDELINES

All soils engineering and geotechnical reports submitted for review shall have been prepared by, or under the responsible charge of, a civil engineer, licensed in the State of California, experienced in the field of soil mechanics, or a geotechnical engineer licensed in the State of California. The reports shall bear the signature and seal or stamp of the licensee and the date of signing and sealing or stamping. For additional details on this requirement see the *Business and Professions Code* Sections 6700 through 6799 (also known as the Professional Engineers Act).





It is the responsibility of the soils engineer to review the project and determine what items must be covered (e.g. slope stability, collapsible soils, liquefaction, pile design, construction constraints, mitigation of effects to offsite property, etcetera) in the preparation of a geotechnical report. The report must demonstrate that property and public welfare will be safeguarded in accordance with current County Codes and policies. Provisions of the CLABC Section 110.2 requires that the building site will be free of geotechnical hazards, such as landslide, settlement, or slippage, and that the proposed work will not adversely affect offsite property. CLABC Section 111 requires the report contain a finding to show compliance with CLABC Section 110.2.

The CLABC Section 111 statement must clearly make a finding regarding the safety of the site of the proposed work against hazard from landslide, settlement or slippage and a finding regarding the effect that the proposed work will have on the geotechnical stability of the area outside of the proposed work. The finding must be substantiated by appropriate data and analyses.

The CLABC Section 111 statement is mandatory for all geotechnical reports except for reports prepared for tentative subdivision and environmental impact reports. Although the 111 Statement is optional for these specific types of reports, there must be sufficient supporting information that demonstrates to the satisfaction of the Building Official or Public Works Land Development Division Subdivision Mapping Section (Subdivision Mapping Section) that the sites will be developable and that the required CLABC Section 111 Statement can be provided at a later stage of development.

The following are minimum requirements, and content of all soils engineering and geotechnical reports submitted to GMED:

### 3.1.1 Report Age

The report must have been prepared within one year prior to submittal to the Geotechnical Development Review Units for verification of compliance with County codes and policies. For geotechnical reports older than one year prior to submittal, an update report/letter will be required, at a minimum, to verify the validity and applicability of the original report.

The update report/letter must address the latest proposed development, the existing site conditions, and utilize the latest plans and/or tentative map as a basis for the geotechnical maps within the report. The update report/letter must address any changes to the proposed scope of work, the existing conditions, or geologic hazards. Additional soils data, updated analyses, and updated geotechnical maps may be required to provide adequate revised recommendations and conclusions.





### 3.1.2 Description of Site and Proposed Development

The report must contain a description of the existing site conditions and a description of the proposed development. The description of the existing site conditions should include, but not be limited to, the location, size, topography, geologic/geotechnical conditions and hazards. The description should address any proposed grading and all proposed structures that will be constructed for the development of the subject site.

Approximate earthwork volumes must be included within the description for developments with proposed grading. There should be a distinction made between the volumes of cut and fill materials. In addition, offsite grading that may influence the proposed development must be addressed.

Basements, habitable structures, and locations and types of retaining walls should be specified as part of the description. If special foundations and specific geotechnical recommendations are provided within the report, it should be addressed as part of the description of the proposed development.

### 3.1.3 Subsurface Conditions

Geotechnical reports shall describe the earth materials and subsurface conditions based on subsurface explorations. References shall be made to the boring logs, trenches, pits, cone penetration test soundings (CPTs) and other subsurface explorations utilized to characterize the soil data, soil properties, and subsurface conditions. Descriptions of the subsurface conditions should be clear and consistent with the subsurface exploration and soil data collected. The logs of all subsurface explorations and subsurface data should be included within or appended to the report.

When subsurface explorations or subsurface conditions are referenced from a separate report or source, those reports or sources should be provided, such that the Geotechnical Development Review Units can review the material in its original form. Referenced materials may be required to be submitted for review.



Note: Reference materials and data that is deemed not relevant (e.g. offsite data is from a source too far away to be relevant, adjacent site data is for fill and proposed site is native, etc.) by the Geotechnical Development Review Units will not be permitted to be used in support of the proposed site development.

The current and historical groundwater conditions and the seasonal groundwater fluctuation should be included in the report. The report shall address the effects the groundwater, seasonally high groundwater, seepage effluent, and flows from onsite infiltration systems may have on the proposed site improvements and offsite properties.

Subsurface descriptions must be based on documented subsurface information and/or soil data from subsurface explorations. Engineering experience and engineering judgment alone will not be adequate for GMED regulatory review processes.

### 3.1.4 Subsurface Exploration and Laboratory Testing Programs

It is the responsibility of the soils engineer to determine the extent of subsurface exploration and laboratory testing programs. The subsurface data and laboratory testing results must be sufficient to provide an accurate characterization of the subsurface conditions. Data shall be used to evaluate potential geologic and geotechnical hazards and conduct engineering analyses. The geotechnical recommendations and conclusions shall be based on appropriate subsurface data, laboratory testing results, and engineering analyses.

All subsurface exploration and laboratory testing programs should first consider the specific geotechnical/geologic information necessary for the proposed development. Previous subsurface exploration and laboratory testing may be referenced if found to be applicable to the proposed development. When appropriate, the soils engineer or engineering geologist should coordinate the subsurface exploration and laboratory testing programs. If geological information is not required, the soils engineer must determine the exploration and testing program needed for the proposed development.



The summary of laboratory test results shall be provided along with the full description of laboratory tests performed (e.g. moisture and drainage conditions during any shear strength tests, shear rates, overburden pressures, etc.). Laboratory testing protocols and results shall be clearly stated. When applicable, the laboratory results should be appended to the appropriate subsurface exploration logs.

Sufficient subsurface exploration information and laboratory test results must be provided to substantiate all findings, analyses, conclusions, and recommendations. Soil data collected for geotechnical analyses must be clear, relevant, quantitative, and objective.

### 3.1.5 Engineering Analyses

The report shall describe and address all engineering analyses conducted for the proposed development. Supporting analyses, calculations, input and output data for computer based analyses, force diagrams, etc., shall be contained in the report, as necessary. Relevant items necessary to conduct a full review of the proposed development should be included in the soils engineering and/or geotechnical report. Exclusion of supporting documents and analyses in the report may impede a full review and cause review comments to be generated requesting those documents and analyses be provided.

Analyses such as slope stability analyses, liquefaction analyses, settlement analyses, lateral spread, etc. must address the results of any proposed mitigation measures. GMED Directives (see Appendix) criteria and requirements shall be followed unless superseded by more conservative Codes or policies.

### 3.1.6 Conclusions and Recommendations

The report shall clearly state all conclusions and recommendations by the soils engineer. All mitigation measures must be supported with data, engineering analyses, and, as necessary, figures and diagrams.

### 3.1.7 Geotechnical Map and Cross Sections

The Geotechnical Map must show the location of subsurface exploration, geology of the site, lot lines, existing and proposed grades, locations of sewage disposal systems, existing and recommended remedial measures, geotechnical setbacks, and recommended "Restricted Use Area(s)." The Geotechnical Map must utilize the most current plans or subdivision map as a base for geotechnical mapping.

All geotechnical maps included within the report shall be considered a part of the report and shall not be considered a part of the plans or subdivision maps.

All geotechnical maps should be numbered or identified by sheet and by the report date. When the geotechnical map requires more than one map sheet, the individual map sheets should include easily discernible match lines. An index map of all sheets may be required if there are many sheets associated with the project plans, which may be the case with large subdivisions and long storm drains.

The geotechnical maps must include all boundaries of the subject site. The topography for areas immediately outside of the subject boundaries should also be included to verify whether geologic hazards will affect the subject site or whether the proposed development will affect adjacent properties.

The geotechnical maps shall have a legend that describes all symbols, geologic formations, geotechnical cross-sections, contours, lines, shading, hashing, colors, etc. All sheets must have a north arrow or north symbol.

The scale of the geotechnical map should be sufficient for geologic and geotechnical purposes. The scale of the map will be dictated by the current policies of the Subdivision Mapping Section and the Building Official. However, tentative maps are typically required to be at a scale of 1 inch = 100 feet and grading plans to be at a scale of 1 inch = 40 feet. In some cases, the consultant or reviewer may deem it necessary for a more detailed map scale to be prepared.

Cross sections are generally necessary to depict geologic conditions for use in slope stability analyses or for clarification of subsurface stratigraphy. Cross sections must be at true scale (horizontal=vertical).

### 3.2 GEOTECHNICAL REPORT ORGANIZATION

The geotechnical report shall be completed in such a manner to ensure that all geotechnical factors affecting the subject site and the proposed development have been considered. The geotechnical report must consider the site stability including temporary conditions during construction. The report must also consider the effect of the proposed development on geologic and geotechnical stability of adjacent property. The geotechnical report must contain recommendations with supporting data, analyses, and calculations, and include all references used. The geotechnical report shall be wet-signed by a licensed civil engineer competent in the field of soils engineering and wet-stamped with the civil engineer's seal or stamp. The date of signing and sealing or stamping must be included.



## Examples from other Jurisdictions:

### Las Vegas, Nevada:

Added to IBC Section 1803.3 to state the following (<https://up.codes/s/minimum-exploration-requirements>)

The minimum exploration requirements are as follows:

The minimum depth of an exploration shall be fifteen feet. Exploration depth shall be increased as necessary to evaluate the suitability of the material within the foundation's depth of influence as determined by the *registered design professional*. The explorations can be terminated should refusal be encountered. However, at least three-fourths of the required explorations shall be to the minimum depth. The geotechnical report shall clearly state the refusal criteria. When information regarding the proposed structure and the final grades is made available, the *registered design professional* shall determine if the explorations originally documented in the geotechnical report meet the depth requirements.

The minimum number of explorations performed shall be as follows:

1. For areas less than or equal to one acre, a minimum of two explorations.
2. For areas greater than one acre, but less than five acres, a minimum of one exploration for the first acre and one for each additional two acres, or portion thereof.
3. For areas greater than five acres, but less than twenty acres, a minimum of three explorations plus one additional exploration for each three acres or fraction thereof above five.
4. For areas greater than twenty acres, a minimum of eight explorations plus one additional exploration for each five acres or fraction thereof above twenty.

#### **Exceptions:**

1. A minimum of one exploration is required for single story structures with a footprint less than 2000 square feet whose locations are known and only that area of the site is to be developed. This provision is limited to detached structures classified as Group U occupancy or building additions of any occupancy. The exploration shall be performed within the proposed footprint.
2. A minimum of one exploration is required for signs, light poles and communication towers whose locations are known and only that area of the site is to be developed. The exploration shall be performed within 50 feet of the proposed foundation for the structure.





**Municipality of Anchorage**  
**Planning Department**  
**Memorandum**



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**Date:** 10/29/2024

**From:** Daniel McKenna-Foster, Senior Planner, Long Range Planning

**Through:** Melissa Babb, Planning Director

**To:** Geotechnical Advisory Commission

**Subject:** Special limitations zoning and environmental hazards

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**Context**

The Assembly recently introduced AO 2024-99, “an ordinance of the Anchorage Municipal Assembly amending Anchorage Municipal Code Section 21.03.160 to prohibit the application for or recommendation of special limitations in approving an amendment to the zoning map.” At the 10/22/2024 Geotechnical Advisory (GAC) Meeting, staff asked the GAC if they would be willing to comment on the concept of special limitations (SLs) and their use as a tool for mitigating or preventing risks from environmental hazards such as steep slopes or seismic activity. This memo provides additional information on the technical expertise requested.

**What are Special Limitations?**

Per 21.03.160G, SLs are a set of conditions that can be applied to a rezone that may include provisions for one or more of the following purposes:

- a. To prohibit structures, or uses of land or structures, that would adversely affect the surrounding neighborhood or conflict with the comprehensive plan.*
- b. To conform the zoning map amendment to the comprehensive plan, or to further the goals and policies of the comprehensive plan.*
- c. To conform development under the zoning map amendment to existing patterns of development in the surrounding neighborhood.*
- d. To mitigate the adverse effects of development under the zoning map amendment on the natural environment, the surrounding neighborhood, and on public facilities and services.*

Types of limitations may include restrictions that:

- Limit residential density; or prohibit structures, or uses of land or structures, otherwise permitted in a zoning district.
- Require compliance with design standards for structures and other site features.
- Require compliance with a site plan approved under this title.
- Require the construction and installation of improvements, including public improvements.
- Impose time limits for taking subsequent development actions.

### **Special Limitations in areas with steep slopes or high seismic risks**

Anchorage has a about 9,221 parcels with special limitations zoning, with much of that acreage located in sloped areas of Eagle River or South Anchorage. Many of the SLs in these areas which were established before 2012 include provisions for limiting lot size, restricting uses, or requiring additional stream setbacks, buffering, or erosion control. Although it is not always explicitly mentioned in the ordinances which created them, the intent of many of these SLs seems to have been attempting to mitigate risks from slopes and negative impacts to waterways. Between 2012-2014, the Municipality of Anchorage made significant changes to both the content and organization of its zoning code, including reorganizing, consolidating, and strengthening sections regulating slope, hillside development, water pollution control, and stream setbacks into the new section of 21.07.020 Natural Resource protection.<sup>1</sup> The new standards also include additional mentions that development of properties with slopes over 30% consider avalanche risk. Preliminary discussions with staff in MOA Development Services and MOA Private Development indicate that while building codes have not changed significantly over the same period, the building codes adopted today do still provide an appropriate procedure for ensuring safe development in steep or seismically-unstable areas.

### **Request for the GAC**

Staff requests that the GAC review the special limitations code section mentioned above, their own practical experience, and the example provided in the table below to answer the following:

- **Is the existing code language in Title 21 and Title 23 sufficient to address any slope or seismic risks that may have been initially regulated under special limitations in individual zoning districts? If SLs were removed, would that allow for any potentially dangerous or unregulated conditions?**
- **Is there a role for a required site plan review in specific zoning language for certain high-slope zones in Anchorage or Eagle River? <sup>2</sup>**

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<sup>1</sup> For reference in “Old” Title 21: see 21.85.180 Erosion and Sedimentation Control, 21.80.370 Design Standards R-10 District. 21.80.360 Design Standards- Hillside lots (based on platting authority and slope chart), 21.67 water pollution control, and 21.45210 stream protection setback.

<sup>2</sup> For reference, Table 21.04-3 in **21.04 Zoning Districts** currently prescribes minimum lot area, width, maximum lot coverage, and impervious surface coverage for development in R-10 based on average lot slope.



The information the GAC provides will help inform recommendations the Department makes on any legislative action on special limitations. The table below provides an example for which the public record provides a significant amount of background information. A full print out of this AO will be attached to this memo.

Area of the MOA	Zone	Ordinance	Excerpt
Hillside	R-6 SL	AO 2011-82	<p>"A. The following uses are allowed: 1. Permitted principal uses and structures. a. Single family home per lot."</p> <p>From PZC findings: "<i>The site has a number of sensitive features such as steep ridges, wetlands, bedrock, high winds and road access issues that make lower density more environmentally appropriate. The site is not necessarily developable at the minimum lot size of the R-6 zone, but the subdivision platting process will ascertain the adequate lot size to accommodate on-site services as the project moves ahead</i>"</p>

2. District-Specific Standards

a. Lot and Site Requirements

Table 21.04-3 provides the lot and site requirements for the R-10 district. This table applies in addition to the dimensional standards stated in table 21.06-1.

TABLE 21.04-3: LOT AND SITE REQUIREMENTS FOR R-10 DISTRICT				
Average Slope of Lot (percent)	Minimum Lot Area (acres)	Minimum Lot Width (feet)	Maximum Lot Coverage of All Buildings (percent)	Coverage Impervious Surfaces (percent)
More than 30.00	7.50	300	3	8
25.01--30.00	5.00	300	5	10
20.01--25.00	2.50	180	8	14
20.00 or less	1.25	100	10	20

Average slope is calculated by the following formula:

$$S = \frac{I \cdot L}{A} \cdot 0.0023$$

Where:  
 S = Average slope of lot or tract in percent  
 I = Contour interval (20 feet or less)  
 L = Sum of length of all contours on lot or tract in feet  
 A = Area of the lot or tract in acres

b.

**Bedrock**

When one-third or more of required soils borings reveal bedrock at a depth of less than 16 feet on the lot or tract, lot and site requirements shall be determined as if the average slope were in the next steeper percentage range shown on the table in this subsection. Any required soil boring that does not extend to a depth of at least 16 feet shall be deemed for the purposes of this subsection to have encountered bedrock.

Figure 1: Existing district-specific standards for R-10 in Title 21

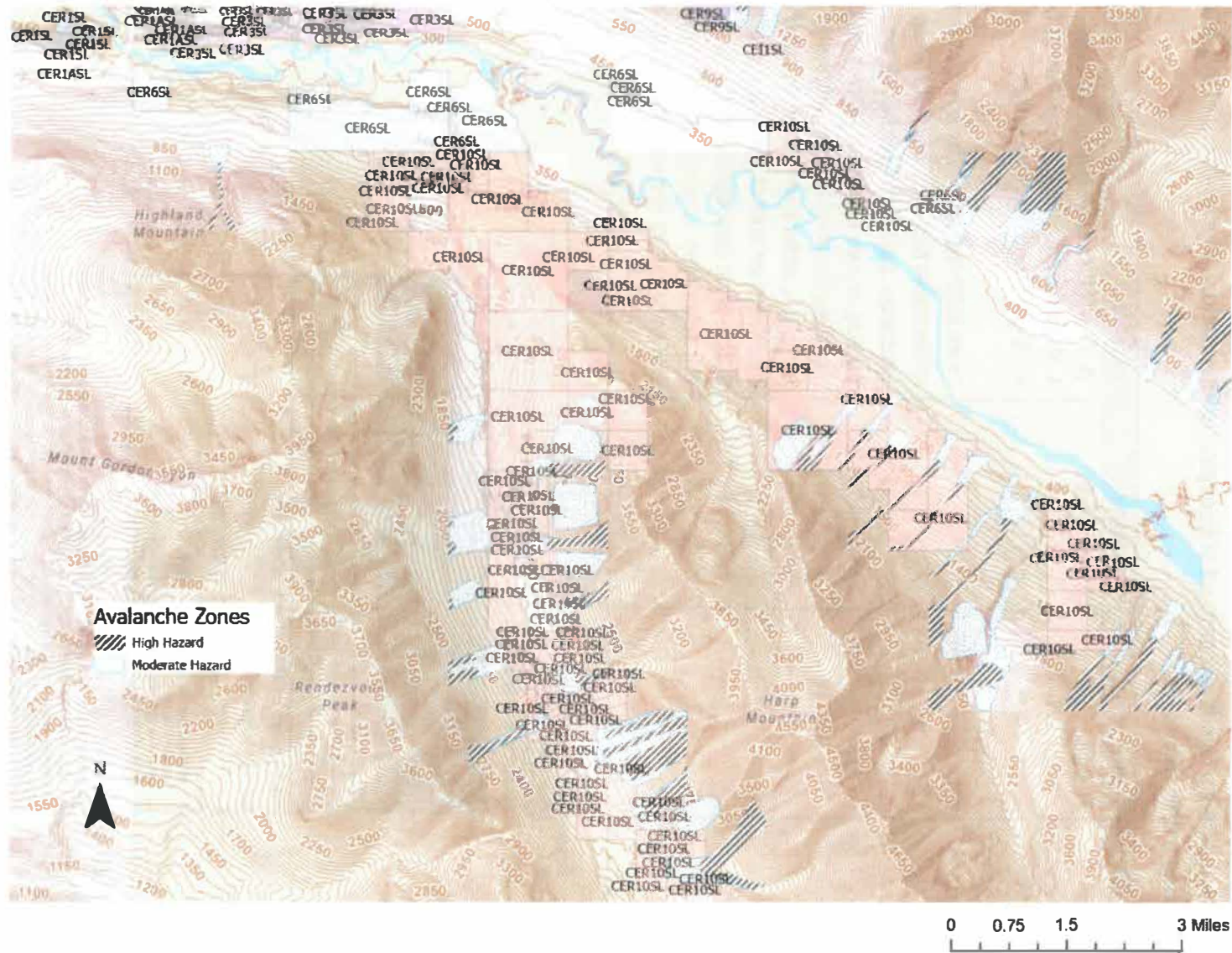


Figure 2: Zones with Special Limitations in the Eagle River Area





For AO 2011-82 related to the 10/29/2024 memo: “Special limitations zoning and environmental hazards” please follow the link below:

<https://www.muni.org/Departments/OCPD/Planning/SiteAssets/Pages/GeotechnicalAdvisoryCommission/AO%202011-082%20OCR.pdf>