



Guidance for Third-Party Geotechnical Report Review

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EXECUTIVE SUMMARY

Third-party review of geotechnical reports is a critical component of risk management for development and infrastructure projects in California, particularly in areas subject to complex geologic conditions and seismic hazards. This white paper provides guidance for agencies and practitioners to conduct consistent, technically rigorous, and transparent independent reviews of geotechnical reports.

The document builds upon prior CalGeo guidance and California Geological Survey (CGS) practices to define expectations for reviewer qualifications, administrative and technical review processes, and standardized deliverables. Emphasis is placed on ensuring that geotechnical reports adequately characterize subsurface conditions, identify hazards, and provide feasible, code-compliant recommendations that support safe design and construction.

GUIDANCE

1. PURPOSE AND SCOPE

The purpose of this white paper is to establish a consistent framework for the performance of third-party peer reviews of geotechnical reports in California. These reviews support local agencies in evaluating whether reports are technically adequate, complete, and consistent with applicable codes and standards.

The scope of this guidance includes review of geotechnical and engineering geology reports prepared for development projects, including buildings, infrastructure, and graded sites. The review process is divided into **administrative and technical phases**, each with distinct objectives. Administrative review confirms completeness and compliance with professional requirements, while technical review evaluates the adequacy of data, analyses, and recommendations.

This guidance is intended to improve review consistency across jurisdictions and enhance public safety by promoting defensible geotechnical conclusions and mitigation measures. It does not replace the role or responsibility of the Geotechnical Engineer of Record (GEOR).

2. AUTHORITY AND REFERENCES

Third-party reviews should be conducted in general accordance with applicable California laws, regulations, and industry standards. These references are typically the minimum for most projects (either new build or retrofit) so it is incumbent on the GEOR to implement the appropriate code(s) relevant for the project type, including but not limited to:

- California Building Code (CBC) (latest adopted edition)
- ASCE 7 – Minimum Design Loads and Associated Criteria
- ASCE 41 – Seismic Evaluation and Retrofit of Existing Buildings
- California Geological Survey (CGS) guidance (e.g., Note 41, Note 48, and related publications)
- Alquist-Priolo Earthquake Fault Zoning Act
- Seismic Hazards Mapping Act
- Applicable local ordinances and agency requirements
- Published geologic mapping and technical literature (CGS, USGS)

The reviewer is responsible for verifying that the subject report appropriately references and applies relevant codes and standards.

3. REVIEWER QUALIFICATIONS AND INDEPENDENCE

Third-party reviewers must be licensed professionals in the State of California (e.g., GE, PE, CEG) with demonstrated expertise relevant to the project type and geologic setting. Reviewers should have experience comparable to that of the report authors and familiarity with local geologic conditions and agency expectations.

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Independence is a fundamental requirement. The reviewer shall have no financial or professional conflict of interest associated with the project. The review must be conducted objectively and without bias to the extent possible.

The role of the reviewer is limited to evaluating the adequacy, completeness, and consistency of the submitted report. The reviewer does not assume responsibility for design, nor do they replace the GEOR.

4. FAMILIARITY WITH APPLICABLE CBC, ASCE, AND CGS REQUIREMENTS

Reviewers must possess a working knowledge of applicable regulatory and technical requirements governing geotechnical practice in California. These references are typically the minimum for most projects (either new build or retrofit) so it is incumbent on the GEOR to implement the appropriate code(s) relevant for the project type, including but not limited to:

- Soils and Foundations per Chapter 18 of current CBC
- Grading per Appendix J of the current CBC
- Seismic design criteria per CBC and ASCE 7
- Site classification and ground motion parameters
- Evaluation of seismic hazards (fault rupture, liquefaction, landsliding)
- CGS guidance for hazard investigations and mitigation

The review should verify that geotechnical reports integrate these requirements appropriately and that analyses and recommendations are consistent with current standards of practice.

5. ADMINISTRATIVE REVIEW

Administrative review is a preliminary step intended to confirm that the submitted report is sufficiently complete and properly documented prior to technical evaluation.

This review should verify that:

- The report includes essential components such as project description, site conditions, exploration data, and recommendations
- Figures, maps, and supporting documentation are provided
- The report is signed and stamped by appropriately licensed professionals
- Authorship reflects the disciplines required by the scope of work

Deficiencies identified during this phase should be resolved prior to or concurrently with technical review.

6. TECHNICAL REVIEW

Technical review evaluates whether the report's findings, analyses, and recommendations are appropriate for the site conditions and proposed development.

The review includes assessment of the geologic setting and background, the field investigation and laboratory testing, seismic hazards evaluation, the geotechnical engineering analyses performed with conclusions and corresponding design recommendations.

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Geologic Setting and Background

The report should provide a clear and accurate description of site geology and its regional context, consistent with published data and mapping.

Field Investigation and Laboratory Testing

Subsurface exploration methods, test frequency, and laboratory testing should be appropriate for the site conditions and project complexity. Groundwater conditions should be adequately characterized through observations or monitoring, to provide parameters relevant for design.

Seismic Hazard Evaluation

The report should evaluate applicable seismic hazards, including fault rupture, liquefaction, seismic settlement, lateral spreading, and slope instability. Methods should reflect current professional practice.

Engineering Analyses

Analytical methods and assumptions should be appropriate and supported by site data. This includes evaluation of foundation capacity parameters (both axial and lateral), settlement (including collapsible, expansive, compressive soils), slope stability (defined by LEM/FEM), lateral earth pressures (including seismic increments, if applicable), constructability, and mitigation of geologic and seismic hazards identified at the project site including dewatering and ground improvement.

Design and Construction Recommendations

Recommendations for shallow or deep foundations, grading and site preparation, drainage, retaining structures, and other mitigation measures should be technically sound, feasible, and constructible. Include construction phase considerations for grading and site preparation, shoring/excavations, drainage/erosion, and pavement/flatwork.

Consistency and Conclusions

Conclusions must logically follow from the data and analyses presented. Identified hazards should be directly addressed by mitigation measures, and recommendations should be internally consistent.

7. ADDITIONAL DETAILS

This guidance document includes Appendices that the Agency or Reviewer can refer to when performing a peer review. A detailed guide for Technical Review is presented in Appendix A. A matrix presenting typical hazards, evaluation elements, and potential mitigation/recommendations is presented in Appendix B. A table presenting typical figures/plates used to convey geotechnical information as they are presented in the report is presented in Appendix C. Where improvements are recommended or deficiencies (i.e., lacking information) are noted, suggested language for each item are presented in Appendix D. Finally, a checklist for the hazard evaluated with respect to the reference cited is presented in Appendix E.

8. REQUIRED REVIEW DELIVERABLES

The third-party review shall be documented in a formal written deliverable submitted to the reviewing agency. This may take the form of a letter, memorandum, or report.

The deliverable should include:

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- Scope of review and documents evaluated
- Summary of findings
- Identification of deficiencies and required revisions
- Clear distinction between required actions and recommendations
- Statement of report acceptability

Standardized checklists and structured comment tables are encouraged to promote clarity and consistency. Suggested outcome statements and resubmittal logistics are provided in Appendix F. The documentation should be presented to the AHJ and include relevant language for the local jurisdiction to enforce as presented in Appendix G.

9. ROLES, LIMITS, AND COORDINATION

The third-party reviewer provides an independent evaluation of the submitted report and does not assume responsibility for project design or construction. The review is based solely on the information provided.

The GEOR retains responsibility for all geotechnical recommendations and project implementation. The third-party review does not replace design review or construction observation services. If during the review process there are differences of opinion between the GEOR and reviewer, the opinion of the GEOR should prevail. Coordination between the reviewer, GEOR, and agency is encouraged, particularly for complex projects or where significant issues are identified. Early collaboration can improve efficiency and reduce rework. All review documents should include a limitation statement clarifying the scope and nature of the review.

APPENDIX A – DETAILED TECHNICAL REVIEW CRITERIA

This appendix provides the detailed technical review criteria referenced in the main text. These items expand upon the high-level expectations and outline the minimum content, analytical checks, and documentation standards expected in a third-party geotechnical review.

A-1. Background Information

- Summary of local/regional geology; surficial and bedrock units; key structures.
- Consistency check against CGS/USGS maps and authoritative literature; explain discrepancies.
- Identification of mapped hazards near/on site (faults, landslides, unstable slopes, etc.) and how considered.
- Relevant site history (grading, undocumented fill, excavations).
- Prior geotechnical/geologic work and record documents reviewed (as available).

A-2. Field Investigation and Laboratory Testing

- Geologic mapping and documentation of significant surface/subsurface features.
- Exploration program appropriateness (type/number/locations of borings, CPTs, test pits); logs prepared and/or reviewed by the licensed geoprofessional; USCS (Unified Soil Classification System) classifications; geologic contacts identified.
- Laboratory test types/frequencies justified by project needs; test results summarized with interpretation.
- Groundwater observations/monitoring and seasonal considerations when material to design.
- Geologic cross-sections; exploration location map at appropriate scale.

A-3. Seismic Hazards Evaluation

- Fault rupture hazard within Earthquake Fault Zones (if applicable).
- Liquefaction and related deformations (settlement, lateral spread) using current, accepted methods per AHJ expectations.
- Seismically induced landslides with appropriate slope stability modeling and seismic loading parameters.
- Ground shaking parameters per current CBC/ASCE 7 or site-specific studies as justified; site class determination consistent with investigation results.

A-4. Geotechnical Analyses and Design Recommendations

- Bearing capacity for shallow elements (including retaining where appropriate); state factors of safety.
- Settlement (total/differential) considering consolidation, elastic, and collapsible/expansive/compressible behavior as applicable; provide criteria for acceptability.
- Slope stability: define methods (Limit Equilibrium Method—LEM; Finite Element Method—FEM), check static and seismic conditions, and address creep where relevant.
- Lateral earth pressures: methodology, parameters, drainage/surcharge; include seismic increments if applicable.

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- Foundation systems (shallow/deep): design parameters for axial/lateral/uplift, spacing/group effects, construction considerations.
- Ground improvement options with design basis, performance goals, and verification/QA where proposed.
- Temporary/permanent dewatering and waterproofing considerations with impacts to adjacent improvements.
- Construction-phase recommendations: grading, temporary excavations/shoring (note contractor means/methods remain contractor's responsibility; provide preliminary assumptions for confirmation), drainage/erosion, pavements/flatwork without prescribing specific design methodologies.

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APPENDIX B – EXAMPLE HAZARD/MITIGATION MATRIX

Hazard	Typical Evaluation Elements	Potential Mitigation/Recommendations
*Fault Rupture	Trenching/zone mapping (if required)	Avoidance/setbacks; foundation discontinuities where permitted
*Strong Seismic Ground Shaking	Appropriate site class to develop seismic design parameters	Perform Site Response Analysis if appropriate
*Seismic-Related ground failure including Liquefaction	Triggering; cyclic strain/deformations; lateral spread susceptibility	Ground improvement; deep foundations; densification; setback/grade changes
*Landslides and Slope Instability (static/seismic)	Geometry, stratigraphy, groundwater; LEM/FEM; seismic coefficients, mapping that indicates unstable geologic units that results in on-or off-site landslide, laterals spreading, subsidence, liquefaction or collapse	Regrade/bench & key; buttress fills; drainage/subdrains; retaining systems
*Soil Erosion or loss of Topsoil	Mapping or lab testing	Grading or surficial treatment and erosion control measurements
*Expansive/Collapsible Soil	Index tests; wet-dry susceptibility	Moisture control; lime/cement treatment; slab/foundation detailing
*Soils use for septic or alternative waste water disposal systems	Testing, geologic mapping, groundwater level measurements	Evaluate alternative locations or geometry of systems proposed
Settlement/Compressible Soil	Consolidation and elastic settlement; differential risk	Preload/surcharge; ground improvement; thicker mats; overexcavate & replace
Excavation Support	Adjacent structures/utilities; soil/groundwater parameters	Shoring systems; underpinning; monitoring

This appendix provides a structured matrix summarizing common geotechnical and geologic hazards, their associated evaluation elements, and representative mitigation approaches. The items denoted with a (*) indicate they are the CEQA Appendix G List for Section VI Geology and Soils.

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Appendix C — Figures and Appendices Checklist

Figure/Plate	Applicability	Presented		Reviewer Comments
		Yes	No	
Site Location Map	Applicable	☐	☐	
Geologic Map	As Needed	☐	☐	
Fault Map	As Needed	☐	☐	
Earthquake Zones of Required Investigation Map	As Needed	☐	☐	
Exploration Location Map	Applicable	☐	☐	
Exploration Logs	Applicable	☐	☐	
Cross-Sections	As Needed	☐	☐	
Groundwater Level Map	If Measured	☐	☐	
Slope Stability Output	If Applicable	☐	☐	
Liquefaction Output	If Applicable	☐	☐	
Pile Capacity Charts	If Applicable	☐	☐	
Laboratory Test Results	Applicable	☐	☐	

This appendix contains a checklist of typical figures, plates, and supplemental documents expected in geotechnical and engineering geologic reports, enabling consistent verification of submittal completeness.

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Appendix D — Recommended Improvements / Deficiencies Noted (Template)

Item Noted	Description	Suggested Improvement Language
Groundwater not discussed	Logs/summary omit groundwater depth/variability	Add groundwater observations and discuss seasonal fluctuation relevance.
Outdated liquefaction method	Older correlations cited without justification	Update to current accepted methods per AHJ expectations or justify legacy use.
Figure/text mismatch	Titles or references inconsistent	Standardize figure titles and text references throughout.
Unquantified settlement	Conclusions cite “significant” without values	Quantify settlement magnitudes and acceptance criteria.
Unsupported conclusions	Findings lack supporting data or references	Provide supporting lab data, mapping, or records as appropriate.

This appendix provides a standardized table format for identifying deficiencies or areas for improvement in submitted reports, along with suggested corrective language.

Appendix E — Code/Guidance Conformance Matrix (As Applicable)

Hazard Evaluation	Evaluated			Reference Cited				Reviewer Comments
	Yes	No	N/A	CBC	ASCE	CGS	Other	
Liquefaction	☐	☐	☐	☐	☐	☐	☐ _____	
Fault Rupture	☐	☐	☐	☐	☐	☐	☐ _____	
Seismically Induced Landslides	☐	☐	☐	☐	☐	☐	☐ _____	
Ground Shaking Parameters	☐	☐	☐	☐	☐	☐	☐ _____	
Site Class Determination	☐	☐	☐	☐	☐	☐	☐ _____	

This appendix presents a matrix for documenting conformance with applicable codes, standards, and guidance referenced by the authority having jurisdiction.

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Appendix F — Reviewer Summary & Outcome Language

Use the following structure for the AHJ summary letter: identify reviewer (name, license), scope and exclusions, documents reviewed, and categorized comments (major/minor) with actionable language. Suggested outcomes:

- Report conclusions and recommendations are adequately addressed for the described development. No further information is requested.
- Report is generally suitable; specific improvements/deficiencies noted. Provide a resubmittal addressing items in Appendices C–E.
- Clarifications needed as identified in checklists/tables; provide a clarifying resubmittal.
- Several significant items noted; coordinate with the reviewer before resubmittal.

Reviewer Summary Form (Short Form)

Project Name	
Project Number / ID	
Location	
Date of Review	
Reviewer Name	
Reviewer Title / Affiliation	
Document Reviewed	☐ Draft ☐ Final ☐ Addendum ☐ Other
Scope of Work — Adequacy	☐ Fully ☐ Partially ☐ Not Addressed
Areas Requiring Clarification	☐ None ☐ Minor ☐ Significant
Missing Data or Unstated Assumptions	☐ None ☐ Some ☐ Major
Consistency with Standards/References	☐ No Issues ☐ Minor ☐ Major
Feasibility for Planning/Design/Construction	☐ Feasible ☐ Concerns ☐ Not Feasible
Reviewer Recommendation	☐ Accept as-is ☐ Accept with minor revisions ☐ Major revisions required
Revisions or Additions Needed	
Further Investigation Required	
Limits of Liability — Reviewer Disclaimer	Review based solely on submitted materials; no independent fieldwork/calcs unless scoped; does not certify report or transfer responsibility from EOR/GeOR.

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Appendix G — Documentation for Local Jurisdiction

The reviewer's transmittal to the AHJ shall identify the reviewer and license number; list documents reviewed and the extent of review; state exclusions; present findings with actionable, professional language; and include a limitations statement and conflict-of-interest disclosure. Encourage the AHJ to require the project owner to retain the geotechnical/engineering geologic GEOR for subsequent plan review and construction observation to maintain continuity and accountability.