Geological Critical Area Report

A geological critical area report (CAR) identifies geological critical areas on a site and presents geological data and analysis necessary to support technical recommendations for minimizing geohazard risks to people and property. The report is based on the collection of site-specific field data and review of background information to convey an objective, factual picture of geologically important characteristics of the site such as soil, bedrock, water, and topography. The report is prepared by a qualified geological professional.

These reports are commonly referred to as ***geotechnical reports*** or ***soils reports*** or some variation thereof. Any report that meets the King County Code requirements of a geological critical area report may be submitted with a permit application, regardless of title.

What are geological critical areas?

Critical areas are lands with natural geologic hazards or lands that support certain unique, fragile or valuable natural resources including fish, wildlife, water, and habitats such as wetlands, streams, rivers, lakes, and marine waters. The King County Code (KCC) protects critical areas in order to protect public health and safety, to promote environmental health and quality of life in the region, and to preserve environmental resources that are valuable to the public.

King County identifies ***Geologically Hazardous Areas*** as types of land which contain critical areas. Specific regulated critical areas which are considered geologically hazardous areas include:

1. Alluvial fan hazard areas
2. Channel Migration Zones
3. Coal mine hazard areas
4. Erosion hazard areas
5. Landslide hazard areas
6. Seismic hazard areas
7. Steep slope hazard areas
8. Tsunami hazard areas
9. Volcanic hazard areas

In some cases, a geological critical area report may also include hydrogeological data necessary to evaluate another type of critical area—a ***Critical Aquifer Recharge Area*** (CARA).

What are geological critical area reports used for?

The Department of Local Services, Permitting Division (Permitting) uses the information transmitted within a geological critical area report during review of a permit application to determine the location, extent, and classification of geological critical areas at the site and determine that the proposal meets the development standards and regulations in King County Code.

Where geotechnical engineering is required to mitigate for geologic hazards, Permitting reviews a permit application to confirm that the recommendations made in the geological critical area report satisfy development standards and best engineering practices, and that they are implemented in the project plans. Permitting may apply conditions on the permit for the geological professional to perform special geotechnical inspections during project construction.

Who prepares a geological critical area report?

A geological critical area report is prepared by a geotechnical engineer or geologist licensed in Washington State. They must be experienced in analyzing geological systems including geological critical areas. In King County Code, qualified geotechnical engineers or geologists are referred to collectively as ***geological professionals***.

A geological professional is an integral member of your project design team. In addition to identifying geological critical areas and recommending mitigation, they may also assist with questions of feasibility, how to locate improvements on a site, and planning for constructability and cost-effective earthwork.

Investing in a capable geological professional can improve the safety of your project, reduce time and expense resulting from additional redesign and review during the permitting process, and may even result in cost savings during construction. When searching for a geological professional, we recommend applying principles similarly to finding any other service provider like an architect, surveyor, or contractor.

- Try to speak with and obtain estimates from multiple firms.
- Ask clarifying questions about project scope and the firm's experience working on similar projects, including working with software for specific geological hazards.
- Likewise, ask about their familiarity with King County Code and experience working with permitting in unincorporated King County.
- Consider whether the firm has the capability of providing special geotechnical inspections such as soil compaction testing or retaining wall inspections that may be required during construction.

King County cannot provide recommendations on which geological professional to use, but you may search for firms to contact using local professional organizations such as the *American Society of Civil Engineers / Geo-Institute Seattle Section Geotechnical Group*. You may also consider searching for firms involved on similar successful projects.

What information is included in a geological critical area report?

New for 2026, King County has adopted minimum requirements for geological critical area reports. These requirements are given in KCC 21A.24.XXX. Permitting highly recommends geological professionals familiarize themselves with the new code section.

A geological critical area report is required to address all areas of a proposed development site and geologically hazardous areas within 300 feet of the site, or that have the potential to affect or be affected by the proposal. The report should include, at a minimum, the following types of information summarized below:

1. **Basic Information** including the author and qualifications, owner, site location and parcel number, and description of the proposal;
2. **Site Conditions** including existing development, vegetation, topography, surface and ground water, and critical areas and buffers;
3. **Site Plan** including topographic contours, geologic data including faults and landslides, drainage flow characteristics, all identified geological critical areas and buffers, exploration locations, and proposed development (if known);
4. **Geological Conditions** including mapped geology, geomorphology of the site including aerials and LiDAR, site history, on-site subsurface soil explorations, description of encountered soils and bedrock, engineering properties of encountered materials, identification and discussion of geologic hazards;
5. **Hazards Analysis** of identified geologic hazards, such as slope stability analysis, liquefaction analysis, debris runout analysis, sediment transport analysis, and erosion or channel migration rates. Analyses must evaluate the potential for impacts to public safety, the hazard area, and the subject property;
6. **Evaluation of Proposed Development** including recommendations for temporary and permanent slopes, structure siting limitations, minimum buffers and setbacks, foundations, grading procedures, drainage, and mitigation of hazards;
7. **Professional Determination**—the geological professional shall state whether the proposed alterations minimize risks to people and development in accordance with the standards of KCC 21A.24, and present technical rationale to support the determination based on the data and analysis presented in the report;

8. **Avoidance and Mitigation Sequencing** including a discussion of how impacts of the proposed development were minimized in accordance with KCC 21A.24.125, and in some cases an analysis of listed alternatives to the proposed development;
9. **Data Sources** including all subsurface exploration logs, test logs and results, and other data sources used in the analyses, and input and output data from quantitative analyses;
10. **Any other information** determined by Permitting to be necessary to confirm compliance with King County Code. During the permitting process, this information may be provided in the form of revised reports or addendums in response to Requests for Information (RFIs) from the Permitting reviewer.

When is a geological critical area report required?

If your project location is likely within or near geological critical areas or would include excavation greater than five feet deep or fill greater than three feet deep, we recommend seeking a geological professional to consult on your design team early in the preliminary design phase. Preliminary information on which geological critical areas may be present at a site is available via the King County iMap GIS viewer.

Geological critical area reports are generally required as part of a complete permit application for projects that will occur near or within the following geological critical areas or default buffers:

- **Alluvial fan hazard area** when within 50 feet of an alluvial fan (currently mapped in iMap only under the River Corridor Mapping project, otherwise combined with the landslide hazard layer);
- **Coal mine hazard area** when within a mapped coal mine hazard on iMap that has not been declassified under a previous permit or Critical Area Designation (CAD);
- **Landslide hazard area** when within 65 feet of the potential landslide layer on iMap;
- **Seismic hazard area** when within the potential seismic hazard area layer on iMap;
- **Steep slope hazard area** when within 65 feet of a potential steep slope with over 10 feet of vertical rise.

Note that areas not shown in iMap may meet the definition of a geologic critical area and Permitting may request a geological critical area report at any time during intake and review of a permit application as necessary to determine whether a critical area is present based on available data outside of iMap including but not limited to topographic landforms, historical information, permit history, aerial photos, LiDAR, or mapped geology from other sources such as the United States Geological Survey (USGS) or Washington State Department of Natural Resources (DNR).

A geological critical area report is generally not required at permit intake for critical areas not listed above. However, for some development proposals, a geological critical area report may be required to address other geological critical areas. Geological critical area reports regarding the above-listed

critical areas are not required but are recommended as part of the submission for a voluntary pre-application meeting. Lastly, for some residential permits only, Permitting may have enough information regarding geologic critical areas to waive the geological critical area report requirement.

For more information about when a geologic critical area report is required, please contact Permitting (see below).

Where can I find more information?

More information regarding report requirements for specific geological critical areas is available on our website.

Questions? Visit our customer service page

For complex projects or projects potentially constrained by geologically hazardous areas or buffers, we strongly recommend you apply for a **voluntary pre-application meeting** and submit a geological critical area report for feedback from Permitting geological review staff. It's often valuable to present your conceptual development proposal and receive comments during the preliminary design phase to gain a better understanding of regulations that will impact project design and feasibility. This information early in a project can reduce time and expense of redesigns or infeasibility later in the permitting process. An applicant may also choose to receive comments from additional review staff if related to their proposal.

- Pre-application Meeting Information