CALIFORNIA SPECIFIC EXAMINATION (CSE) EXAM PLAN (January 2020)	
TOTAL %	**TOPIC**
23%	**Hydrogeology**
	Professional Activities - Plan and conduct California hydrogeological investigations and evaluate results. Evaluate and protect California water resources, assess aquifer characteristics, groundwater quality, and sustainability. Provide the geologic interpretation to support the design, installation, development, and decommissioning of water wells in accordance with California laws and regulations.
	California Knowledge base as it pertains to hydrogeology: California laws and regulations related to the development of groundwater sustainability plans; methods and procedures preventing cross contamination; methods and procedures for well design, construction, and destruction; hydrogeologic considerations for selecting well locations; procedures and California laws and regulations for aquifer testing, groundwater quality and aquifer characteristics as they pertain to the use of groundwater resources; and hydrogeologic conceptual models for assessing water quality and inpacts to beneficial use.
	Recommended References - **California's Groundwater, Bulletin 118**, Department of Water Resources, December 22, 2016 **California Well Standards, Bulletin 74-90** (Supplement to Bulletin 74-81), California Department of Water Resources, June 1991 **Groundwater**, R. Allan Freeze/John A. Cherry, 1st Edition, 1979, Prentice Hall **Groundwater & Wells**, Robert J. Sterrett, 3rd Edition, 2007, Smyth Co Inc **Porter-Cologne Water Quality Control Act**, CA Water Resources Control Board, Regional Water Quality Control Boards, January 2019 **Preliminary Endangerment Assessment Guidance Manual**, EPA, DTSC, **Water Well Standards: State of California**, Bulletins 74-81, December 1981
26%	**Environmental Geology**
	Professional Activities - Plan and implement sampling and monitoring programs to characterize geologic media (soil, groundwater, soil vapor) and assess potential impacts. Evaluate results of environmental geologic investigations. Plan and implement remediation of geologic media. Provide geologic interpretation to support the design, installation, development, and decommissioning of wells in accordance with California laws and regulations.
	California Knowledge base as it pertains to environmental geology: Geologic factors involved in environmental evaluations of school properties; geologic factors involved in environmental review for land use planning; geologic factors involved in developing a conceptual site model and planning and environmental investigation; geologic conditions affecting surface water quality; methods and procedures for collection and analysis of water, soil, and soil vapor samples; fate and transport in geologic media; procedures and California laws and regulations related to remediation of water, soil, and soil vapor; and California laws and regulations related to environmental geologic aspects of waste disposal facility development, operations and closure.
	Recommended References - **Abandoned Mine Lands Preliminary Assessment Handbook Department of Toxic Substances Control** (DTSC), February 1999 **Advisory Active Soil Gas Investigations**, Cal EPA, DTSC, LA Regional Water Quality Control Board, SF Regional Water Quality Board, July 2015 **Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance)**, DTSC, October 2011 **Leaking Underground Fuel Tank (LUFT) Guidance Manual**, State Water Resources Control Board, October 2015 **Preliminary Endangerment Assessment Guidance Manual**, EPA, DTSC, October 2015 **Principles of Contaminant Hydrogeology**, Christopher M. Palmer, 2nd Edition, 1996, CRC Press

24%	**Engineering Geology**
	Professional Activities - Plan and conduct engineering geologic investigations and evaluate the results. Evaluate the geologic factors and processes affecting planning, design, construction, maintenance, and vulnerability of civil engineering works. Characterize, evaluate, and provide recommendations regarding geologic and seismic hazards.
	California Knowledge base as it pertains to engineering geology: Procedures and California laws and regulations for investigation and evaluation of surface fault rupture hazards; geologic features related to active faulting; engineering geology and seismology data collection and analyses requirements for the development of public schools, hospitals, and essential services buildings; geologic and seismic aspects and California laws and regulations related to soil and foundation investigations for structures and grading; geologic features related to identification, characterization, and mitigation of mass wasting; geologic factors applicable to the design and construction of flood control systems and water resources infrastructure;California laws and regulations related to encineering geology aspects of waste disposal facility development, operations, and closure; geologic hazards related to coastal processes; investigation methods and analyses for seismically-induced ground deformation and slope instability.
	Recommended References - **California Geological Survey (CGS) - Note 48.** Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings, California Geological Survey (CGS), October 2013 **Earthquake Fault Zones**, (formerly known as Alquist-Priolo Earthquake Fault Zoning Act), Special Publication 42, 2018 **Engineering Geology**, F.G. Bell, 2nd Edition, 2007, Butterworth-Heinemann **Engineering Geology – Rock in Engineering Construction**, Richard E. Goodman, 1st Edition, 1993, John Wiley & Sons **Geologic Hazards – A Field Guide for Geotechnical Engineers**, Roy E. Hunt, 1st Edition, 2007, CRC Press **Geological Hazards: Their Assessment, Avoidance and Mitigation**, Fred C. Bell, 1999, CRC Press **Geotechnical Engineering Investigation Handbook**, Roy E. Hunt, 2nd Edition, 2005, CRC Press **Guidelines for Evaluation and Mitigating Seismic Hazards in California**, Special Publication 117A, California Geological Survey, 20 **Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California**, Special Publication 124, California Geological Survey, , 2002 **Landslides in Practice**, Derek Cornforth, 1st Edition, 2005, Wiley **Principles of Engineering Geology**, Robert B. Johnson/Jerome V. DeGraff, 1988, John Wiley & Sons **Soils in Construction**, Don C. Warrington/W. L. Schroeder, 6th Edition, 2019, Waveland Press, Inc
9%	**Energy Resources and Mining Geology**
	Professional Activities - Identify, map and characterize geologic resources for beneficial use. Provide the geologic interpretation to support the design of energy and mining development operations. Provide geologic support for the reclamation and closure of energy and mining operations.
	California Knowledge base as it pertains to economic geology: Identification and characterization of energy and mineral resources and associated hazards; procedures and California laws and regulations for geologic evaluation to support development of energy and mineral resources; procedures and California laws and regulations for geologic evaluation in support of reclamation and closure of energy and mining operations.
18%	**Geomorphology and General Geology**
	Professional Activities - Provide geologic interpretations and recommendations to support land and watershed protectio, restoration and maintenance. Identify, map, and evaluate geomorphic features and geologic units. Identify and evaluate surface processes. Identify soil and rock units or formations with potential for protected paleontologic resources.
	California Knowledge base as it pertains to geomorphology and general geology: California mineralogy and associated hazards; California laws and regulations related to paleontologic resources; California geomorphic provinces and their associated geological processes and hazards; geologic factors related to Basin Plans; geologic factors related to impacts from forestry practices; methods and procedures for watershed maintenance and restoration.
	Recommended References - **California Geology**, Deborah R. Harden, 2nd Edition, 2004, Pearson Prentice-Hall **Glossary of Geology**, Klaus K.E. Neuendorf, 5th Edition, 2011, American Geosciences Institute