Certified Hydrogeologist Examination Test Plan Effective April 2025

General Definition of Hydrogeology:

Hydrogeology means the application of the science of geology to the study of the occurrence, distribution, quantity and movement of water below the surface of the earth, as it relates to the interrelationships of geologic materials and processes with water, with particular emphasis given to groundwater quality. (Title 16, CCR 3003)

This area of practice is structured into four primary content areas:

- I. Project Planning (20%)
- II. Data Collection (25%)
- III. Evaluation and Analysis (35%)
- IV. Application (20%)

BPELSG Certified Hydrogeologist Test Plan 2025	Percentage of Questions on the Exam
I. Project Planning	20%
Professional Activities:	
1. Develop a process to achieve project objectives	
2. Determine type, collection methods, quantity and quality of data, and methods of data	
analysis needed to achieve project objectives based on anticipated hydrogeology	
3. Identify technical and regulatory requirements for hydrogeologic investigations	
4. Determine potential sources of contamination	
5. Develop and refine a conceptual hydrogeologic model	
6. Identify water quality criteria for the intended use	
8. Evaluate potential sources of water supply	
9 Identify the potential need to control groundwater flow direction	
10. Develop preliminary well design based on existing site data	
11. Assess hydrogeologic conditions pertaining to water management decisions	
12. Assess hydrogeologic conditions related to seismic and geologic hazards	
Test questions on these professional activities may include one or more of the	
following:	
A. Applicable laws, regulations, permitting and policies pertaining to hydrogeology	
B. Regulatory agencies that have jurisdictional authority over water (e.g., supply, quality, rights, use, sustainability)	
C. Regional and local hydrogeologic conditions that may affect investigation approaches (e.g., basin boundaries, buried stream channels, proximity to pumping wells, utility trenches)	
D. Laboratory methods to determine physical properties and chemical concentrations of soil, rock, water, gas, and waste samples	
E. Subsurface exploration methods for different geologic settings	
F. The characteristics of different types of wells (e.g., siting, design, construction, development, testing, sampling)	
G. Methods for measuring groundwater levels, nonaqueous phase liquid thickness, and field water quality parameters from wells	
H. Field testing and sampling methods for soil, soil gas, and groundwater	
I. Groundwater monitoring program elements (e.g., location, density, frequency)	
J. Aquifer testing methods and procedures, including their uses and limitations	
K. The elements of preparing a conceptual site model	
L. Quality assurance and quality control methods for hydrogeologic and water quality data	
M. The types and sources of potential groundwater contaminants associated with land uses, industrial processes, and geologic conditions	
N. The sources and quality of meteorological data related to hydrogeologic analysis	
O. The principles of groundwater flow and aquifer characteristics	
P. Potential groundwater effects from long-term land use	
Q. Relationship between tresh water and saline water in aquiters	
R. Tual and barometric pressure enects on groundwater levels	
T Sustainable groundwater management plan elements	
n edetamatio groundmater management plan elemente	

U. Hydrogeologic site-evaluation related to on-site wastewater disposal (e.g., septic systems, land application, ponds, injection wells)	
V. Hydrogeologic conditions contributing to seismic and geologic hazards (e.g., liquefaction, subsidence, landslides, settlement)	
II. Data Collection	25%
Professional Activities:	-
1. Collect hydrogeologic data from public and private sources (e.g., land use information, aerial photographs, remote sensing, historical records, online databases)	
2. Assess surficial conditions and site features in the field	
3. Conduct subsurface evaluations (e.g., rapid profiling techniques, lithologic and geophysical logging)	
4. Map hydrogeologic features (e.g., streams, springs, wetlands, wells, geologic structures)	
5. Collect samples and field data (e.g., lithology, moisture, water levels, flow rate, chemistry, geophysics, other properties)	
6. Apply quality control procedures to the collection of data	
7. Assess the physical condition, construction, and performance of existing wells	
8. Conduct infiltration tests in the unsaturated zone (e.g., falling head)	
9. Conduct aquiler testing (e.g., pumping, injection, slug tests)	
following:	
A. Sources and interpretive techniques for aerial photographs and remote sensing imagery	
B. Site reconnaissance elements related to hydrogeology (e.g., drainage patterns, presence of wetlands, current and past use, anthropogenic structures)	
C. The relationships among geologic structures and strata, hydrostratigraphic units and hydraulic characteristics	
D. How the properties of geologic media may affect water and contaminant migration through the vadose zone	
E. Techniques and equipment to conduct single and multi-well aquifer tests	
F. Techniques and equipment to measure groundwater levels and non-aqueous phase liquid thickness in wells	
G. Techniques and equipment for sample collection	
H. Techniques to estimate groundwater flow, direction, and velocity	
I. Leconfigues and equipment for inflitration tests	
K. Rapid subsurface profiling techniques/direct-push technologies (e.g., CPT, MIP,	
A Methods to determine hydraulic properties of saturated and upsaturated zone materials	
M. Aquifer properties and principles of well hydraulics	
N. Techniques to measure well discharge and well efficiency	
O. Quality control procedures	
III. Evaluation and Analysis	35%
Professional Activities:	0070
1. Evaluate hydrogeologic data from public and private sources (e.g., land use information, aerial photographs, remote sensing, historical records, online databases)	
2. Interpret aquifer test and other data to characterize hydrogeologic properties, boundaries, heterogeneity, and anisotropy in aquifers	

- 3. Prepare hydrogeologic inventory and water budget
- 4. Assess surface water/groundwater interactions
- 5. Characterize nature and extent of contamination
- 6. Prepare illustrations and interpret trends from water level and/or quality data
- 7. Evaluate fate and transport of contaminants
- 8. Evaluate hydrogeologic effects of pumping wells, fluid injection, containment walls, reactive barriers, and subsurface structures on groundwater flow and quality
- 9. Evaluate remedial technologies given the hydrogeologic conditions
- 10. Evaluate the potential impacts of anthropogenic activities (e.g., agricultural development, mining, pumping) on surface and groundwater quality and supply
- 11. Evaluate the potential impact of groundwater recharge on water quality
- 12. Develop groundwater flow and transport models
- 13. Determine the need for groundwater control (e.g., production well, sensitive receptors, subsurface structures, excavations)

Test questions on these professional activities may include one or more of the following:

A. Applicable laws, regulations, and policies pertaining to data collected for groundwater use and protection

B. The interpretation of relationships among geologic strata, hydrostratigraphic units and hydraulic characteristics

C. Data evaluation to establish background conditions in soil and groundwater

D. Potential groundwater contaminants and impacts associated with various categories of land use and industrial processes

E. The effects of anthropogenic modifications on subsurface drainage and groundwater flow conditions

- F. Statistical methods to evaluate soil or groundwater data
- G. Graphical and tabular techniques for analysis and presentation of hydrogeologic data
- H. Methods to determine groundwater flow directions and horizontal and vertical hydraulic gradients

I. Data selection for groundwater potentiometric surface maps

J. Water chemistry evaluation (e.g., stable isotope studies, radiometric dating, major ion distribution, contaminants)

- K. Techniques to analyze aquifer test data
- L. Interpretation of soil moisture and soil vapor migration in the unsaturated zone
- M. Causes and effects of land subsidence
- N. Procedures for calculating recharge rates
- O. Techniques and procedures used for water budget evaluations
- P. Groundwater and surface water interaction
- Q. Land use impacts on water resources
- R. Methods to calculate groundwater flow rates, mass flux and volume
- S. The effects of boundary conditions on groundwater flow during pumping
- T. Methods for evaluating changes in groundwater storage
- U. Principles and methods to estimate natural attenuation
- V. The chemical and biochemical transformation of organic and inorganic compounds
- W. Groundwater flow and solute transport modeling practices
- X. Numerical models, including calibration, sensitivity analysis, and uncertainty analysis
- Y. Fractured rock groundwater flow systems
- Z. Wellhead protection strategies

AA. Hydrogeologic factors in selecting remedial alternatives BB. Hydrogeologic conditions pertaining to excavation hazards	
CC. Sustainable groundwater management practices	
IV. Application	20%
Professional Activities:	
1. Design, install and develop wells (e.g., production, extraction, injection, monitoring)	
2. Develop subsurface monitoring programs	
3. Prepare design recommendations for dewatering or collection systems	
4. Design and implement well rehabilitation programs	
5. Prepare design recommendations for groundwater and vapor extraction remediation systems	
6. Prepare recommendations for groundwater replenishment and aquifer storage	
7. Develop plans for the destruction of wells and boreholes	
Test questions on these professional activities may include one or more of the following:	
A. Borehole drilling and well construction techniques to prevent cross-contamination	
B. Drilling techniques and construction practices for different types of wells	
C. Well design (e.g., screen type, length, slot size, filter pack selection)	
D. Well development and testing	
E. Procedures for well maintenance and rehabilitation	
F. Techniques and regulations for well and borehole destruction	
G. Analytical techniques and numeric modeling to design a well field for groundwater extraction or injection	
H. Soil, soil vapor and groundwater remediation methods, performance and optimization	
I. Sustainable groundwater management criteria (e.g., groundwater declines, subsidence, seawater intrusion)	
J. Hydrogeologic requirements pertaining to the location, monitoring, and operation of septic systems and waste disposal facilities	
K. Methods for dewatering and groundwater control	
L. Methods for conducting and estimating groundwater recharge	