

# I. GEOLOGY ELEMENT

## A. INTRODUCTION

*In view of the geologic diversity of Boulder County as described in the Geology Element and the multiplicity of existing and foreseeable land uses, it is intended that the land use policies presented here shall provide clear direction in the formulation and implementation of the county Land Use decisions so far as geological factors are concerned. To these ends, it is necessary that reference be made to certain geographic areas. Accordingly, reference will be made, as appropriate, within the text of the definitions and policies to areas on the Mineral Resource Areas Map and the Geologic Hazards and Constraint Areas Map. Furthermore, it is the intent of the policies to 1) move toward the attainment of the adopted goals for the Boulder County Comprehensive Plan as directed in Goal Statements B.1 and B.2, and 2) fulfill the county's obligation to implement a Master Plan for Extraction of Commercial Mineral Deposits pursuant to 30-28-106(c), CRS.*

### Amendment Status

## DEFINITIONS

In the interest of clarity in interpreting the land use policies, it is necessary to define certain terms. For these purposes, the terms, titles, and phrases, shall be defined as follows:

### **Land Uses**

~~**Intensive uses:** Those land uses which include any structures used for supporting or sheltering any human use or occupancy; and/or facilities or improvements which tend to attract congregations of people.~~

### ~~**Geologic Hazards & Constraints**~~

~~**Geologic hazard:** A geologic condition or geologic process which poses a significant threat to health, life, limb, or property.~~

~~**Geologic constraint:** A geologic condition which does not pose a significant threat to life or limb, but which can cause intolerable damage to structures.~~

~~**Colorado Professional Geologist:** A person engaged in the practice of geology and who meets the requirements outlined in Colorado Revised Statute 23-41-208.~~

~~**Debris Flow:** A flowing mass of loose mud, sand, sediment, rock, debris, water, and air that travels by gravity down a slope, entraining debris in their paths.~~

- ~~• **Debris Flow Susceptibility:** areas modeled to have debris flow susceptibility based on geologic, topographic, geomorphic, and other characteristics associated with a debris flow.~~

~~**Expansive Soil and Bedrock:** Soil or bedrock containing clay with the tendency to volumetrically change based on moisture content (shrink when dry and expand when wet). Expansive soils that shrink and swell can damage roads, structural foundations, and other built structures.~~

**Fluvial Hazards:** Areas susceptible to fluvial hazards based on the area a stream has occupied in recent history, could potentially occupy, or could physically influence as it stores and transports sediment and debris during flood events.

**Geologic Constraint:** A geologic condition which can cause intolerable damage to structures, but does not present a significant threat to health, life, or limb. ~~A geologic condition which does not pose a significant threat to life or limb, but which can cause intolerable damage to structures.~~

**Geologic Hazard:** A geologic condition or geologic process which presents a threat to health, life, limb, or property. Geologic Hazard Areas are shown on the Geologic Hazards Map as areas where geologic conditions have been either documented, approximated or determined susceptible through modeling. Depending on the geologic hazard(s) present, these areas are associated with nominal to extensive geotechnical issues with the potential to cause intolerable damage to structures and a variable level of risk related to construction or land use purposes.

**Intensive uses:** Those land uses which include any structures used for supporting or sheltering any human use or occupancy; and/or facilities or improvements which tend to attract congregations of people.

**Landslide:** An outward or downward movement of a mass of soil and rock, containing a distinct rupture surface or zone of weakness which separates and distinguishes the slide materials from more stable underlying material.

- **Landslide Inventory:** documented landslides, published landslides and landslides identified using high resolution LiDAR terrain surface.
- **Landslide Susceptibility:** areas modeled to have landslide susceptibility based on geologic, topographic, geomorphic, and other characteristics associated with slope instability.

**Rockfall:** Rapid free-fall of large masses of rock or individual rocks of variable sizes and composition which bounce, slide, or roll downslope. Rockfalls can occur where a rockfall source (exposed bedrock cliffs, unconsolidated material containing boulders) overlies a steep slope.

- **Rockfall Susceptibility:** areas modeled to have rockfall susceptibility based on rock outcrops and source zones, topographic, and other characteristics associated with rockfall.

**Steeply Dipping Heaving Bedrock:** A geologic hazard condition where the presence of steeply dipping bedrock layers with high swell potential can result in severe differential heaving of bedrock and damaging levels of movement of foundations, roads, subsurface utilities, concrete flatwork, and other built structures.

**Subsidence:** Collapse of the ground surface over subsurface voids or settlement over native, low density soils. Subsidence can occur suddenly or slowly over a long period of time.

**Undermined Area:** An area underlain by coal mine workings, with the potential for subsidence of the ground surface due to collapse of underground mine voids. Holes, cracks, troughs, sags, and other subsidence features can develop suddenly or gradually over many years as subsurface material shifts and falls downward into the abandoned mine area.

~~**Major Hazard Area:** That area, or those areas, as shown on the Geologic Hazards and Constraint Areas Map where geologic conditions are such that extensive geotechnical problems exist and there is high risk related to intensive land uses.~~

~~**Moderate Hazard Area:** That area, or those areas, as shown on the Geologic Hazards and Constraint Areas Map where geologic conditions are such that significant geotechnical problems exist and there is provisional risk related to intensive land uses.~~

~~**Moderate Constraint Area:** That area, or those areas, as shown on the Geologic Hazards and Constraint Areas Map, where geologic conditions are such that moderate geotechnical problems exist and there is provisional risk related to intensive land uses.~~

~~**Minor Constraint Area:** That area, or those areas, as shown on the Geologic Hazards and Constraint Areas Map where geologic conditions are such that few geotechnical problems exist and there is no risk or nominal risk related to intensive land uses.~~

Sidebar: The Mineral Resources Areas Map & the Geologic Hazards & Constraint Areas Map are both associated with the Geology Element. The Geologic Hazards Map is also associated with the Natural Hazards element.

### **Aggregate Resource Area**

That area, or those areas, as shown on the Mineral Resource Areas Map, which are considered to be underlain by “commercial mineral deposits” as defined by 34-1-102(1) CRS and which are intended under the provisions of Colorado House Bill 1529 of 1973, to serve as resource preservation areas as part of *Boulder County’s Master Plan for Extraction*. Aggregate Resource Areas are further defined by way of statements which are part of Policies GE 1.06 -GE 1.08 below.

### **Lode Mineral Area**

That area, or those areas, as shown on the Mineral Resource Areas Map where mineral ores occur in veins or zones of enrichment in the basement complex rocks.

Sidebar: Swelling soils, floodways, & steep slopes are examples of geologic hazards and constraints.

### **GEOLOGIC HAZARD AND CONSTRAINTS - GUIDELINES TABLE AND MAP**

The BCCP Geologic Hazards and Constraints Map, and policies within the BCCP Geology and Natural Hazards elements make reference to the geologic hazards and constraints listed in the following table. The table provides guidance regarding the treatment of each type of hazard or constraint for purposes of reviewing and approving development on properties with such characteristics. A property can be deemed to possess the listed geologic hazards or constraints based on the Geologic Hazards Map data or based on a site assessment that indicates the mapped features to be inaccurate.

**A potentially hazardous feature is deemed either a “hazard” or a “constraint” based on the outcomes of an appropriate study, per the guidelines outlined in Table 1.**

Table 1. Review and Approval Guidelines for Properties with Geologic Hazards and/or Constraints

<u>Geologic Hazard or Constraint</u>	<u>Land Use Guidelines</u>	<u>Recommended Site-Specific Study</u>		
		<u>Geotechnical</u>	<u>Geologic Hazard</u>	<u>Subsidence</u>
<u>Landslide</u>	<u>Developable subject to results of recommended site-specific study completed by a qualified professional. Development should be guided away from areas with landslide susceptibility. The impact of landslides on foundations, slope stability, grading plans, retaining walls, septic drain fields, and other proposed structures should be carefully studied by a qualified professional.</u>	<u>X</u>	<u>X</u>	
<u>Debris Flow</u>	<u>Developable subject to results of recommended site-specific study completed by a qualified professional. Development should be guided away from areas with debris flow susceptibility. Where avoidance is not possible, mitigation options must be presented which adequately manage and reduce the hazard and which do not adversely impact or increase the hazard on neighboring properties.</u>	<u>X</u>	<u>X</u>	
<u>Rockfall</u>	<u>Developable subject to results of recommended site-specific study completed by a qualified professional. Development should be guided away from areas with rockfall susceptibility. In the cases where proposed development cannot avoid the hazard, rockfall mitigation options must be presented which will adequately reduce the hazard and which do not adversely impact or increase the rockfall hazard on neighboring properties.</u>	<u>X</u>	<u>X</u>	
<u>Expansive Soil and Bedrock</u>	<u>Developable subject to results of recommended site-specific study completed by a qualified professional. Design of foundations must be appropriate to address the swell potential of the subsurface materials.</u>	<u>X</u>		
<u>Steeply Dipping Heaving Bedrock</u>	<u>Developable subject to results of recommended site-specific study completed by a qualified professional. It must be demonstrated that steeply dipping heaving bedrock hazard does not exist at the site, or if it does exist, present adequate mitigation methodologies.</u>	<u>X</u>	<u>X</u>	
<u>Undermined Area</u>	<u>Areas identified to be undermined by abandoned coal mines should be considered for non-structural land use, unless it can be demonstrated that the subsidence hazard does not exist for the proposed development. In the event a proposed structure is sited within or near an undermined area, the site should be considered developable subject to the results of the site-specific subsidence study.</u>	<u>X</u>	<u>X</u>	<u>X</u>

## B. POLICIES

*[NOTE for reviewer: All policy titles are new proposed content. Parentheses will be removed when the proposed content is finalized.]*

### Geologic Hazards & Constraints

**GE 1.01 (Development in Geologic Hazard and Constraint Areas).** ~~The county shall strongly discourage intensive uses in Major Hazard Areas.~~ The county strongly discourages development in Geologic Hazard areas and only allows development in these areas when adequate mitigation can be demonstrated. The county refers to the guidelines and recommendations for studies presented in Table 1 (“Review and Approval Guidelines for Properties with Geologic Hazards and/or Constraints”) when reviewing proposals for development on properties possessing the geologic hazards and constraints listed and described in the table. A geologic hazard study should be required and performed by a Colorado Professional Geologist for sites with the conditions listed here, and development approval should be subject to the applicant completing the recommendations provided in the completed study:

- Documented landslide, debris flow or rockfall deposit or event.
- Landslide hazard susceptibility.
- Debris flow hazard susceptibility.
- Rockfall susceptibility.
- Steeply Dipping Heaving Bedrock mapped extents within property boundaries.
- Undermined Area mapped extents within or near property boundaries.

**GE 1.02 (Transfer of Development Rights and Development Credits for Properties with Limited Development Potential).** The county will consider a property’s geologic hazards, and the limitations those hazards place on a property’s development potential, when assessing a property’s eligibility as a transferable development rights (TDR) sending site, or for creating bonus development credits. ~~shall discourage intensive uses in Moderate Hazard Areas.~~

**GE 1.03 (Intensive Uses in Geologic Constraint Areas).** ~~Where in the public interest it may be desirable to permit intensive uses, the county shall direct such uses toward Geologic Constraint Areas rather than toward Geologic Hazard Areas.~~

**GE 1.04 (City Cooperation with Municipalities).** The county shall cooperate fully with the municipalities of the county with respect to the evaluation and mitigation of geologic hazards and constraints located within the unincorporated areas of the mutually adopted city and county comprehensive plans.

**GE 1.05 (Evaluation of Geologic Hazards and Constraints in Unincorporated Areas).** The county shall require the evaluation of all ~~county-wide~~ geologic hazards and constraints as appropriate to reflect conditions that may change following natural disasters where such hazards or constraints may exist in unincorporated areas of the county as related to new intensive uses. Such evaluations shall be conducted by a Colorado Professional Geologist with knowledge and experience with the geology and geologic hazard conditions of Boulder County ~~professional practitioner having expertise in the subject matter.~~ Such evaluations should incorporate analytical methods representing current, generally accepted, professional principles and practice.

## Mineral Resources

**GE 2.01 (Commercial Mineral Deposits)** The county shall consider the following deposits, as mapped by Schwochow et. al., (Special Publication 5B, *Colorado Geological Survey*, 1974) to be “commercial mineral deposits” as defined by 34-1-102(1) CRS.

- a) “...fine-grained igneous rock...” in
  - 1. Township 2 North, Range 71 West; and,
  - 2. Township 3 North, Range 71 West.
    - a. “Site-specific information which became available subsequent to the adoption of the *Boulder County Comprehensive Plan* and the Master Plan for Mineral Extraction indicates that the Geer Canyon area (Sections 12, 13, 14, Township 2 North, Range 71 West) is extremely sensitive in terms of potential blasting effects and impacts upon surrounding residential areas and environmental quality.” (Approved by Planning Commission 12/3/ 80, not approved by Board of County Commissioners)
- b) “F1” deposits in Ranges 69 and 70 West.

**GE 2.02 (Delineation of Aggregate Resource Areas).** Aggregate Resource Areas shall be delineated utilizing certain portions of areas which are underlain by “commercial mineral deposits” as those deposits are defined in Policy GE 2.01.

**GE 2.03 (Lands Excluded from Aggregate Resource Areas).** Pursuant to Policy GE 2.02 and the provisions of 34-1-304(1)(a-g) CRS, the county shall not include in its Aggregate Resource Areas, the following lands:

- a) those areas defined and mapped in the Environmental Resources and Agricultural Elements as:
  - 1. “Critical Wildlife Habitat”
  - 2. “Agricultural Lands of National and State-wide Importance”.
  - 3. “Designated Natural Landmarks and Natural Areas”.
- b) those areas defined and mapped in the Geology Element where:
  - 1. existing development effectively precludes extraction; or,
  - 2. extraction has been completed.
- c) those unincorporated areas in the county lying within adopted community service areas where existing or previous capital improvement commitments effectively preclude mineral resource designation.
- d) those areas remaining after the exclusions contained in Items a-c, above, where the contiguous surface area underlain by a commercial mineral deposit is 20 acres or less.
- e) those parcels remaining after the exclusions contained in Items a-d, above, where the surface area underlain by a commercial mineral deposit is 20 acres or less.

- f) any specific site the mineral extraction from which would not be appropriate in light of the countervailing factors listed in 34-1-304(1), CRS.

Sidebar: In Boulder County, open mining requires Special Use Review.

**GE 2.04 (Intensive Uses in Aggregate Resources Areas).** The county shall strongly discourage intensive uses in Aggregate Resource Areas.

**GE 2.05 (Regulation of Open Mining and Accessory Activities).** Whether within or without a designated aggregate or other resource area, the county shall prohibit or regulate, including by Special Use Review and the like, the open mining of any mineral or earthen material including, but not limited to, limestone, coal, peat, quarry aggregate, sand and gravel, sandstone, building stone, topsoil, common borrow, clay, shale, gold, lead, silver, zinc, copper, uranium, tungsten, and fluorspar as well as all accessory activities related thereto.

It is emphasized that the extraction plan is fundamentally and primarily a preservation plan and that these portions of the county's commercial aggregate deposits shall be protected from the encroachment of land uses which tend to inhibit or preclude extraction so that the options of future decision-makers will remain open in considering the demand for aggregate. Conversely, it is not intended that an applicant for the extractive land use in an Aggregate Resource Area shall automatically be assured of success in lieu of addressing all environmental concerns. Nor is it intended that extractive land uses shall be denied outside the Aggregate Resource Areas. Rather, it is reemphasized that the extraction master plan shall insure the availability of and adequate supply of quality aggregate over the next 30 years so far as can be reasonably estimated. (Approved by Planning Commission 12/3/80, not approved by Board of County Commissioners.)

Sidebar: The requirement for reclamation of mined land is usually a cooperative effort between the county & the Mined Land Reclamation Board.

**GE 2.06 (Geothermal Resources).** The county shall regulate the exploration for, development of, and production of geothermal resources as well as all accessory activities related thereto, to the extent permitted by state statutes.

**GE 2.07 (Subsurface Coal).** The county shall regulate the subsurface mining, gasification, liquification, and methane desorption of coal as well as all accessory activities related thereto.

**GE 2.08 (In Situ Leaching).** The county shall regulate the mining of any mineral by means of in situ leaching as well as all accessory activities related thereto.

**GE 2.09 (Subsurface Mining in Montane and Alpine Subprovinces).** Whereas subsurface mining in the Lode Mineral Areas in the recent past has been, and in the foreseeable future will probably remain, of limited scope and impact, it shall presently be county policy to consider subsurface mining in the Montane and Alpine Subprovinces (as defined in the Geology Element background information) and its accessory activities, to be a permitted land use subject to the procurement of an appropriate administrative permit in compliance with attendant criteria.

However, whereas the lode mineral deposits of Boulder County are of such magnitude and diversity that it is conceivable that subsurface mining of major scope and impact may be initiated, the county shall continuously monitor and evaluate the scope of subsurface mining in said Subprovinces and,

on recommendation from the county Planning Staff or by petition from the citizens of the county, the county Planning Commission may recommend to the Board of County Commissioners that such subsurface mining be regulated and that the county land use regulations be so amended.

**GE 2.10 (Land Reclamation).** In cooperation with the Colorado Mined Land Reclamation Board and its staff, the county shall require that all “affected land” as defined by Colorado Statute, be reclaimed whether the subject mining activity shall have been open mining or subsurface mining.

## Groundwater

**GE 3.01 (Groundwater Quality and Supply).** The county shall render land use decisions consistent with the preservation or improvement of groundwater quality as well as the conservation of groundwater supplies.

**GE 3.02 (Adequacy of Water Supply for Intensive Land Uses).** Whereas (1) geological conditions in some areas of the county, as described in the Geology Element, are such that dependable or potable groundwater supplies may not be available for intensive land uses; and (2) applicants for intensive land uses may specify that groundwater shall be partially or solely utilized as a water source, the county’s land use regulations shall require that said applicants furnish hydrogeological or other acceptable evidence to establish that definite provision has been made for a water supply that is sufficient in terms of quantity, dependability, and quality for the intensive use proposed.

Sidebar: Geologic conditions in some areas of the county are such that dependable or potable groundwater supplies may not be available for intensive land uses.

## Oil & Gas Exploration & Development

Boulder County recognizes the existence of oil and gas mineral rights within its unincorporated areas. It is the county’s objective to exercise its fundamental duty to protect public health, safety and welfare and the environment from adverse effects of oil and gas exploration and development, and to minimize potential land use conflicts between those activities and current or planned land uses.

All policies, procedures and regulations dealing with oil and gas exploration and development shall be based on the implementation of the “precautionary principle” so as to ensure the safety, public health and protection of Boulder County’s residents, environment, infrastructure, and resources with respect to local and cumulative, short and long-term considerations.

**GE 4.01 (Protection from Impacts of Oil and Gas Exploration and Development).** Boulder County is dedicated to promoting, requiring and implementing programs, policies and practices that provide benefit to the well-being of current and future residents as well as protecting the integrity of the air, water and ecosystems on which all life depends. Consequently, it is county policy to pursue the following actions regarding the exploration and development of oil and gas resources:

- a) Where oil and gas exploration and development is regulated by the federal and/or state government alone, both currently and in the future, advocate for requiring use of the most effective performance technologies and practices;
- b) For oil and gas exploration and development activities in areas of shared regulatory authority, provide direction, leadership and support for incorporating the most effective

performance technologies and practices into the applicable jurisdiction's rules and regulations; and

- c) For those oil and gas exploration and development activities subject primarily or solely to county jurisdiction, establish and maintain a comprehensive planning basis for amending, revising and updating the Land Use Code as well as the full array of regulatory tools and procedures available to the county as they are identified and found to be consistent with the Objective of these policies.

**GE 4.02 (Priorities for Most Effective Performance Technologies and Practices).** Areas where the county has an interest in assuring that the most effective performance technologies and practices are applied include, but may not be limited to:

- a) Transportation impacts on roads and their users
- b) Development impacts on county open space lands and conservation easements
- c) Impacts on and consumption of environmental resources, including
  1. Wildlife and wildlife/plant habitat
  2. Wetlands
  3. Riparian areas
  4. Surface and subsurface water – sources, volumes, and consumptive vs. non-consumptive use
  5. Aquifers – casing that isolates and protects aquifers, due diligence in finding abandoned wells, and protective setbacks from areas of outcropping aquifers
  6. Air quality – greenhouse gas emissions, ozone precursors, and toxic air pollutants affecting local residents, visitors and users of nearby public facilities
  7. Water quality
  8. Soil quality and productive integrity
- d) Geologic hazards
- e) Wildfire mitigation
- f) Storm water, drainage and erosion controls
- g) Solid and liquid wastes management
- h) Noise, lighting and odor controls
- i) Land restoration and reclamation
- j) Agricultural land preservation
- k) Irrigation ditches, drain tiles, laterals, ponds and other water resource systems associated with agricultural operations
- l) Fencing, both temporary and replacement
- m) Noxious weed control
- n) Floodplain and floodways

- o) Visual impacts and preservation of scenic views
- p) Access roads/facilities removal upon well closures/abandonment
- q) Historic/archeological/cultural protection
- r) Emergency response planning and capabilities
- s) Adjacent landowner concerns
- t) Other areas of public health, safety and welfare as they may be identified

**GE 4.03 (Assessing Adherence to Most Effective Performance Technologies and Practices).**

Measures the county will look for in assessing whether an application for oil and gas exploration and development is adhering to most effective performance technologies and practices will include, but not be limited to, the following:

- a) use of closed loop systems for the containment and/or recycling of drilling and completion fluids;
- b) use of emissions controls, prevention capture/co-benefits producing systems, and other green completion or reduced emissions systems to minimize or eliminate the release of volatile organic compounds, hazardous air pollutants, and greenhouse gases;
- c) use of electric motors or muffled internal combustion engines in pumping and production operations;
- d) extensions of setbacks from adjacent land uses, water bodies, water courses, riparian areas and other important environmental resources as determined on a case-by-case and site-by-site basis;
- e) air quality baseline testing and monitoring at wellheads, condensate tanks, pipelines, compressor stations and other potential gaseous emissions sources;
- f) soil structure and condition baseline testing and documentation within and adjacent to the drill pad area prior to commencing pad preparation and construction;
- g) surface, groundwater, and well water quality and level baseline testing and monitoring within and adjacent to the drill pad area prior to commencing pad preparation and construction;
- h) extensions of setbacks to achieve public health, safety and welfare objectives as determined on a case-by-case and site-by-site basis;
- i) submittal of comprehensive drilling and phasing plans for oil and gas holdings within and adjacent to Boulder County;
- j) preparation of plugged and abandoned hydrocarbon well integrity surveys within an adequate distance along the full length of the bore hole and production casing for proposed new wells and existing wells to be reopened for production, to identify potential integrity problems and remedies for improperly plugged wells or where plugs and well casings have failed over time;
- k) use of temporary, removable, low-impact “laydown” roads or similar methods for access to sites from local, county, state and/or federal roads;
- l) dark sky lighting measures;

- m) odor, dust and noise reduction/suppression measures;
- n) complete reclamation and restoration of all disturbed areas, including roads, to their pre-exploration and development conditions;
- o) sharing of transportation, drilling, production, transmission and access facilities among operators to minimize duplication of activities and potential impacts;
- p) use of existing easements and infrastructure where appropriate and allowed by easement holders for the surface and subsurface infrastructure necessary for drilling, extraction, production and transmission operations;
- q) “fair share” compensation for impacts on county roads, county open space lands and other county infrastructure or properties

**GE 4.04 (Greenhouse Gas Emissions).** In addition to the county’s expressed interest in eliminating methane and other greenhouse gas emissions from oil and gas development into the atmosphere, the county strongly supports all efforts at all levels to further study and ultimately eliminate such emissions resulting from oil and gas operations whether through legislative, regulatory, voluntary or other means.

**GE 4.05 (Minimize New Land Use and Cumulative Impacts).** The county shall consider requiring operators to use and share existing infrastructure, to minimize installation of new facilities, and to avoid additional disturbance to lands to the greatest extent possible in order to forego introducing significant new land use and cumulative impacts to the environment, landowners and natural resources.

**GE 4.06 (As-Built Facilities Maps for Emergency Response and Management).** Applicants for oil and gas exploration and development shall provide the Boulder Office of Emergency Management and affected emergency response agencies with as-built facilities maps in a format suitable for input into the county’s GIS system depicting the locations, sizes, and depths below grade of all oil and gas gathering and transmissions lines and associated equipment, surface facilities and their functions, as well as transportation routes to and from exploration and development sites, for emergency response and management purposes in case of an incident or accident involving transmission or transportation presenting an immediate or potential hazard to the public and environment.

**GE 4.06.01** Operators shall cooperate with local emergency response agencies in planning and conducting on-site emergency preparedness exercises that simulate industrial incidents and accidents that may, in the opinion of the emergency response agencies, take place on site.

**GE 4.06.02** Operators shall disclose all hazardous chemicals used in their operation to the Boulder Office of Emergency Management and all affected emergency response agencies.

**GE 4.06.03** All unintended releases of hazardous chemicals shall be immediately reported to the Boulder Office of Emergency Management and all affected emergency response providers.

**GE 4.07 (Assistance to Landowners).** The county will encourage and provide appropriate assistance to landowners seeking expert advice for negotiating surface use agreements or leasing arrangements for oil and gas exploration and development.

**GE 4.08 (Collaboration with Stakeholders, Regulators and Interested Parties).** Achieving the county's Objective regarding oil and gas activities requires not only a thorough review of local regulations but also communication and cooperation between the county, other levels of government and organizations involved in the oil and gas industry and in the study of oil and gas development and exploration. To this end, the county has appointed a Local Governmental Designee pursuant to Rule 214 of the Colorado Oil and Gas Conservation Commission. In addition, the county is committed to working with stakeholders, regulators and interested parties to:

- a) Identify and address deficiencies in regulating detrimental land use and surface impacts as well as environmental and health impacts;
- b) Continue review of studies, data and other information to ensure regulations and implementation measures are presently addressing or need revising to incorporate the most contemporary research on impacts and technological advances;
- c) Monitor state and federal legislation and policies, to be followed when deemed necessary by lobbying, letters of support and advocacy, and dissemination of information to enhance local protection for land use, surface impacts, public health and the environment;
- d) Investigate the feasibility and utility of entering into memoranda of understanding (MOUs), intergovernmental agreements (IGAs) or other accords with industry, the state, and other public or private sector interests where the outcome will help facilitate the implementation of these policies; and
- e) Consider addressing impacts of oil and gas development by acquiring and retiring mineral estates interests on a willing seller-willing buyer basis where appropriate.

**GE 4.09 (Public Engagement by Oil and Gas Applicants).** The county will require that applicants for oil and gas exploration and development directly engage with local communities, residents and other stakeholders at each phase of a development plan, starting prior to exploration, in order to provide sufficient opportunity for comment on plans, operations and performance, listen to concerns, and respond appropriately and promptly.

**GE 4.10 (Water Rights).** Boulder County shall not lease or sell any of its current or future water rights for oil and gas exploration and development.

**GE 4.11 (Agricultural Land Restoration and Reclamation).** Agricultural land preservation and conservation is a core goal and value of the BCCP. Oil and gas operations will be required to restore and reclaim all on and off-site agricultural lands impacted by any activity related to exploration, development, infrastructure installation, closure, and transportation to the soil tilth, productivity, and/or drainage patterns that were in place prior to the initiation of oil and gas operations.

**GE 4.12 (Applicants' Acceptance of Responsibility and Liability).** Boulder County will require explicit commitments by applicants to accept responsibility and liability for compensation and/or mitigation of directly and indirectly related costs, nuisances, damages and adverse impacts as a condition for issuance of permits dealing with oil and gas resource exploration and production.