
Santa Fe County, New Mexico

Sustainable Land Development Plan

Volume II-B: Plan Elements
Oil and Gas Element

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2B-1. Context

This Oil and Gas Plan Element (the “Element”) is an update to the Santa Fe County General Plan necessitated by the proposed development of oil and gas fields in Santa Fe County, particularly proposals for development in the most natural and cultural resource rich areas of the County, including the Galisteo Basin (See **Map 1**). This update to the General Plan was adopted by the Board of County Commissioners on November 18, 2008, and is hereby incorporated in its entirety into the Sustainable Land Development Plan as Volume II-B: Oil and Gas Element. This Element of the SDLP was developed with extensive public and stakeholder participation and is intended to facilitate regulation of oil and gas resources in the County by laying a foundation for protection of the County’s existing development and resources through mitigation of the adverse effects of oil and gas exploration and extraction.

Concerns arising in the fall of 2007 about the impacts of proposed oil and gas development, including potential impacts to the economy, public facilities and services, the environment, cultural and archeological sites, traditional and contemporary communities and the general public health, safety and welfare have led to a public process for the development of a comprehensive framework for managing oil and gas extraction.

On February 24, 2008 the County adopted an Interim Development Ordinance (“IDO”) placing a hold on oil and gas project approval until the adoption of an Oil and Gas Element to the General Plan pursuant to studies, reports and assessment. The IDO also proposed adoption of capital improvement programs and an oil and gas regulatory ordinance.

The County recognized that there is a need to ensure that oil and gas well development does not create adverse effects or impacts at the expense of surface owners or the community at large. This Element establishes goals, objectives, policies and strategies to ensure adequate protection of the County’s valuable resources and environment. The implementation of these policies will be achieved through establishment of development standards for oil and gas exploration and extraction to be adopted in the County’s Land Development Code.

2B-1.1. Purpose

This Element is consistent with findings identified in the *Report on the Galisteo Basin (2008)*, created pursuant to Governor Richardson’s Executive Order 2008-004, *Imposing a Six-Month Moratorium on New Oil and Gas Drilling in Santa Fe County and the Galisteo Basin*, which indicated the following:

- The full use of the police power should be used to ensure that no oil and gas drilling activity occurs in Santa Fe County and the Galisteo Basin that would be contrary to the interests of the State of New Mexico and its citizens;
- An appropriate and comprehensive resource-based planning process should be established;
- The cumulative effect of development should be accounted for, as the Oil Conservation Division’s existing regulatory structure, which looks at individual permit applications, makes it difficult to evaluate and address the impact of development on a particular area;
- Santa Fe County should address issues raised by the public, such as setbacks from buildings and archaeological sites, noise pollution and air pollution;
- The protection and preservation of significant cultural resources benefits New Mexico and the public;
- Water resources in the Galisteo Basin are at risk and are particularly vulnerable to contamination from surface activity;
- The Galisteo Basin is not only a major source basin for the Rio Grande, but is also the only source of domestic water for much of the population of Santa Fe County;
- The hydrogeology of the basin is not completely known, very complicated in nature, can vary significantly within a short distance and is susceptible to human influence;
- Knowledge of groundwater flow, including its direction both horizontally and vertically is very difficult to ascertain due to the complexity of the hydrologic system and a lack of sufficient data, especially below a depth of 500 feet; and

- The complexity of the geology in the basin makes it very difficult to predict well success.

The Oil and Gas Element update of the Santa Fe County General Plan focuses on protecting natural and cultural resources from the adverse effects and impacts of oil and gas exploration, drilling, extraction and production by:

- Establishing baseline standards against which the impact of oil and gas projects may be evaluated;
- Requiring availability of adequate public facilities and levels of service for oil and gas projects prior to approval, including fiscal and revenue-raising policies;
- Protecting environmentally and culturally sensitive lands through appropriate mitigation efforts; and
- Making recommendations to develop, adopt and implement oil and gas regulatory techniques, to amend and revise County regulations, plans, and programs.

2B-1.2. Planning Process

Public participation is an essential component of the planning process, and achieving a sense of community ownership in planning is vital to ensuring long-term implementation. Santa Fe County has a history of engaging the public in planning and vesting the community in the creation of plans. The timeline for the planning process was very pressing due to the need to adopt an Oil and Gas Element and implementation regulations within the timeframe of the IDO. The County recognized the public desire for an open and inclusive process; thus extensive public participation was a priority in the execution of the project, which has supported the ability of the County to reflect the values of the community in its planning documents.

The County participated in a variety of meetings and workshops, including work sessions with County Staff and meetings with stakeholders, focus groups, elected and appointed decision-makers and public workshops, beginning in mid-2007. A project website, a dedicated portion of the County website, press releases and other media outreach were used to communicate with the public.

- **Meeting Types and Participant Identification.** One-on-one meetings with individual stakeholders, focus groups and the general public, as well as on-going meetings among County Staff and the Consultant Team occurred throughout the process. The participants in the stakeholder and focus groups meetings were identified by either County Staff or the Consultant Team as having an important and/or representative viewpoint that should be expressed in the process. Focus group sessions were intended to engage specific groups of similarly situated stakeholders to participate in an informal discussion with County Staff and the Consultant Team, with the limited group size enabling a more in-depth conversation than would be possible in a large group meeting. Additional meetings were also held with individuals and groups that specifically requested involvement.
- **Focus Group Meetings.** The following list includes the focus group meetings that the Consultant Team participated in during the course of the project (not inclusive of one-on-one meetings with individual stakeholders or various meetings with County Staff). Participants are identified by the main interest or group they associate with or represent rather than as individuals. Some groups had more than one representative that participated, which are not identified here. The objective of the first round of focus groups, held June 9-11, 2008, was primarily to identify key issues. As a part of those meetings, many participants identified data documents that they believed the Consultant Team should consider; therefore members of the Consultant Team returned to Santa Fe July 1-2 and August 3-4 to meeting with some of those groups again to obtain and discuss the provided data, as well as to meet with some groups that had not been previously identified. The Consultant Team also visited Santa Fe County on August 27 to discuss technical issues related to the Oil and Gas Suitability Analysis.
- **Focus Group Participants**
 - Drilling Santa Fe
 - Earthworks
 - Groundwater Restoration

- New Mexico Oil and Gas Association
 - Pueblos
 - Ranchers
 - Santa Fe Friends of Capitalism
 - Santa Fe Fire Department
 - Santa Fe Not Oil
 - Santa Fe Sheriff's Department
 - Sierra Club
- **Elected and Appointed Decision-Makers.** The Consultant Team made presentations to the Board of County Commissioners ("Board") and the County Development Review Committee ("CDRC"). The CDRC acted as the project Steering Committee at intervals throughout the process to update and inform them as well as to set direction for the process and define desirable outcomes.
 - **Brown Bag Meetings.** A series of public information sessions and participation workshops were held on July 14-15, 2008 at the Santa Fe Hilton. "Brown bag lunch" sessions were held, with Jack Kolkmeier, Director, Santa Fe County Land Use Department presenting "Growth Management Planning in Santa Fe County" on Monday, July 14, and Dr. Robert H. Freilich presenting "Impacts of Growth: Tools and Techniques" on Tuesday, July 15.
 - **Public Workshops.** A public meeting was held on May 9, 2008 to kick-off the inclusion of the Consultant Team in the planning process.

Participatory workshops were held July 14-15. Due to the size limitations of the available room (100 people), the same workshop was scheduled three times in order allow maximum participation.

The public meetings were advertised in the newspaper, on local radio, on the County website and on the project website. County staff and the Consultant Team further e-mailed the announcement to previous participants and other individuals who had expressed an interest in participating.

Several meetings were also held with the State Oil and Gas Division and the Executive Director of the State Department of Energy.

- **Project Website.** In addition to the meetings, a project website was created to provide information and updates to the public. The project website includes a "Comment Center" feature that allows individuals to e-mail comments to the project team as well as to register to receive notice of upcoming meetings and project updates.
- **County Website.** The County website was formatted to include information about the project, meeting announcements and informational resources, easily accessible and visible off of the site's home page.
- **Public Hearings.** The draft Oil and Gas Element and Ordinance were presented to the County Development Review Committee at an open meeting on September 30, 2008. Both the Element and Ordinance were made available to the public to download on the project website and the County website. Both documents were then presented to the Board of County Commissioners at an open meeting on October 16. Public hearings for both documents are scheduled for the County Development Review Committee on November 13, 2008 and the Board of County Commissioners on November 18, 2008.

2B-1.3. History

Oil and gas development is not new to Santa Fe County, though development of wells in the 1980s did not prove to be successful or profitable, limiting concern about the full field development of oil and gas resources and the need for updated oil and gas regulations. A new application for drilling wells in 2007 triggered a realization on the part of the County Board and the public that a serious effort needed to be made to plan for and regulate proposed oil and gas exploration, drilling, extraction, transportation of product and site remediation in the County, particularly in the Galisteo Basin, where the 2007 application sites were located. **Appendix A** includes a brief overview of oil and gas development and terminology.

In a review of publicly available well data from the New Mexico Oil conservation Division (“NMOCD”) and production data from (HIS) and the GO-TECH website, holder of digital production data from the NMOCD, twenty-nine wells were found to have been drilled for oil and/or gas production in Santa Fe County, New Mexico. Of the twenty-nine wells drilled, twenty-five were dry holes, two tested oil but were never commercially produced, two had oil and/or gas shows but were never commercially produced and one produced from an oil reservoir. Three of these twenty-nine wells were subsequently tested for production, as described below:

- Completed on October 30, 1985, with a perforation at a depth of 2,740 to 2,762’ in the Niobrara Formation, the Black Ferrill No. 1 well was the only well to produce in Santa Fe County. In twelve hours of testing on November 12, 1985, Black Ferrill No. 1 tested 15 barrels of oil and 3 barrels of water. In over twenty-two years of production, from November 1985 to December 2007 when the well was shut-in by Tecton Energy, LLC, total production from Black Ferrill No. 1 amounted to 762 barrels of oil and 163 barrels of water. The maximum amount of oil produced by Black Ferrill No. 1 in a single month was 67 barrels of oil in March 1986, equivalent to slightly more than two barrels of oil per day.
- The Ortiz No. 1 well, testing numerous foundations, including the Dakota “A” Formation at depths of 7,205 to 7,258 feet, tested 13 barrels of oil and 34 barrels of water in eleven hours on July 6, 1981. Testing of the Greenhorn Formation, perforated at depths of 7,003 to 7,075 feet, tested 3.6 barrels of oil and 20.4 barrels of water in eleven hours on July 26, 1981. Two days later the well was shut-in. Two years later, from August 24, 1983 through January 31, 1984 the well perforated the Niobrara Formation at depths of 6,138 to 6,354 feet, but no oil was tested. The well was plugged and abandoned on May 8, 1986. There is no evidence that the Ortiz No. 1 ever produced oil and/or gas at commercial rates.
- The Pinon No. 2 well perforated the Dakota Formation from 7,071 to 7,265 feet and tested slight amounts of oil and gas. Later, the Gallup Formation was perforated from 5,437 to 6,196 feet and tested 30 barrels of oil and 53 barrels of water in twenty-four hours on October 31, 1985. After testing the well was plugged and abandoned. There is no evidence that the Pinon No. 2 ever produced oil and/or gas at commercial rates.

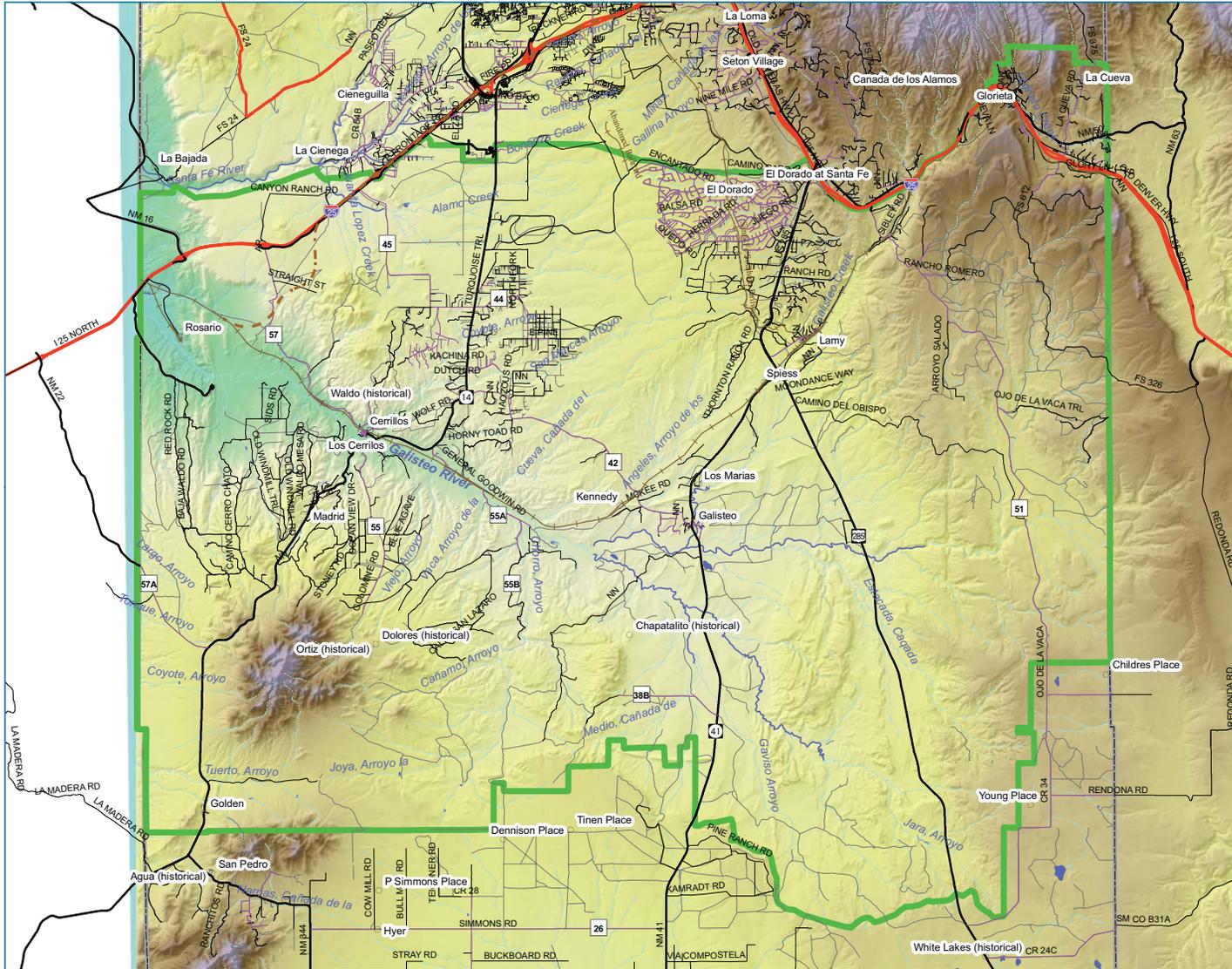
In The Rio Grande Rift – A New Oil and Gas Province in New Mexico, Bruce Black and Bill Dirks posit that “The commercially successful Tecton Black – Ferrill #1, and subsequent activities, has opened a new oil and gas province in the Rio Grande Rift. The recent activities suggest a multi-TCF and multi-hundred million-barrel oil accumulation potential within the downthrown areas of the rift.” However the Rio Grande Rift covers many counties in New Mexico and it is not obvious how much of the oil potential is in Santa Fe County.

Further, the Black Ferrill No. 1 was not commercially successful, as it is unlikely that the 762 barrels of oil produced over twenty-two years covered the costs of drilling and operating the well. Based on available documents, there has not been a well drilled to date in Santa Fe County that has produced sufficient amounts of oil and/or gas to bring enough revenue to cover the cost to drill and operate such well.

Based on the review of production data, there is not any actual well performance that proves or suggests that there is a ‘multi-TCF and multi-hundred million-barrel oil accumulation potential’ in the Galisteo Basin of Santa Fe County, New Mexico.

Map 2 shows the location of existing wells in the County.

Base Map



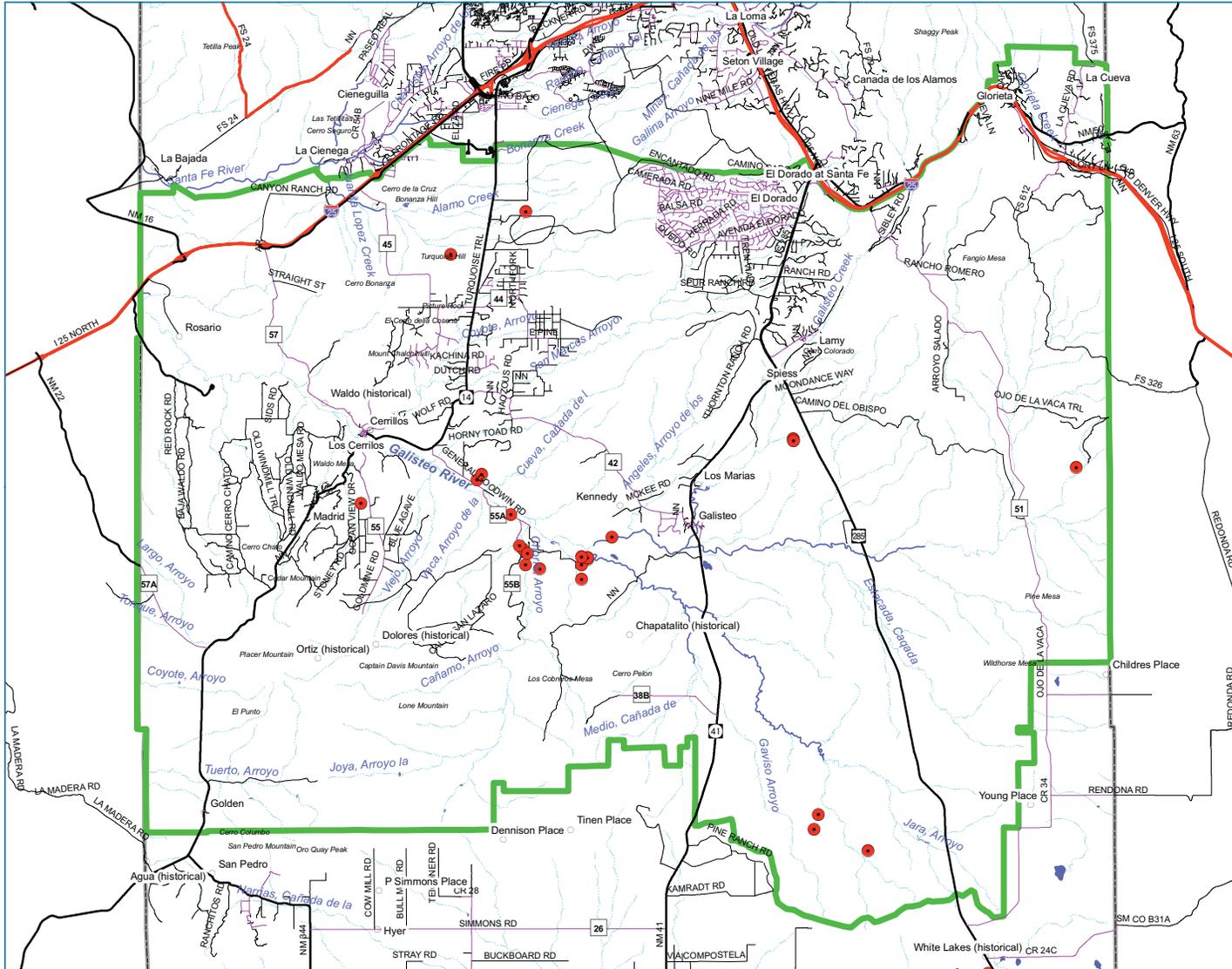
Legend

- Railroads
- Railrunner Alignment
- Roads**
- Ownership**
- Federal
- State
- County
- Other
- Revised Galisteo GMA
- Santa Fe County Boundary
- Hydrology**
- Stream/River: Intermittent / Other
- Stream/River: Perennial
- Water Body

Please use this map as a guide and not as definitive information. The areas depicted by this map are approximate and are provided for illustrative purposes only. While every effort has been made to ensure the accuracy, completeness, correctness, and timeliness of information presented within this map, the burden for determining appropriateness for use rests solely with the user. This map is provided "as is" with no warranties, express or implied.



Oil and Gas Well Locations



Legend

- Well Locations
- Roads**
- Ownership**
- Federal
- State
- County
- Other
- ▭ Revised Galisteo GMA
- ▭ Sante Fe County Boundary
- Hydrology**
- Stream/River: Intermittent / Other
- Stream/River: Perennial
- Water Body

Locations for Existing Oil and Gas wells were extracted and digitized from the EMNRD website "Well Files" database. It should be noted that the mapped locations are approximate and were not provided by EMNRD.

<http://ocdimage.emnrd.state.nm.us/imaging/>
as of 9/18/2008

Please use this map as a guide and not as definitive information. The areas depicted by this map are approximate and are provided for illustrative purposes only. While every effort has been made to ensure the accuracy, completeness, correctness, and timeliness of information presented within this map, the burden for determining appropriateness for use rests solely with the user. This map is provided "as is" with no warranties, express or implied.



2B-2. Policy Framework and Implementation

2B-2.1. Vision and Guiding Principles

The Oil and Gas Element of the General Plan reflects the interests, values and desires of citizens and groups within the County. For Santa Fe County and the Galisteo Basin, the planning effort included extensive public involvement throughout the process, including interviews with key civic leaders, focus groups, public workshops, a project website and media outreach. It also focused on inclusion of all the community involvement and planning that occurred prior to the start of this particular planning project, recognizing that the County made a commitment to honor the community plans and extensive work that went into the creation of those plans, as well as the fact that planning generally builds on the successes and failures of past planning efforts in a bid to continually improve the quality of our built and natural environment, quality of life and sense of community. The public participation process has led to a series of guiding principles to govern the Oil and Gas Element of the General Plan. The **guiding principles** are intended to clarify the intent of the vision statement and establish the context for the goals, objectives and policies, as follows:

Principle 1: Santa Fe County is a diverse and historic landscape, where community and the environment must be protected and enhanced without being subsumed by economic growth.

- We will continue to support community-based planning efforts.
- We will support the on-going vitality and viability of Santa Fe County's diverse communities and rural areas.
- We will protect our archaeological, historic and cultural sites and resources.
- We will support the ability of Native Americans and others to use the land for religious and cultural purposes.

Principle 2: We will protect and enhance our natural environment.

- We will protect the quality and quantity of our limited water supply.
- We will promote sustainable water use throughout all aspects of our community.
- We will protect our natural landscapes and vistas that define our community.
- We will require that land uses be compatible with environmental characteristics.
- We will create natural and built connections among our protected natural resources.

Principle 3: We will protect and enhance our resource-based economy.

- We will encourage low-impact economic development dependent upon our natural landscape, including eco-tourism.
- We will support agricultural and ranching uses that have long defined the character of Santa Fe County.
- We will support opportunities to protect natural resources, including acquisition of parks and open spaces.
- We will require that all mining, extractive and oil and natural gas activities be constrained unless they can mitigate all adverse effects and impacts upon the sustained quality of life in the community.

2B-2.2. Issues and Opportunities

Santa Fe County faces challenges as it prepares for and responds to growth and development demands. As oil and gas pressures accelerate in outlying areas, deficient public facilities and services in these areas will be unable to meet the demand generated by oil and gas projects. The character of these rural, environmentally sensitive and historically, culturally and archeologically significant areas will be irretrievably damaged. Residents and service providers are concerned about the long-term impact of these trends on the quality of life within Santa Fe County. The goals, policies and recommendations of this Oil and Gas Element are essential to address the following challenges facing Santa Fe County:

- **The need to regulate oil and gas projects.** The planning process was spurred by intense concern about the impacts of oil and gas development in the Galisteo Basin. Protection from negative impacts to the environment, cultural and archeological sites, traditional and contemporary communities and preservation of the public health, safety and welfare spurred the need for intensive regulation of oil and gas development. The County's challenge is to provide the maximum level of protection for surface property owners, existing land uses and environmental and cultural features, while fairly treating oil and gas mineral estates owners and lessees where oil and gas projects can be mitigated to meet County needs.
- **The need to consider the cumulative impacts of development.** The approach to planning and development regulation must be comprehensive, considering the end in mind and not considering the permitting of each individual oil and gas project proposal independently. It is the cumulative effect of individual development projects that impact the character of the County and the way it functions as a place. Facility and service deficiencies exist in many parts of the County due to unplanned development that is too expensive to serve.
- **The need to prepare for long-term growth.** If oil and gas development occurs on the edges of communities, it will create a physical and social barrier to more compatible types of planned growth in the County. The expense of extending urban facilities through industrialized areas to reach growth will be costly. It is in the best interests of the County, its cities and communities to ensure that compatible residential and commercial development occurs near to developed areas and that oil and gas development does not create an impediment to future growth.
- **The need to protect natural and cultural resources.** The Galisteo Basin's abundance of prime ranching and agricultural areas, environmentally sensitive areas and important historical, archeological and cultural sites makes it a priority area for preservation and protection. The economy and character of the area is almost entirely resource-dependent. One example is the use of the Galisteo Basin by members of Native American Pueblos in the County and surrounding area who visit the Basin to participate in important cultural and religious ceremonies and to gather native plant materials to facilitate those ceremonies. Another example is the movie industry, which regularly uses the Galisteo Basin Area for its wide open vistas and natural setting. To ensure that these uses of the Galisteo Basin remain viable, the County must identify the most effective regulatory and mitigation techniques.
- **The need to minimize traffic congestion.** In order to meet the safety demands of heavy tanker loads and increasing trips and vehicle miles travelled, it will be necessary to coordinate roadway segment improvements and funding with County, City and State plans to make transportation network improvements and circulation patterns to address congestion, connectivity and accessibility for existing and projected oil and gas project traffic volumes at key intersections and along critical corridors. Roadways must be improved and maintained to standards that allow oil and gas, residential, agriculture and ranching users to interact safely and for adequate police, fire and emergency response.
- **The need to protect water quantity and quality.** Protecting water quality and quantity from the negative effects and impacts of oil and gas projects is absolutely critical to the sustainability of the region. The viability of life in Santa Fe County is dependent upon a safe and available water supply. The County must ensure that oil and gas projects not only maintain and protect the available water, but also protect the

aquifer recharge areas and the ability of the natural water system to maintain its function and refresh its supply. Oil and gas development must not negatively impact the County's hydrogeology.

- **The need to provide adequate police, fire and emergency response.** Adequate police, fire and emergency service is a critical service and demand for such services generated by oil and gas projects must not degrade existing levels of service. Oil and gas development must pay its fair share of facility and service improvements in order to protect the existing levels of service and provide an adequate level of service to prevent and respond to emergencies due to oil and gas projects.
- **The need for fiscal balance and responsibility.** Proper regulation of oil and gas projects through fiscally responsible policies ensures the long-term fiscal health of the County and its residents. The County must balance the need to protect its environment and natural resources and County costs. Through improvement districts, assessments, rates and charges, Santa Fe County must manage oil and gas projects to minimize negative fiscal externalities.

2B-2.3. Goals, Objectives and Policies

Goals, objectives, policies and strategies are developed to describe how the County will meet the challenge of regulating oil and gas projects.

Goal: Description of a desired state of affairs for the community in the future. Goals are the broad, public purposes toward which policies and programs are directed. Goals are phrased to express the desired results of the Oil and Gas Element.

Objective: A measurable stepping stone. Objectives identify a quantifiable target to achieve a goal.

Policy: Statements of government intent against which individual actions and decisions are evaluated. Policies indicate the *direction* the community should take.

Strategy: Individual regulations and action which, taken together, will enable the community to achieve Goals, Objectives and Policies. Strategies are the basis for implementation of the Element by identifying and recommending specific courses of action.

2B-2.3.1. Oil and Gas

Goal 1: Ensure that resources and fiscal health are protected from the adverse effects and impacts of oil and gas development.

Objective 1.1: No adverse effects and impacts or public nuisances from oil and gas projects.

Policy 1.1.1: Create a process of discretionary development approval for oil and gas projects that requires extensive environmental, fiscal, traffic, adequate public facilities, water availability, geo-hydrological protection and emergency service and response reports, plans, assessments and studies.

Policy 1.1.2: As part of the development review process, the County shall find that the proposed oil and gas project:

- a) Does not threaten the health, safety, or welfare of the County, its residents, or its environment by creating detrimental adverse public nuisance, environmental, fire, fiscal, health, pollution, safety, adequate public facility and service impacts or effects;
- b) Does not impair or preclude the purposes of planning, including but not limited to environmentally sustainable land use, cultural, historic and archaeological resource preservation and adequate public facilities and services;

- c) Ensures the adequacy of public facilities and services at the time of project operation, including fire, police, emergency and response services and transportation capacity;
- d) Does not create or increase any adverse public nuisance effects and impacts due to the exploration, drilling, operation, transportation, and abandonment of oil and gas activities within the County;
- e) Does not threaten or negatively impact the Galisteo Basin's priceless, unique, and fragile ecosystem, the preservation of which is of significant value to the citizens of the County and State;
- f) Does not threaten or negatively impact the Galisteo Basin's unique and irreplaceable archaeological, cultural, water and other natural resources; and
- g) Is consistent with the July 2008 recommendations of the Governor's Executive Task Force to ensure the health, safety, and welfare of all New Mexicans and protect the natural and ecological riches of Santa Fe County and the Galisteo Basin from adverse public nuisance effects.

- Policy 1.1.3: Use the General Plan Oil and Gas Element to guide land use and development decisions for oil and gas projects.
- Policy 1.1.4: Consider the cumulative impacts of incremental oil and gas project approvals rather than projects in isolation.
- Policy 1.1.5: Create an Oil and Gas Overlay Zoning District classification using the reports, plans, assessment and studies for mitigation of oil and gas project effects and impacts.
- Policy 1.1.6: Incorporate public facility and service adequacy, availability and funding into conditions for development approval of oil and gas projects.
- Policy 1.1.7: Use the Oil and Gas Suitability Analysis to support land use decision-making, requiring development to be compatible with environmental and cultural resource factors.
- Policy 1.1.8: Maintain compatible transitions between different land uses and housing types through effective land use and site design regulations.
- Policy 1.1.9: Require adequate and available public facilities and services prior to the approval of new development.
- Policy 1.1.10: Ensure that oil and gas projects abutting residential development are compatible with the scale, intensity and overall character of the neighborhood.
- Policy 1.1.11: Ensure that oil and gas development projects are compatible with existing development patterns.
- Policy 1.1.12: Require new development to incorporate consistent design features that preserve community image.
- Policy 1.1.13: Promote the use of good site design and layout, architectural design and building materials that incorporate regional, indigenous and historical design and materials.

- Policy 1.1.14: Ensure that oil and gas projects are compatible with the unique, rural character of the community in which it is located.
- Policy 1.1.15: Limit and minimize negative impacts and public nuisances from oil and gas projects through the planning and development review process.
- Policy 1.1.16: Protect the unique countryside of the County and the special landscapes, places and lifestyles that residents and visitors value.
- Policy 1.1.17: Direct the location, mix and density/intensity of oil and gas projects so that the surface footprint is minimized and open space is preserved.
- Policy 1.1.18: Provide a fair and equitable development review process that provides significant opportunities for applicant, public agency, service provider and public input.
- Policy 1.1.19: Engage community residents and property owners in the development and implementation of plans and development standards for oil and gas projects.
- Policy 1.1.20: Encourage the adoption of oil and gas plans and regulations on a regional level and consider the impacts of oil and gas projects in jurisdictions within and abutting Santa Fe County.
- Policy 1.1.21: Support intergovernmental coordination with cities, adjacent counties and the State in the regulation of oil and gas projects.
- Policy 1.1.22: Promote an open and cooperative relationship among the County, the public and the oil and gas industry, based on timely information sharing and opportunities for communication.
- Policy 1.1.23: Proactively engage oil and gas company representatives to promote cooperation and achieve mutual goals.
- Policy 1.1.24: Establish a Beneficial Use and Value Determination Variance process to evaluate takings claims.
- Policy 1.1.25: Setbacks required by the Oil and Gas Ordinance are the *minimum* required setbacks; protection of residential uses is a high priority in the siting and approval of oil and gas projects. Setbacks may be increased on a site-specific basis to protect residential uses.

2B-2.3.2. Agriculture and Ranching

Goal 2: Support, protect and enhance the rural agricultural and ranching economies throughout the County from deleterious effects and impacts of oil and gas projects.

Objective 2.1: No net loss of acres used for agricultural or ranching purposes.

- Policy 2.1.1: Protect land used for agricultural or ranching uses from excessive and incompatible development of the surface by oil and gas projects.
- Policy 2.1.2: Preserve land currently used for agricultural and ranching operations.
- Policy 2.1.3: Limit impacts to existing agricultural and ranching operations from on- and off-site oil and gas development.
- Policy 2.1.4: Prevent the spread of noxious and invasive species and associated negative impacts to agricultural and ranching operations.
- Policy 2.1.5: Protect livestock through implementation of best management practices for oil and gas development.

Policy 2.1.6: Protect surface land by minimizing and consolidating new road construction.

Policy 2.1.7: Enhance the viability of farming and ranching operations through use of incentives.

Goal 3: Support and protect the County’s tourism industry from the adverse and public nuisance effects of oil and gas projects.

Objective 3.1: Increase the number of annual visitors to Santa Fe County.

Policy 3.1.1: Protect natural, cultural and community assets that contribute to the County’s appeal as a tourist destination.

Policy 3.1.2: Support development of ecotourism businesses.

Policy 3.1.3: Protect ecotourism assets through open space protection and creation of an ecotourism overlay district.

Policy 3.1.4: Maintain and enhance Santa Fe County as an “artistic” community, supporting and celebrating local arts, art-related businesses and cultural events.

2B-2.3.3. Resource Protection

Goal 4: Protect and preserve the numerous cultural, natural, economic and community resources in Santa Fe County from incompatible development.

Objective 4.1: No non-native plant material used in oil and gas development site plans approved by the County.

Policy 4.1.1: Promote high quality landscaping, screening and buffering and encourage the use of use of native plants and regional design elements.

Policy 4.1.2: Enhance the design of the gateways and corridors leading into and through the County and its communities by establishing appropriate landscaping, setback, buffering and design standards for oil and gas projects.

Policy 4.1.3: Mitigate traffic noise and other noises that would negatively impact existing development through a combination of landscaping, structural controls, road maintenance, limit outdoor noise levels to an appropriate level in consideration of the surrounding land uses.

2B-2.3.4. Cultural, Historic and Archaeological Resources

Goal 5: Protect and preserve the cultural, historic and archaeological resources of the County.

Objective 5.1: Increase records in database of known cultural, historic and archaeological resources from approximately 15% to 50%.

Policy 5.1.1: Ensure proper surveying, mapping and documentation of cultural, historic and archaeological resources in reviewing oil and gas project approval.

Policy 5.1.2: Enhance the database of known cultural, historic and archaeological resources by compiling information that becomes available through the development review process on a County-wide basis.

Objective 5.2: No net loss of significant archeological, cultural or historic sites.

- Policy 5.2.1: Ensure prevention and mitigation of impacts from development on cultural, historic and archaeological resources.
- Policy 5.2.2: Ensure oil and gas operations do not cause significant degradation in quantity or quality of cultural, historic and archaeological resources.
- Policy 5.2.3: Protect and support the ability of Native Americans and others to use the natural resources of the County for ceremonial, religious, cultural and other uses.
- Policy 5.2.4: Protect the sanctity of unmarked burial areas and places of importance for Native America ceremonies.
- Policy 5.2.5: Ensure that oil and gas project activity within and adjacent to historic districts is compatible with existing historic development.

Objective 5.3: Adoption of the Galisteo Archaeological Site Management Plan.

- Policy 5.3.1: Support and participate in the federal development of a Galisteo Archaeological Site Management Plan.

2B-2.3.5. Environmental Protection and Natural Resources

Goal 6: Preserve, protect and enhance the County's natural environment and resources from adverse effects, impacts and public nuisances due to oil and gas projects.

Objective 6.1: No net loss of significant environmentally sensitive areas.

- Policy 6.1.1: Encourage sustainable development and "green" construction and operating techniques for oil and gas development, including, but not limited to, the following:
 - a) Consideration of the cumulative impact of all actions
 - b) Creating the least impact possible on a site
 - c) Constructing facilities, to the extent feasible, using existing infrastructure
 - d) Recycling of all waste products
 - e) Minimization of emissions through the use of "green" technology
 - f) Use of best management practices
 - g) Alternatives to gas generators, such as solar or wind
 - h) Use of recycled materials
 - i) The development of a sustainability plan (analyzing current practices for ways to reduce waste, reuse and recycle equipment, facilities and materials)
- Policy 6.1.2: Limit incompatible oil and gas projects in sensitive environmental areas and near natural resources.
- Policy 6.1.3: Encourage oil and gas projects to co-locate wells in areas away from natural/environmental resources to minimize impacts and protect open space.
- Policy 6.1.4: Support an integrated framework for protection of natural resources that includes the use of Environmental Impact Reports and Impact Assessments to assess existing conditions, identify fiscal impacts, minimize and mitigate potential damage to the environment and monitor change.
- Policy 6.1.5: Limit the overall surface area impacted by development through use of clustering and co-location of drill sites and other development.

Policy 6.1.6: Limit the overall surface area impacted by development by setting standards for the amount, siting, location and design of roadway improvements and other access.

Policy 6.1.7: Discourage oil and gas development on land held in conservation easement and encourage the highest level of protection for such land.

Objective 6.2: No net increase in measurable pollution levels throughout the County.

Policy 6.2.1: Support the adoption of standards that provide the highest level of protection for the environment.

Objective 6.3: Increase the amount of protected open space.

Policy 6.3.1: Support and encourage designation of local, state and federal parks, open space and other protected areas in the County.

Policy 6.3.2: Support federal designation of the Galisteo Basin as a national monument.

2B-2.3.6. Water Quality

Goal 7: Preserve and protect the quality and quantity of surface and groundwater resources from oil and gas projects.

Objective 7.1: No net increase in surface or groundwater pollution or decrease of available water supply.

Policy 7.1.1: Ensure long-term water quality and availability.

Policy 7.1.2: Promote water conservation in oil and gas projects.

Policy 7.1.3: Prevent groundwater contamination

Policy 7.1.4: Protect aquifer re-charge areas.

Policy 7.1.5: Prohibit oil and gas projects near to surface or groundwater resources, including all perennial or intermittent water bodies, including, but not limited to rivers, streams, creeks, arroyos, ponds, drainage ditches and other riparian areas.

Policy 7.1.6: Prevent water pollution through use of best management practices, including use of vegetative buffers.

Policy 7.1.7: Ensure that all oil and gas exploration and production methods minimize potential impacts to the underlying hydrogeologic structure and surface water.

Policy 7.1.8: Require oil and gas operations to minimize and mitigate potential impacts to all surface water resources and groundwater recharge areas.

Policy 7.1.9: Require adequate setbacks from water-related areas when conducting potentially harmful operations such as cleaning and storage.

Policy 7.1.10: Promote operator development of a storm water management plan and an analysis of water quality non-point source impacts (identifying potential impacts of oil and gas development and proposing mitigation techniques).

Policy 7.1.11: Require that operations not cause significant degradation in water quality or pressure at any public or private wells.

- Policy 7.1.12: Ensure safety of domestic wells and surface and groundwater quality through pre- and post-development monitoring. Monitoring shall occur on an annual basis at a *minimum*, and may occur more frequently based on recommendations of County Staff and/or the Board of Commissioners.
- Policy 7.1.13: Prevent water pollution from point or non-point source pollution.
- Policy 7.1.14: Limit development near domestic water wells.
- Policy 7.1.15: Prevent use of dangerous and/or toxic chemicals near surface or groundwater resources.
- Policy 7.1.16: Ensure produced water and other wastes are disposed of in accordance with local, state and federal regulations.
- Policy 7.1.17: Ensure all oil and gas development equipment is maintained to prevent leaks and other malfunctions which may contribute to discharges.
- Policy 7.1.18: Require oil and gas development to disclose hydrogeologic information with the County and other agencies and service providers, including the target formation and all potentially affected formations that contain water.
- Policy 7.1.19: Prohibit use of toxic substances in drilling and fracing. The only approved substance for fracing should be clean water.
- Policy 7.1.20: Prohibit use of re-injection wells for produced water or other liquids.
- Policy 7.1.21: Protect and preserve riparian areas and recharge zones.
- Policy 7.1.22: Require disclosure of water sources and quantities to be used in oil and gas construction, drilling and operation activities.
- Policy 7.1.23: Support the development of “Domestic Well Management Areas” within the Galisteo Basin and its watersheds.
- Policy 7.1.24: Require assurances from oil and gas operators that water contamination that may reasonably have been caused by oil and gas activities be contained and water supplies replaced by the oil and gas operations within the area.
- Policy 7.1.25: Support the Earth Works Restoration Action Strategy (WRAS) projects funded through the NMED Clean Water Act Section 319.

2B-2.3.7. Geology

Goal 8: Prevent geologic hazards from oil and gas projects.

- Policy 8.1.1: Require a geologic hazard assessment, including mitigation methods for any and all identified hazards prior to oil and gas development.
- Policy 8.1.2: Limit oil and gas development in geologic hazard areas, including all fault lines, as determined by the state geologic survey or other reliable data sources.
- Policy 8.1.3: Limit the risk of seismic activity due to oil and gas development.
- Policy 8.1.4: Require oil and gas development to disclose geologic information with the County and other agencies and service providers, including the target formation, all formations traversed by the well hole and nearby fault lines.
- Policy 8.1.5: Prevent seepage through well casing requirements.

2B-2.3.8. Vegetation and Soils

Goal 9: Protect vegetation, including rare and native species, from the impacts of oil and gas projects.

Objective 9.1: No net loss in the amount of native vegetation on development sites.

- Policy 9.1.1: Require a vegetation analysis, prior to development, identifying existing vegetation, anticipated impacts from the development and proposed mitigation.
- Policy 9.1.2: Require stormwater management, drainage and erosion control best management practices.
- Policy 9.1.3: Prevent the spread of noxious and invasive species.
- Policy 9.1.4: Prevent erosion and associated impacts to surface water, such as sedimentation and turbidity.
- Policy 9.1.5: Limit impacts to vegetation through the use of proper siting of equipment, restricting vehicular movement to roadways and other measures.
- Policy 9.1.6: Encourage the use of native species in landscaping.
- Policy 9.1.7: Require the use of vegetative buffers to prevent erosion and water pollution.
- Policy 9.1.8: Require the use of native species in site reclamation.
- Policy 9.1.9: Encourage the harvesting and replanting of native vegetation removed from development sites, either on- or off-site.
- Policy 9.1.10: Limit the “scraping” of development sites and protect existing vegetation.

2B-2.3.9. Wildlife

Goal 10: Protect wildlife, including threatened and endangered species, from the impacts of oil and gas projects.

Objective 10.1: No net loss of wildlife habitat acreage.

- Policy 10.1.1: Preserve and protect wildlife habitat and migration corridors.
- Policy 10.1.2: Preserve and protect riparian areas and surface water resources that support wildlife health.

Objective 10.2: Promote biodiversity in rural areas of the County.

- Policy 10.2.1: Ensure facilities, roads, fencing and lighting are sited so as to minimize the impact and disturbance on wildlife habitat and corridors.
- Policy 10.2.2: Require that operations not cause significant degradation of wildlife or sensitive wildlife habitat, especially to any wildlife listed as threatened or endangered on a state or federal list.
- Policy 10.2.3: Require use of best management practice to prevent harm to wildlife.
- Policy 10.2.4: Protect and preserve endangered or threatened species.

Objective 10.3: Increase the number of records in database of known wildlife and habitat resources.

- Policy 10.3.1: Require oil and gas operators develop a wildlife and wildlife habitat analysis, documenting existing wildlife and corridors, potential operational impacts and proposed mitigation.

- Policy 10.3.2: Enhance the database of known wildlife and habitat resources by compiling information that becomes available through the oil and gas development review process on a County-wide basis.

2B-2.3.10. Scenic Viewsheds

Goal 11: Preserve and protect scenic viewsheds as an important resource for economic development and quality of life from adverse effects and impacts of oil and gas projects.

- Policy 11.1.1: Promote sensitive siting and design of oil and gas-related facilities to minimize visual impacts.
- Policy 11.1.2: Encourage the use of existing natural features and vegetation to screen oil and gas-related development.
- Policy 11.1.3: Limit development on steep slopes with a grade equal to or greater than 11%, visible ridges and peaks.
- Policy 11.1.4: Limit the need for cut and fill through sensitive siting and design.
- Policy 11.1.5: Limit development near prominent natural features such as distinctive rock and land forms, vegetative patterns, river crossings or other landmarks.
- Policy 11.1.6: Promote facility placement that avoids crossing hills and ridges (silhouetting).
- Policy 11.1.7: Encourage the location of pipelines and utilities underground.
- Policy 11.1.8: Limit the height of facilities and equipment.
- Policy 11.1.9: Encourage the screening and buffering of drill sites and oil and gas facilities with landscaping that includes native vegetation and use of materials that reflect natural, regional design elements.
- Policy 11.1.10: Limit outdoor lighting and prevent light pollution.

2B-2.3.11. Oil and Gas Detailed Development Plans

Well Siting and Design

Goal 12: Encourage oil and gas well siting and design that has the least impact on surface land uses and resources.

- Objective 12.1: All new wells to be clustered on multiple drill sites.
- Policy 12.1.1: Encourage placement of the well site, facilities, equipment and roadways such that long-term disruption of surface resources and existing uses are minimized.
- Policy 12.1.2: Require use of directional drilling and multiple wells drilled on existing drill sites to reduce surface impacts.
- Policy 12.1.3: Encourage the co-location of multiple wells on a single drill site.
- Policy 12.1.4: Encourage design of the well site to fit the landscape and minimize construction needs, even if this requires a non-rectangular shape.
- Policy 12.1.5: Promote use of equipment and facilities of appropriate size and scope, being of minimum size needed to access the resource.
- Policy 12.1.6: Limit placement of equipment and facilities on steep hillsides and watercourses with a grade equal to or greater than 11 percent.

Policy 12.1.7: Require re-vegetation of drill sites as part of reclamation.

Extraction Techniques

Goal 13: Promote, encourage and ensure the use of best management practices and least-impact methods of oil and gas extraction.

Objective 13.1: No new contamination of ground or surface waters or soils.

Policy 13.1.1: Limit use of any toxic substances at oil and gas development sites. Require the use of water-based, chemically inert, environmentally benign fluids for all oil and gas operations.

Policy 13.1.2: Prohibit the use any substance other than clean water for fracturing fluids.

Policy 13.1.3: Ensure known carcinogens, endocrine disruptors, diesel fuel, other petroleum products and chemicals are not released into the environment through water, air, soil or other delivery methods.

Prevention of Adverse Public Nuisance Effects and Impacts

Goal 14: Ensure the prevention of any adverse public nuisance affects and impacts due to oil and gas development.

Objective 14.1: No nuisance complaints from County residents due to oil and gas development.

Objective 14.2: Prevent violations of EPA, state or federal air or water quality standards due to oil and gas development.

Policy 14.2.1: Protect the public and natural environment from noise, odors, dust and other nuisances due to oil and gas development and related construction and shipping/trucking.

Policy 14.2.2: Limit noise, with emphasis on operations near residential, commercial or public uses.

Policy 14.2.3: Require the utilization of electric pump motors.

Policy 14.2.4: Require the use of quiet design mufflers.

Policy 14.2.5: Promote the use of remote well monitoring to reduce truck traffic, related noise impacts, emissions and impact on the environment.

Policy 14.2.6: Require equipment to be anchored to isolation pads to minimize vibration.

Policy 14.2.7: Limit fugitive dust.

Policy 14.2.8: Require all exhaust from oil and gas operations to be vented away from existing buildings or platted lots.

Policy 14.2.9: Require operations to meet all EPA, state and federal air quality standards.

Policy 14.2.10: Ensure all motorized equipment uses catalytic converters and lean burn technology to reduce air quality impacts.

Policy 14.2.11: Limit outdoor lighting and ensure that the minimum amount of outdoor lighting is used.

Policy 14.2.12: Require lighting to be downward directed or shielded to prevent direct reflection on adjacent property and protect the visibility of the night sky.

Policy 14.2.13: Limit hours of active operation.

Emergency Management

Goal 15: Protect life and property through wildfire prevention and response.

- Objective 15.1: No emergency response calls for service related to oil and gas development for wildfire or hazardous material emergencies.
- Policy 15.1.1: Ensure oil and gas development meets the standards of the Wildland-Urban Interface Code.
- Policy 15.1.2: Require an assessment of wildfire hazards and development of plans to mitigate any hazards identified.
- Policy 15.1.3: Require exploration and production sites to be kept free of flammable materials, dry weeds, grass or rubbish.
- Policy 15.1.4: Ensure that no fires are started near facilities or equipment.
- Policy 15.1.5: Limit on-site welding to prevent fires.
- Policy 15.1.6: Ensure proper storage of all flammable or explosive solids or gases.
- Policy 15.1.7: Require operators to notify the fire department and County Manager in the event of any oil or gas spills, leaks, explosions, fires or other hazards.

Waste Management Policies

Goal 16: Require the safe handling and disposal of wastes related to oil and gas development.

- Objective 16.1: No pollution due to improper waste handling, storage or disposal.
- Policy 16.1.1: Require development of a waste minimization and management plan, detailing re-use and recycling methods for all variations of waste produced by oil and gas operations, including exploration and production waste.
- Policy 16.1.2: Ensure adequate disposal and containment of all human waste through provision of on-site sanitary facilities for employees.
- Policy 16.1.3: Prohibit on-site burning of debris, vegetation, trash or other waste.
- Policy 16.1.4: Prohibit use of open pits for any type of storage.
- Policy 16.1.5: Limit outdoor storage of construction debris or other waste.
- Policy 16.1.6: Require proper storage, handling, transportation, treatment, recycling and disposal of all exploration and production waste.
- Policy 16.1.7: Require closed-loop (“pitless”) drilling systems and closed containment of stored fluids.
- Policy 16.1.8: Prohibit use of re-injection wells for any produced water or other liquid.

Reclamation

Goal 17: Ensure reclamation of oil and gas development sites to pre-construction or better conditions.

- Objective 17.1: No sites remain un-reclaimed to County standards after operations have ceased at oil and gas development sites.
- Policy 17.1.1: Require ongoing reclamation of disturbed areas not needed for active support of production operations.

- Policy 17.1.2: Ensure adequate maintenance of disturbed topsoil and vegetation, including re-use through proper salvage and re-spreading/planting.
- Policy 17.1.3: Require re-contouring of the land to pre-disturbance conditions.
- Policy 17.1.4: Require disturbed areas be re-seeded with native grasses or other vegetation similar in kind to surrounding vegetation, including access roads.
- Policy 17.1.5: Ensure newly reclaimed vegetation is established properly, ensuring its survival through methods such as watering, fencing protection, use of vigorous self-sustaining vegetation and a final inspection process before well abandonment is finalized.
- Policy 17.1.6: Require removal of all concrete pads and equipment as part of reclamation.
- Policy 17.1.7: Require financial guarantees of adequate well closure and site reclamation as part of the development review process.

Worker Housing

Goal 18: Ensure the provision of safe, adequate and appropriate housing for oil and gas workers.

- Objective 18.1: No violations of standards for temporary housing.
 - Policy 18.1.1: Support the provision of safe and adequate housing through cooperation between the County and the oil and gas industry.
 - Policy 18.1.2: Require housing plans for oil and gas workers as part of the application for an oil and gas project.
 - Policy 18.1.3: Ensure that temporary housing meets minimum standards and does not unduly impact the environment or surrounding land uses.
 - Policy 18.1.4: Ensure that temporary housing meets minimum sanitation standards.

2B-2.3.12. Facilities and Services

Goal 19: Protect and enhance the County's fiscal resources and ensure high quality public facilities and services.

- Objective 19.1: No increase in County tax rates for existing residents to fund facilities and services for oil and gas projects.
 - Policy 19.1.1: Require oil and gas projects to provide all public facilities and public services including fire, police, stormwater management, roads, and emergency response facilities, the need for which is generated by the project.
 - Policy 19.1.2: Ensure that community facilities meet green building requirements, encouraging attainment of Leadership in Energy and Environmental Design (LEED) gold standards when applicable.
 - Policy 19.1.3: Require that oil and gas projects fund the efficient provision of public facilities and services.
 - Policy 19.1.4: Assure that the provision of facilities and services does not shift the costs of such facilities and services to existing residents and businesses.
 - Policy 19.1.5: Coordinate with other service providers on the timing and location of installation or replacement of utilities.

- Policy 19.1.6: Coordinate oil and gas decisions with the ability of the County and other service providers to adequately meet service demands concurrently with the creation of those demands by oil and gas projects.
- Policy 19.1.7: Ensure that adequate public facilities are available or funded prior to approval of oil and gas projects. The implementation of this policy will be coordinated with the adoption of a Capital Improvements Program that addresses existing deficiencies and future capacity needs.
- Policy 19.1.8: Maintain adequate road capacity, operation and maintenance, law enforcement, fire protection and emergency medical response times at adopted levels of service for all oil and gas projects within the County.
- Policy 19.1.9: New oil and gas projects shall fund the proportional share of costs for capital facilities for on- and off-site capital improvements required to serve new development.
- Policy 19.1.10: Encourage oil and gas operations to use existing infrastructure and facilities, such as roads, pipeline routes and drill sites, reducing costs and minimizing impacts to the environment.
- Policy 19.1.11: Use improvement districts in oil and gas areas to assess oil and gas projects with the cost of road, fire, police, emergency response and stormwater detention.

Roads

Goal 20: Ensure provision and maintenance of a safe and convenient roadway system.

- Objective 20.1: Maintain existing level of service standards on County arterial roads.
 - Policy 20.1.1: Deny development approvals of oil and gas or require phased implementation of oil and gas projects where road facilities are inadequate to meet adopted levels of service.
 - Policy 20.1.2: Require the provision of road improvements, including construction and funding of improvements by oil and gas projects, to prevent severe traffic congestion.
 - Policy 20.1.3: Require the provision of an interconnected system of local roads, collectors, and arterials with sufficient capacity to meet the capacity and safety needs generated by oil and gas projects.
 - Policy 20.1.4: Identify rights-of-way needed for future road construction and expansion through the adoption of an Official Map.
 - Policy 20.1.5: Encourage design standards for roadways that reflect and enhance local community character.
 - Policy 20.1.6: Minimize noise, light and visual impact of roadways and traffic.
 - Policy 20.1.7: Protect important highway corridors from incompatible oil and gas projects.
 - Policy 20.1.8: Designate truck and tanker transportation routes through the County.
 - Policy 20.1.9: Require all new access roads to oil and gas projects to provide safe access, with features including adequate turnouts, emergency braking lanes and appropriate public signage.
 - Policy 20.1.10: Require all new roadways to be of a quality such that passage by heavily laden oil and gas trucks, tankers, and equipment can pass safely.
 - Policy 20.1.11: Ensure new roadways constitute the least impact to areas, resources, and residents adjacent to oil and gas project sites.

- Policy 20.1.12: Ensure that roadways are improved and maintained to standards that allow road users to interact safely and allow adequate emergency response.
- Policy 20.1.13: Require use of a Traffic Impact Analysis (TIA) in the development review process of oil and gas projects.

Public Health/Law Enforcement/Fire Protection/EMS

Goal 21: Ensure public health, safety and welfare and the provision of adequate law enforcement, fire protection and emergency medical services.

- Objective 21.1: No increase in calls for service related to oil and gas development.
- Policy 21.1.1: Support formation of an “Oil and Gas Roundtable Forum,” which includes representatives of the Santa Fe County Growth Management Department, including Planning and Public Works, the Fire Department, the Sheriff’s Department, representatives of the Oil and Gas Industry and other service providers, such as public health officials, medical providers and emergency first responders.
- Policy 21.1.2: Support formation of a special Rural Crimes Unit to work closely with the Oil and Gas Industry and address issues related to oil and gas.
- Policy 21.1.3: Limit opportunities for vandalism through requirements for gating, fencing and screening of oil and gas development sites.
- Policy 21.1.4: Enhance law enforcement and emergency prevention through on and off-site monitoring of oil and gas development sites.
- Policy 21.1.5: Ensure provision of appropriate traffic control and security during heavy activity stages of oil and gas development.
- Policy 21.1.6: Require that all chemical, mineral, or toxic substances stored or used at oil and gas development sites be limited to those on a list of approved substances established by the County.
- Policy 21.1.7: Support opportunities for emergency response training in cooperation with the oil and gas industry.
- Policy 21.1.8: Encourage input from public health, law enforcement, fire protection and emergency medical service (EMS) response providers during the development review process.
- Policy 21.1.9: Support provision of established levels of service for law enforcement, fire protection and EMS.
- Policy 21.1.10: Encourage industry support to acquire equipment, vehicles and training necessary to support service provision to oil and gas development.
- Policy 21.1.11: Support outreach programs that focus on community education and notification about oil and gas development activities.

Emergency Management

Goal 22: Ensure the protection of life and property through emergency prevention and response.

- Objective 22.1: No loss of life or property resulting from hazards associated with oil and gas development.
- Policy 22.1.1: Support development of a County “Emergency Response Planning Committee” to include all County first responders and representatives of the oil and gas industry.

- Policy 22.1.2: Support development and maintenance of a Countywide Hazard Mitigation and Emergency Response Plan that address threats from oil and gas development as well as other natural and manmade hazards.
- Policy 22.1.3: Require operator development of emergency preparedness plans, providing a 24 hour contact and detailed fire prevention, response and safety plans for all entities involved.
- Policy 22.1.4: Ensure that the Fire Department, Sheriff and other first responders, including medical personnel at County hospitals comment on oil and gas development plans as part of the development review process.
- Policy 22.1.5: Ensure safe storage of chemicals and petroleum products at oil and gas development sites.
- Policy 22.1.6: Require disclosure of all chemicals used or stored on-site to ensure compatibility with the County's approved list of chemicals and require adequate product hazard labels.
- Policy 22.1.7: Require adequate signage to inform workers, emergency personnel and/or trespassers of on-site dangers.
- Policy 22.1.8: Require financial assurances, covering emergency response and environmental remediation, from all oil and gas operators to ensure the protection of the public health, environment, wildlife and water.
- Policy 22.1.9: Promote the use of the best safety practices generally accepted by the oil and gas industry at all times during drilling and production to minimize danger to the general public.

2B-2.4. Implementation

This Oil and Gas Element is intended to be a flexible document -- one that responds to changing needs and conditions. To assess the Element's effectiveness in responding to changing conditions, the County will need to monitor actions affecting the Plan. As a result of these monitoring efforts and private development or public suggestions, the County will need to amend this Element periodically. Decision-makers should consider each proposed amendment carefully to determine whether or not it is consistent with the Plan's goals and policies. In addition, the cumulative effect of many changes may be a change in policy direction. For this reason, Plan amendments must be evaluated in terms of their significance to overall County policy.

This chapter describes the processes to annually review, monitor and amend the Plan, Plan goals and policies.

2B-2.4.1. Annual Review and Monitoring

Department Directors should provide to the County Administrator an annual review of Oil and Gas Element related activities. The annual review is intended to:

- Measure the County's success in achieving plan goals through the recommended strategies;
- Propose new strategies to be pursued;
- Document oil and gas development trends and assess the impacts of existing and projected development;
- List development actions which affect the Plan's provisions; and
- Explain difficulties in implementing the Plan.

This annual review should include statements identifying that respective departments' progress in achieving the goals of the Plan, the impact of the Plan on service provision, and proposed programs to help achieve the Plan's goals. The annual review should be used as a tool to help set County priorities.

2B-2.4.2. Key Implementation Tools

The Plan implementation program identifies a number of tools available to the County that may be employed to bring the goals, policies and strategies of the Plan to fruition. These implementation tools are interrelated and work together providing continuity and breadth to the implementation program.

Land Development Code and Oil and Natural Gas Ordinance

On a day-to-day basis, the Santa Fe County Land Development Code and the Oil and Natural Gas Amendments to the Santa Fe County Land Development Code are the most important tools for Plan implementation. Oil and gas development management is achieved through a myriad of incremental decisions about specific oil and gas projects. This Plan shall carry the force of law to the extent that all regulations and development approvals of oil and gas projects shall be consistent with the provisions of this Oil and Gas Element. Updates to development regulations shall be consistent with the Plan to ensure that County development regulations on oil and gas are consistent with the applicable goals, policies and recommendations.

Capital Improvements and Services Plan (CIP)

Short- and long-range CIPs are important planning tools to ensure that the County has planned required facilities and services and to determine whether the County will have the capability to fund needed public facilities and maintenance costs. The short-range CIP shall identify and estimate costs of improvements and services needed to serve anticipated growth for the next five (5) years; the long-range CIP should identify and estimate costs of improvements needed to serve anticipated growth for the next 10 to 15 years. The CIP is not an engineering document, but should provide enough specificity to determine costs required to remedy existing deficiencies and costs necessary to provide new capacity that will be generated by oil and gas projects. The short-range CIP shall establish the basis for the County's development fees, improvement district assessments and development agreement provisions for financing facilities and services. The CIP shall be updated annually.

The long-range CIP should be updated at least once every five years or when significant changes to the base systems modify the County's long-term capital and service investment strategies (*e.g.*, changes in service areas, changes in service demand or delivery patterns). The CIP should list short-term projects needed to maintain existing levels of service, with each project being assigned a budget and a time frame for completion. The CIP shall delineate the proportion of project costs that is designed to provide new capacity and the proportion that is required to fund existing deficiencies. This delineation will enable the County to quantify the capital costs associated with new development and to monitor the expenditure of development fees.

The CIP is the mechanism by which the County provides new public facilities and expansion of the capacity of public facilities and services, which are needed to accommodate oil and gas projects. Through the CIP, the County intends to use all reasonable means to provide the public facilities and services needed to accommodate oil and gas projects consistent with the availability of revenue sources, and contributions for capital improvements provided by state or federal sources or applicants, taking into account physical, environmental, and topographical constraints on the expansion of the capacity of public facilities.

The CIP shall:

- Prioritize the need for public facilities;
- Estimate the cost of improvements for deficiencies or repairs for which the County has fiscal responsibility;
- Estimate the cost of maintenance for capital improvements;
- Analyze the fiscal capability of the County to finance, construct and maintain improvements;
- Establish financial policies to provide for the funding of improvements from grants, development exactions and impact fees, dedications of land, taxes, assessments, rates, and charges; and
- Schedule the funding, prioritization, and construction of improvements in a manner necessary to ensure that capital improvements are provided when required based on needs identified in the Plan.

See **Section 4** for the CIP for oil and gas development.

Intergovernmental Agreements

Intergovernmental agreements (IGAs) are essentially treaties between two or more units of government for the mutual benefit of all parties. Within the context of this plan, an agreement between the County, its cities, the Pueblos, the State, State and Federal agencies, and other service providers could address oil and gas development management. Such agreements shall establish each party's rights, responsibilities and recourse within a cooperative growth management process designed to implement this Oil and Gas Element.

General Plan

This Oil and Gas Element supplements and amends the County's General Plan. As the County continues to plan for the future, planning efforts regulations and oil and gas project development approvals shall be based on the goals and policies of this Oil and Gas Element.

Plan Implementation Program

Successful implementation of this Element results from many individual actions by the County, other jurisdictions and service providers, and private decision-makers over the course of many years. The Strategies Matrix, which serves as the long-term work plan, is intended to be the most dynamic component of this Element. Through annual updates, the County can ensure that this Element continues to serve the community effectively.

The **Implementation Strategies Matrix**, shown as **Table 1**, schedules actions and recommends an initial work program, which should be updated annually to reflect community accomplishments, new approaches to community issues, changing conditions, shifting priorities and new demands. This list is not intended to be exhaustive or all inclusive – the County and other public and private entities will take numerous actions throughout the life of this plan to achieve the community goals. This list is intended to identify the highest priority tasks to be pursued over the next several years. The table identifies the goals related to each task, the timeframe for task completion, and the entities responsible for carrying out the tasks. Tasks that are not funded in the recommended years should be evaluated for removal from the list or to be shifted back for later implementation. Programs that are completed should be removed from the list.

The list of implementation strategies provides the following information in each column:

Strategy Number - the number of the implementation strategy to allow for future referencing of County activities.

Action - description of the specific strategy being recommended to implement the Plan.

Priority/Schedule - a ranking of importance based on its priority relative to other similarly-classed strategies. The ranking abbreviations are labeled in the following manner:

- 1 = This is a critical task and should be undertaken as soon as possible. Necessary for immediate implementation of the Plan. To occur now.
- 2 = This is a very important task with a sense of urgency. Necessary to implement the Plan. To occur within one year.
- 3 = This is an important task but there is no immediate sense of urgency. This task will help implement the Plan. To occur within two to five years.

Responsible Entity- the person, department or agency that is primarily responsible for initiating, advocating and/or performing the strategy. Anticipating that some functions currently performed by County staff may be contracted to qualified consultants, references are made to function (*i.e.*, 'Planning' refers to tasks that are the responsibility of the County Planning Department or planning consultant). When multiple entities are identified, they are presented in order of responsibility for the task.

Tool - the document or action necessary to carry-out the strategy.

Budgetary Impact - indicates the relative fiscal impact of the specific strategy on the County's budget. The ranking abbreviations are labeled in the following manner:

- Low = Little or no fiscal impact on the County's budget.
- Mod = Moderate; some fiscal impact, but likely to be funded within one to two fiscal periods.
- High = May be significant fiscal impact, depending on the nature of the capital investment, but may provide opportunities for the use of alternative revenue sources.

2B-2.4.3. Strategies

Implementation strategies are enumerated in **Table 1**.

Table 1: Implementation Strategies

Implementation Strategies	Priority	Responsible Entity	Action Tool	Budgetary Impact	Capital Item
1. Develop and support a County “Emergency Response Planning Committee” to include all County first responders and representatives of the oil and gas industry, mining industry and other large employers and potentially hazardous industries. The Committee will be tasked with the creation of a Countywide Hazard Mitigation and Emergency Response Plan that addresses threats from oil and gas development as well as other natural and manmade hazards.	1	County Administrator; County Attorney; Fire Chief; Sheriff	Outreach	Low	No
2. Develop and support formation of an “Oil and Gas Roundtable Forum,” which includes representatives of the Santa Fe County Growth Management Department, including Planning and Public Works, the Fire Department, the Sheriff’s Department, representatives of the Oil and Gas Industry and other service providers, such as public health officials, medical providers and emergency first responders. This group should meet on a monthly basis and be charged with collaborating and designing solutions to address the issues in Table 18 in Appendix B.	1	County Administrator; County Attorney; Oil/Gas Coordinator (proposed)	Outreach	Low	No
3. Use the Beneficial Use and Value Determination (BUD) process as a variance process and to evaluate takings claims.	1	County Attorney; Planning / Land Use	Development Review Process	Low	No
4. Use Fiscal Impact Analysis as a tool to measure the public costs and benefits of oil and gas development.	1	County Administrator; Treasurer	Development Review Process	Low	No
5. Use Environmental Impact Reports (EIR) to assess, manage and monitor adverse public nuisance effects and impacts to the natural environment.	1	County Attorney; Oil/Gas Coordinator (proposed); Planning / Land Use	Ongoing Inspection and Monitoring	Low	No

Implementation Strategies	Priority	Responsible Entity	Action Tool	Budgetary Impact	Capital Item
6. Adopt amendments to the Land Development Code to manage oil and gas development. Such amendments should include, but not be limited to, the use of standards, techniques and best management practices enumerated in Table 19 in Appendix B to ensure land use compatibility and protect existing community resources.	1	County Attorney	LDC	Moderate	No
7. Pursue a full range of funding sources and mechanisms to provide adequate public facilities and services, including, but not limited to exactions, dedications, user fees and development agreements.	1	County Attorney; Public Works Director; Treasurer	CIP; Budget; LDC	Low	No
8. Use Transportation Impact Analysis to assess, manage and monitor impacts to the roadway system.	1	County Attorney; Oil/Gas Coordinator (proposed); Public Works Director	Development Review Process	Low	No
9. Adopt a short- and long-range Capital Improvements Plan (CIP), as further described in Section 4 .	1	Treasurer	CIP; Budget	Low	No
10. Coordinate with State departments and other statewide or federal agencies that have a role in the planning, permitting or regulation of oil and gas development.	1	County Attorney; Oil/Gas Coordinator (proposed);	Outreach; Development Review Process	Low	No
11. Work closely with the Oil and Gas industry to prevent and respond to emergencies and fires and to cooperatively address issues related to oil and gas and as enumerated in Table 20 in Appendix B .	2	Oil/Gas Coordinator (proposed)	Outreach	Moderate	Yes
12. Adopt an amendment to the Land Development Code that establishes an ecotourism overlay	2	County	LDC	Moderate	No

Implementation Strategies	Priority	Responsible Entity	Action Tool	Budgetary Impact	Capital Item
district that provides a higher level of protection for natural resources and supports the establishment and operation of ecotourism-related businesses.		Attorney			
13. Continue to update and improve the Oil and Gas Suitability Analysis including, but not limited to, the tasks enumerated in Table 21 .	2	Planning / Land Use; County GIS	LDC; Development Review Process	Moderate	No
14. Support formation of a special Rural Crimes Unit to work closely with the Oil and Gas Industry and address issues related to oil and gas, as enumerated in Table 22 in Appendix B .	3	Sheriff	Outreach	Moderate	Yes
15. Coordinate with County Extension Office to identify alternative incentives that support farming and ranching.	3	Planning / Land Use; Economic Development	Outreach	Low	No
16. Support an increase the State fines associated with violations of state statutes and administrative rules. The current fine structure for violations has not been amended since 1935 and fails to serve as a deterrent for violators.	3	County Attorney; Treasurer	County Code	Low	No

2B-3. Oil Suitability Analysis

2B-3.1. Oil and Gas Overlay Zoning District

An overlay district is a zoning designation the County may use to create additional zoning requirements for a specific use or area, while maintaining the underlying base zoning requirements. Rather than changing the standards in each zoning district to accommodate oil and gas development, an oil and gas overlay district allows proper standards for oil and gas development to be applied wherever an oil and gas project is applied for.

An overlay district can be used to, among other things: protect public health, safety and welfare, preserve quality of life and important resources, protect the environment, ensure compatibility of oil and gas projects with other development and assure adequate public facilities are fully funded and available. An oil and gas overlay district shall be used to authorize a subsequent special use and development permit, impose additional zoning requirements, such as performance standards and setbacks, and ensure planning and analysis show that a development is appropriate before it progresses further into the approval process.

The process requires that each oil and gas project be rezoned to an oil and gas overlay district classification. The proposed development must submit specified plans and studies to determine potential impacts of the development. Potential studies include: an environmental impact report, an adequate public facilities and services assessment, a traffic impact assessment, a geohydrology report, an emergency response and preparedness plan, a fiscal impact analysis, and a water availability assessment.

The planning objective behind these studies, assessments, plans, and reports is to ensure that impacts to surrounding uses and resources will be fully understood before a rezoning decision is made. To facilitate such, the applicant will be required to provide a detailed description of the proposed oil and gas activities to include items such as:

- The planning objectives and the character of the development to be achieved through the overlay, and the approximate phases in which the exploration and drilling for and extraction of oil and gas from the property will occur.
- The approximate location of all neighboring development areas, subdivisions, residential dwellings, neighborhoods, village and town centers, commercial and industrial facilities and structures within five (5) miles of the site perimeter.
- The number and type of drilling wells proposed, and the approximate location, arrangement, size, floor area ratio of any buildings and structures and parking facilities related to the drilling or exploratory activities.
- The proposed traffic circulation plan, including number of daily and peak hour trips to and from the site and the proposed transportation routes to the nearest intersection with I-25 (and S 285 if located in the Galisteo Basin).
- The approximate location of all fire, police, and emergency service facilities and all roads shown on the capital improvement plan, budgets and programs for the area, floodways, floodplains, wetlands or other natural resource areas surrounding the applicant's property; location of historic, cultural and archeological sites and artifacts; steep slopes greater than 11% grade; wildlife and vegetation habitats and habitat corridors; and all of the above within five (5) miles of the concept plan site perimeter.
- A statement explaining how the proposed overlay complies with the vision, goals, objectives, policies and strategies of the County's General Plan, Oil and Gas Element, Growth Management Element and any area plan covering the property, including but not limited to, the Galisteo Basin Growth Management Area Plan.
- A statement or visual presentation of how the overlay will relate to and be compatible with adjacent and neighboring areas, within the five (5) mile radius of the project site perimeter.

The reviewing body will then consider the description, studies and reports in its determination of whether rezoning is appropriate. If rezoning is approved, the overlay district also sets forth specific zoning and performance standards oil and gas development must follow. When taken as a whole, the overlay district provides a fair and efficient system for engineering, planning, environmental regulation and monitoring of oil and gas activities.

2B-3.2. Environmental Impact Report (EIR)

This Element recommends the use of an Environmental Impact Report as part of the development review process for oil and gas development. An Environmental Impact Report (EIR) is a study that allows the County and the public to examine the environmental impact of a project, identify possible ways to minimize any significant impacts, and consider reasonable alternatives to the project. The County will use the information in the EIR along with other information presented in the development application in making a decision on whether to approve the application.

An EIR will be required as part of an application for an oil and gas development project. Applicants will be required to complete and submit an EIR to the County. Each EIR must include information about the project's impact on:

- wildlife and vegetation natural habitats and corridors;
- flood plains, floodways, stream corridors and wetlands;
- steep slopes and hillsides;
- air and water pollution;
- global warming, transportation congestion, excessive energy consumption from vehicle miles traveled;
- priceless archeological, historical and cultural artifacts and resources reflecting Hispanic, Anglo and Indian Pueblo civilizations;
- toxic chemical pollution and related diseases and conditions affecting the health and safety of current and future residents; and
- open space and scenic vistas.

Each EIR must also include a consideration of project alternatives, including a "no project" alternative, and measures to minimize the impact of the project on the environment.

Reviewing an EIR prior to making a decision allows the County to consider the effects of the project in the full environmental context. The EIR's description of feasible measures is meant to minimize significant adverse impacts, including inefficient and unnecessary consumption of energy and pollution attributable to the project that contributes to global warming, expand the options available to the County and enable better decision making.

Considering alternatives allows the County to fully understand the impact of the project and consider ways to work with the developer to lessen the project's impact on the environment.

2B-3.3. Transfer of Development Rights (TDR)

A transfer of development rights (TDR) program specifies "sending" zones, which are areas appropriate for surface protection, and "receiving zones" which are areas more appropriate for surface development. Development rights are transferred from one parcel to another through purchase and resale via a development rights bank or through direct purchase /resale between property owners. Once the development rights from a property have been sold, the land is placed in a permanent conservation easement.

The TDR program would apply only to the right to develop drilling sites on the surface of the land, and would not apply to subsurface mineral rights. The right to develop a surface drill site would be transferred to a more appropriate parcel in order to access the same subsurface minerals.

The County can use a transfer of development rights program to allow oil and gas projects which require relief by reason of surface constraints (due to adverse effects and impacts upon environmental, water, historic, cultural and archaeological resources and public facilities and services) to transfer one or more rights to develop oil and gas drill sites to receiving properties based on the following purposes:

- Conserve agriculture, ranch, and forestry uses of land;
- Protect lands and structures of cultural, architectural, and historic significance;
- Ensure that owners of protected may make reasonable use of their property by transferring their right to develop to more appropriate locations;
- Provide a mechanism whereby oil and gas development rights may be reliably transferred;
- Ensure that development rights are transferred to oil and gas mineral estates and leases that have received development approvals;
- Authorize the County to create a TDR Bank, whereby oil and gas development rights may be purchased and conveyed by the County, to stabilize the market in development rights and to regulate or control the development property that the County intends to protect; and
- Authorize donations of development rights to the County or the TDR Bank.

2B-3.4. Land Use Model

The Oil and Gas Suitability Analysis (OGSA) is a Geographic Information Systems (GIS-based) land use model. The OGSA model was created to provide a consistent, technically defensible system for the evaluation of oil and gas proposals in the County. The model measures a wide variety of factors, such as distance to surface water, habitat value, distance to infrastructure and other environmental and community factors. Data was obtained from various local, State, Federal and Private entities. These factors are weighted in importance based on the relevance of the factor to the County's goals, objectives and policies. The model is intended to aid decision-making by assessing the impact of development on the County's natural, cultural, archaeological, economic, infrastructure and other community resources. An overview of the model, its creation, application and technical details is located in **Appendix C**.

Table 2 identifies the mitigation buffers which would be applied during the two tier development review process. Mitigation buffers are identified by the corresponding Oil and Gas Suitability Factor as a part of the model. The Oil and Gas Ordinance includes setbacks not identified in the model that are required as determined by site and project specific conditions. The maps generated by the Oil and Gas Suitability Analysis follow discussion of the model.

The underlying data of the model is raster, or a continuous grid of cells, all the same size, all lining up exactly on top of each other. Each raster layer represents a continuous area, such as in or out of a floodplain, and has over 21 million cells, each representing 32 square feet on the ground. Using raster math, each layer is summed to make the final raster layer, assigning a final score for the development suitability.

This suitability analysis is used to determine the appropriateness of proposed development for its geographic location. Land suitability is defined in the following manner:

- **High Cultural and Environmental Sensitivity** – In these areas, there is a presumption that land is not suitable for oil and gas well development. This does not preclude oil and gas development, but requires a showing by the applicant that sufficient conditions exist that, should oil and gas development occur, on- and off-site mitigation attributable to the proposed development is required and addressed.
- **Moderate Cultural and Environmental Sensitivity** – In these areas, there is no presumption regarding suitability (that land is suitable or not suitable for oil and gas development).

- **Low Cultural and Environmental Sensitivity** – In these areas, there is a presumption that land is suitable for oil and gas development. This does not guarantee that a proposed development is appropriate for any specific location.

2B-3.4.1. Applicability

The OGSA currently exists only for the Galisteo Basin Area. Due to the incredible natural and cultural richness and sensitivity of the Galisteo Basin Area, combined with the location of the currently proposed oil and gas projects in and near sensitive areas of the Galisteo Basin, the creation of the OSGA for this area was prioritized. Additionally, due to the significance of the Galisteo Basin Area, a greater amount of reliable data to create the model was available in comparison to the remainder of the County. This Element recommends that the County use the OGSA as a template to expand on a Countywide basis. In the event of oil and gas project applications in other parts of the County, such a model will provide guidance on the location of low, moderate and high suitability areas.

2B-3.4.2. Model Maintenance and Updating

As expanded and improved datasets become available through enhanced public information, the development review process and other venues, the model should be updated to provide the fullest and most accurate information available. The model should be updated on an annual basis, or more often as necessary due to the availability of updated data. Through accurate and relevant data availability the County can make informed land use decisions.

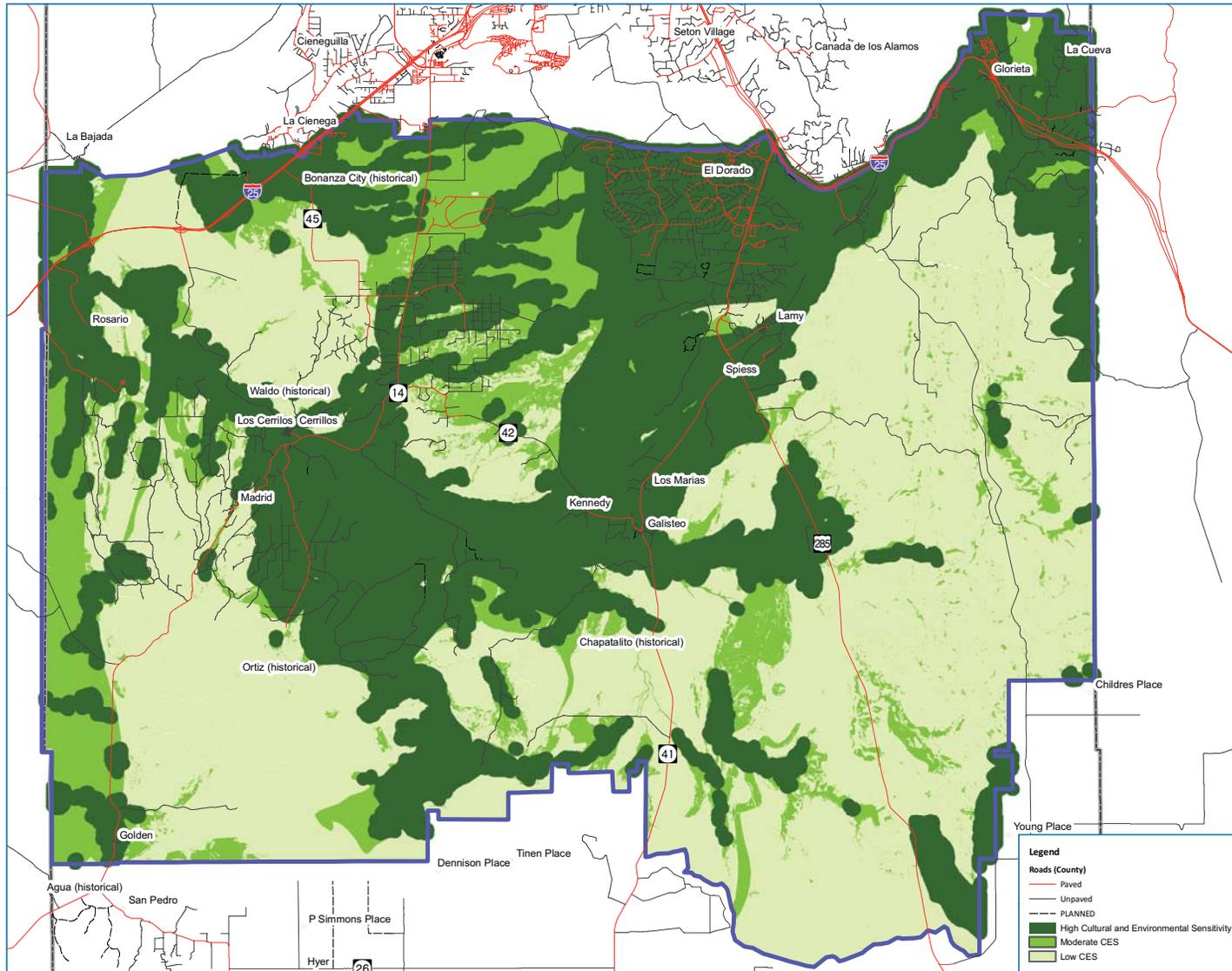
Table 2: Mitigation Buffers

Oil and Gas Suitability Analysis (OGSA) Model				
Suitability Factors		Presumption of Oil / Gas Suitability		
		High Suitability	Moderate Suitability	Low Suitability
Factor 1	Identify farms / ranches to be protected			
1.1	Identify farm / ranch size	500 acres or more	40 to less than 500 acres	less than 40 acres
Factor 2	Identify lands suitable for protecting native plant and animal species			
2.1	Identify lands with high amphibian species richness	low value	moderate value	high value
2.2	Identify lands with high reptilian species richness	low value	moderate value	high value
2.3	Identify lands with high bird species richness	low value	moderate value	high value
2.4	Identify lands with high mammal species richness	low value	moderate value	high value
2.5	Identify lands with undisturbed natural grasslands	greater than 1/4-mile from area	1/4-mile or less from area	within area
2.6	Identify lands with Rocky Mountain Conifer Woodlands	greater than 1/4-mile from area	1/4-mile or less from area	within area
2.7	Identify lands with undisturbed forested areas	greater than 1/4-mile from area	1/4-mile or less from area	within area
Factor 3	Identify lands suitable for protecting surface and groundwater quality			
3.1	Identify lands proximal to natural springs	greater than 1/4-mile from location	from 1,000' to 1/4-mile from location	within 1,000' of location
3.2	Identify lands proximal permanent water bodies	greater than 1/4-mile from area	from 1,000' to 1/4-mile from area	within 1,000' of area

Oil and Gas Suitability Analysis (OGSA) Model				
Suitability Factors		Presumption of Oil / Gas Suitability		
		High Suitability	Moderate Suitability	Low Suitability
3.3	Identify lands proximal to drainage buffers	greater than 1/4-mile from area	from 1,000' to 1/4-mile from area	within 1,000' of area
3.4	Identify lands within riparian and wetlands inventory	greater than 1/4-mile from area	from 1,000' to 1/4-mile from area	within 1,000' of area
3.5	Groundwater sensitivity (DRASTIC model)	low value	moderate value	high value
3.6	Aquifer susceptibility	low value	high value	moderate value
Factor 4	Identify lands with important physical characteristics			
4.1	Identify lands within the 100-year floodplain	greater than 1/4-mile from area	1/4-mile or less from area	within area
4.2	Identify steep slopes	below 10%	10% to 25%	greater than 25%
4.3	Faults	greater than 1/4-mile from location	from 1,000' to 1/4-mile from location	within 1,000' of location
Factor 5	Identify areas of cultural, historical and archaeological importance			
5.1	Identify lands proximal to recorded archaeological, historical, and paleontological sites of demonstrated or potential significance, major Pre-Columbian pueblo sites and areas of importance to Native American groups	low value	moderate value	high value
Factor 6	Identify lands with scenic value			
6.1	Identify scenic highways, dirt roads and railways	greater than 1,000' from centerline	from 500' to 1,000' from centerline	within 500' of centerline

Oil and Gas Suitability Analysis (OGSA) Model				
Suitability Factors		Presumption of Oil / Gas Suitability		
		High Suitability	Moderate Suitability	Low Suitability
6.2	Combined scenic quality (intrinsic and public perceived scenic values)	low value	moderate value	high value
6.3	Identify lands within delphi-based scenic landmarks, outcrops, peaks, gaps and geologic features	greater than 1,000' from area	from 500' to 1,000' from area	within 500' of area
Factor 7	Identify public facilities and services			
7.1	Identify lands proximal to community / public water system	greater than 4-miles	from 2-miles to 4-miles	less than 2-miles
7.2	Identify lands proximal to paved roadway	less than 1-mile	from 1-miles to 2-miles	greater than 2-miles
7.3	Identify lands proximal to fire station	less than 2-miles	from 2-miles to 4-miles	greater than 4-miles
7.4	Identify lands proximal to improved trails	greater than 1/4-mile from location	from 1,000' to 1/4-mile from location	within 1,000' of location
Factor 8	Identify land use compatibility			
8.1	Identify lands proximal to designated open space	greater than 1/4-mile from area	from 1,000' to 1/4-mile from area	within 1,000' of area
8.2	Identify lands proximal to designated conservation easements	greater than 1,000' from area	from 500' to 1,000' from area	within 500' of area
8.3	Identify lands proximal to existing residential structures	greater than 1,500' from location	from 750' to 1,500' from location	within 750' of location
8.4	Identify lands proximal to existing non-residential structures	greater than 800' from location	from 400' to 800' from location	within 400' of location

Composite Oil and Gas Suitability



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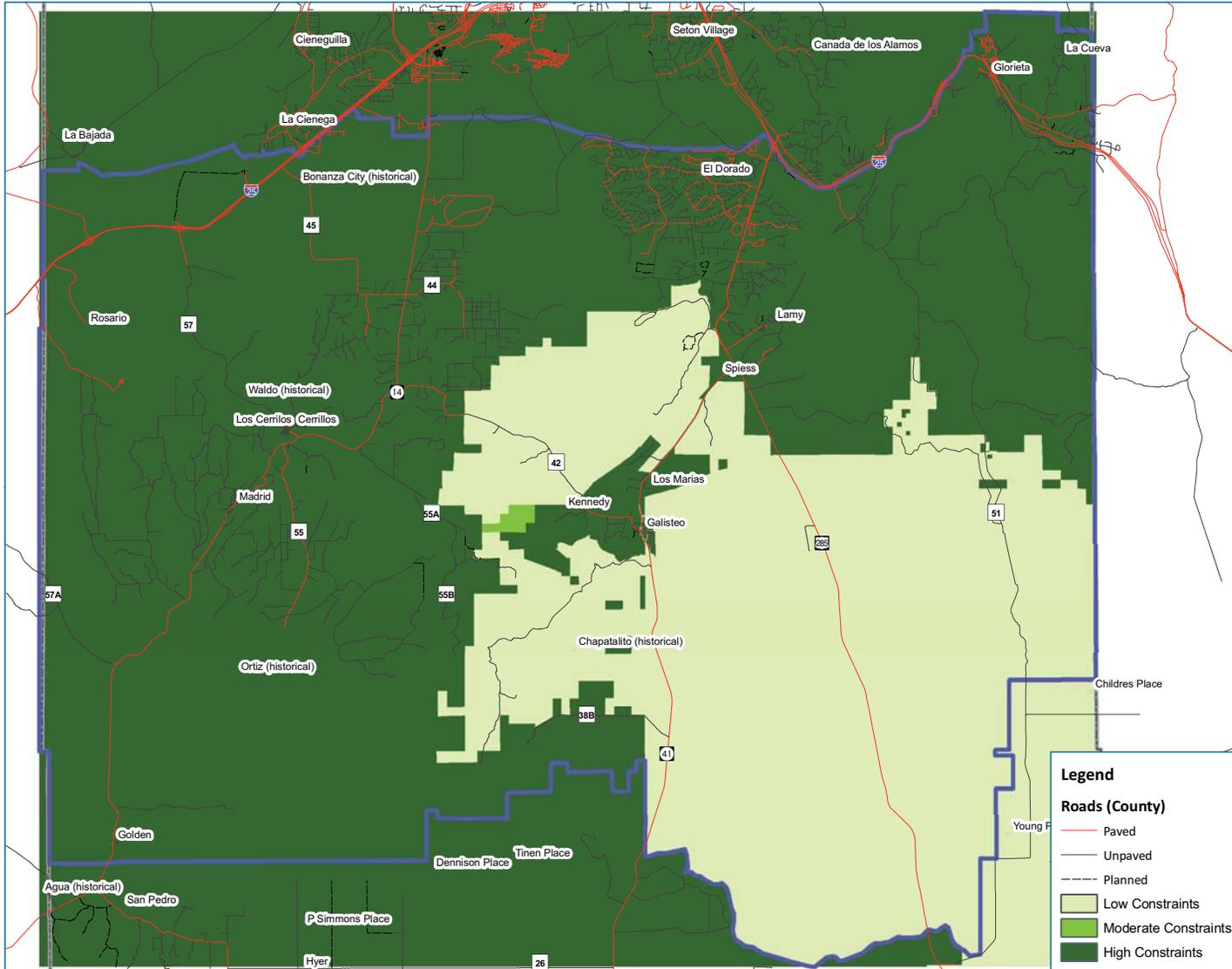
Map Analysis

The Composite map is the output of the model that takes into consideration the 26 Oil and Gas Suitability Analysis (OGSA) factors. High Cultural and Environmental Sensitivity (CES) represent areas calculated to have the most constraints while "Low CES" would mark the areas that could be most suitable for the location of oil and gas industry.

The model and resultant maps are to be updated annually based on expanded and updated information.

It should be noted that this map, as well as all factor maps, should be used as a guide for decision making and not as definitive information. The areas depicted by these maps are approximate and are provided for illustrative purposes only. While every effort has been made to ensure the accuracy, completeness, correctness, and timeliness of information presented within the maps, the burden for determining appropriateness for use rests solely with the user. All maps are provided "as is" with no warranties, express or implied.

Factor 1.1 - Large Ranch Constraints



Map Analysis

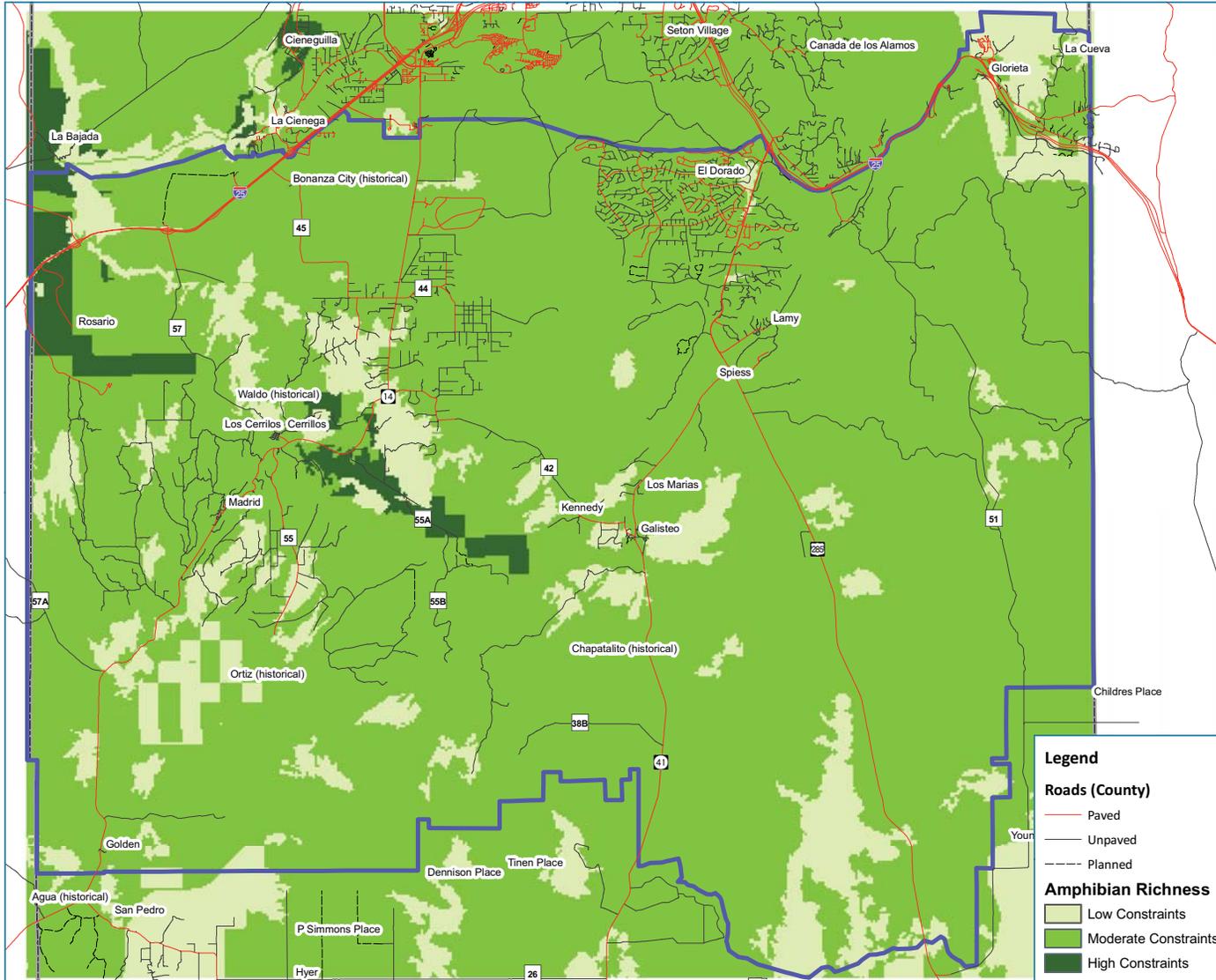
Ranch sizes are commonly used in Land Evaluation and Site Assessment (LESA) for agricultural assessment. Ranch locations were identified by Santa Fe County staff and GIS software was used to calculate ranch size indices. Generally, a larger ranch size indicates that there is more flexibility in terms of appropriate surface locations for the locations of drill sites. Larger ranches are more suitable to accommodate oil and gas production as part of a diversified agricultural environment.

"Low Constraints" includes the largest ranches which are five hundred acres or larger. "Moderate Constraints" includes ranches between 40 and 500 acres. "High Constraints" includes ranches with less than 40 acres.



Factor 2.1 - Amphibian Richness Constraints

Map Analysis

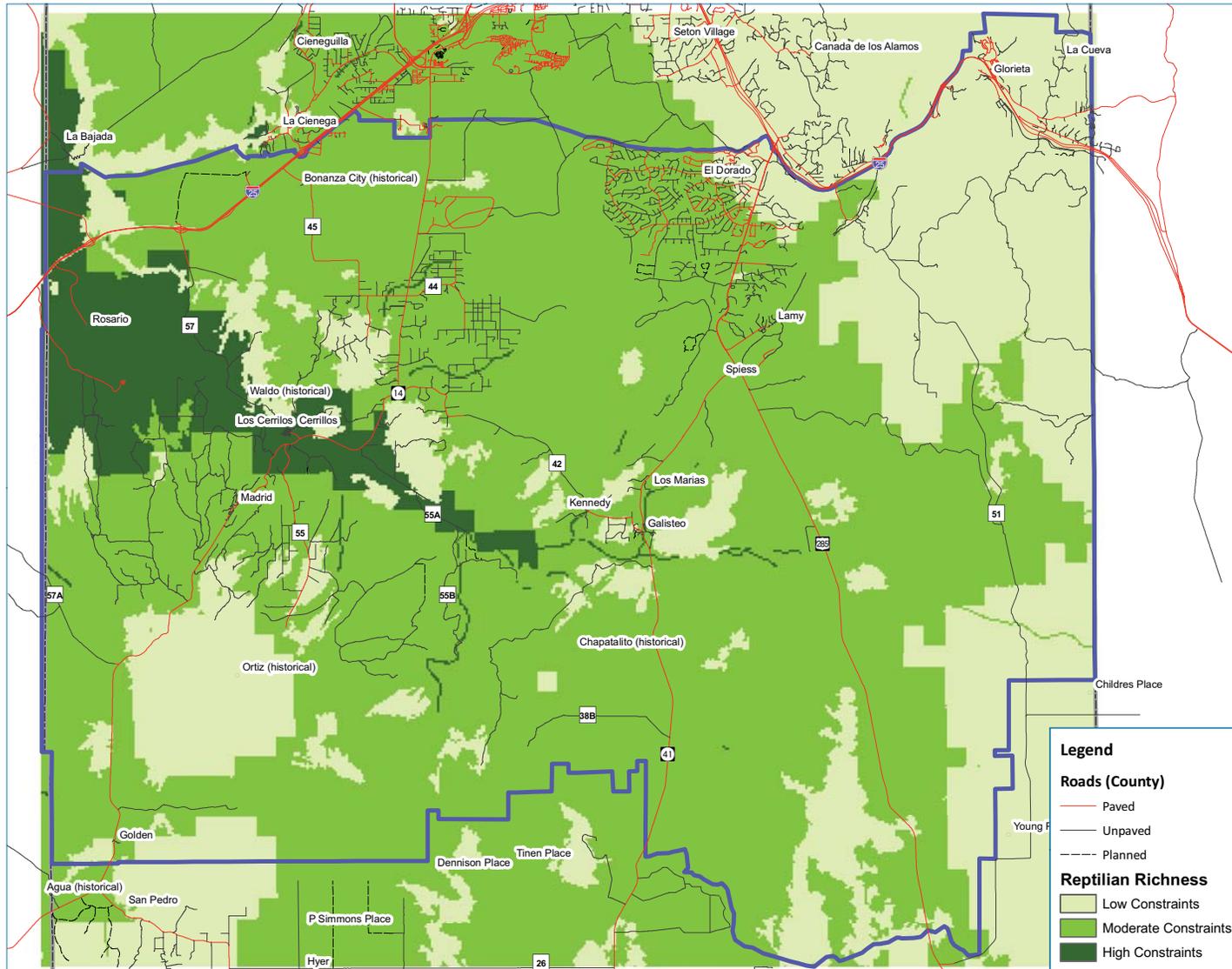


The Amphibian Richness dataset came from the New Mexico Gap Analysis Program (NM-GAP), a division of the New Mexico Fish and Wildlife Research Unit.

GAP provides an assessment of the conservation status of native vertebrate species and natural land cover types. 26 different amphibian species were considered in GAP's amphibian richness dataset. "Low Constraints" represent areas where few types of amphibian species are predicted to be located, while "High Constraints" represent locations with a predicted abundance of species types. Areas of "Low Constraints" are therefore most suitable for oil and gas drilling, as the impacts of such activities will be minimized in these areas.



Factor 2.2 - Reptilian Richness Constraints

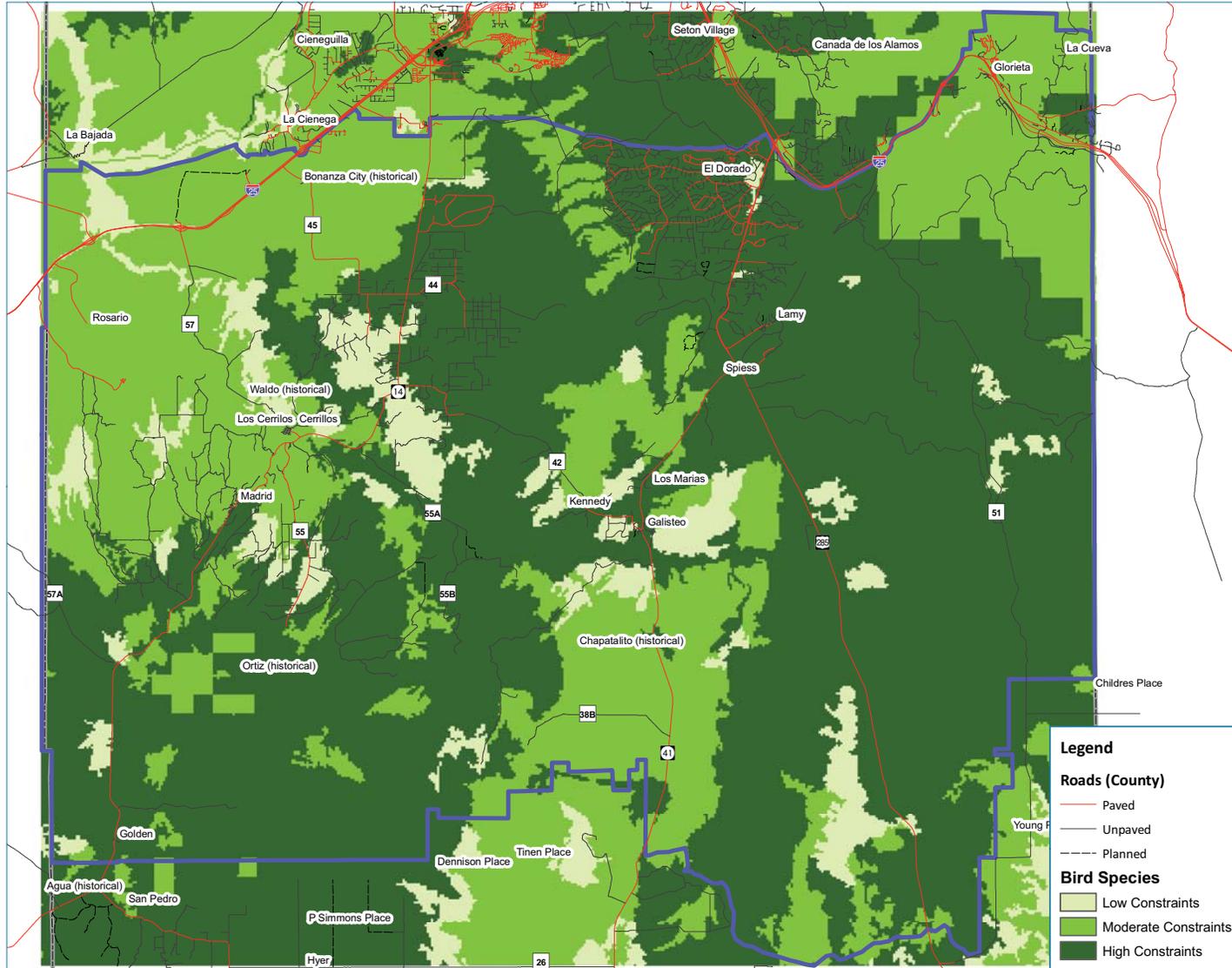


Map Analysis

The Reptilian Richness dataset came from the New Mexico Gap Analysis Program (NM-GAP), a division of the New Mexico Fish and Wildlife Research Unit.

GAP provides an assessment of the conservation status of native vertebrate species and natural land cover types. 26 different reptilian species were considered in GAP's reptilian richness dataset. "Low Constraints" are areas where few types of reptilian species are predicted to be located, while "High Constraints" represents an abundance of species types. Areas of "Low Constraints" are therefore preferred for oil and gas drilling, as the impact of such activities will be minimized in these areas.

Factor 2.3 - Bird Richness Constraints



Map Analysis

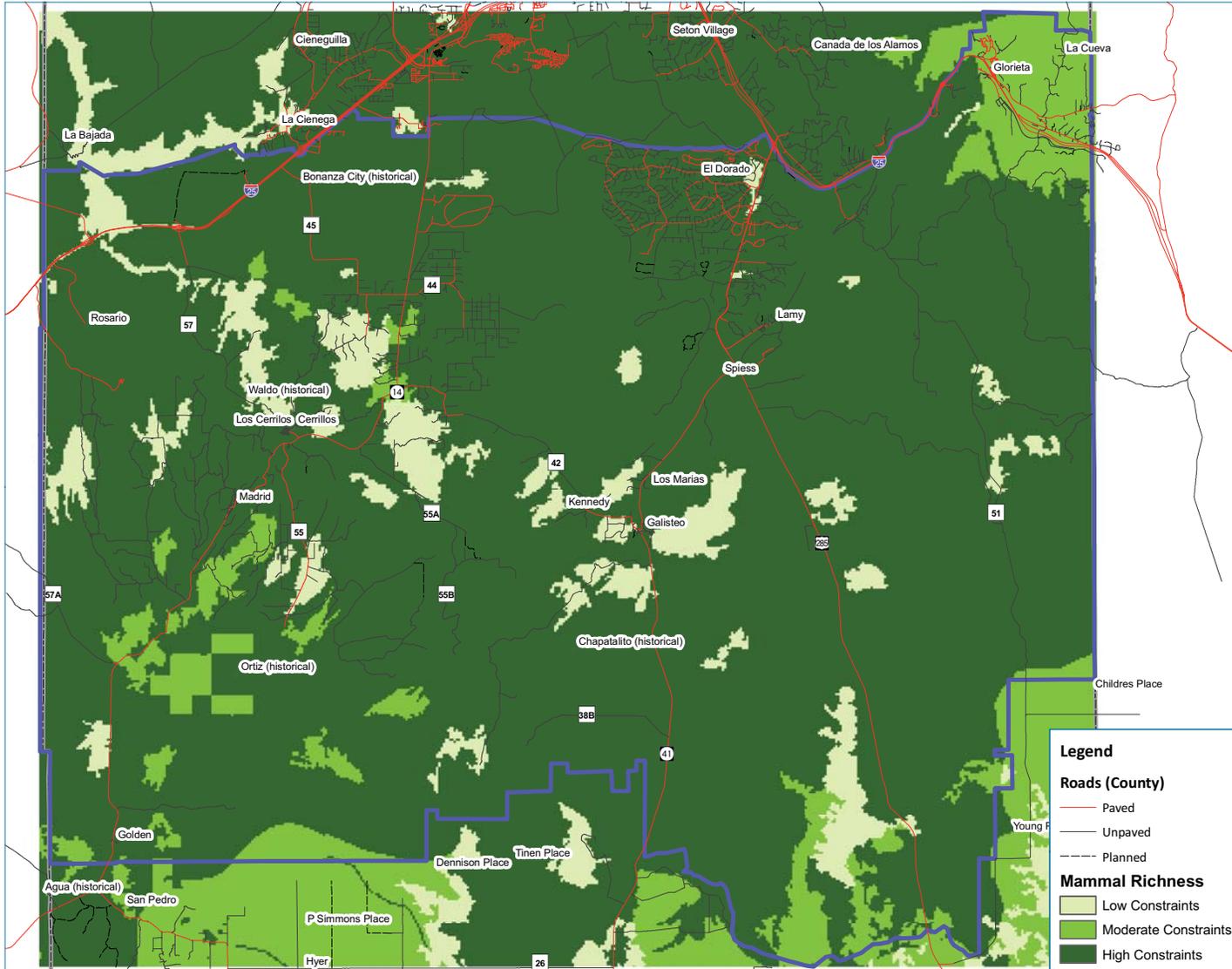
The Bird Richness dataset came from the New Mexico Gap Analysis Program (NM-GAP), a division of the New Mexico Fish and Wildlife Research Unit.

GAP provides an assessment of the conservation status of native bird species and natural land cover types. 324 different bird species were considered in GAP's bird richness dataset. "Low Constraints" are those areas where few bird species are predicted to be located, while "High Constraints" represents an abundance of species types. Areas of Low Constraints are therefore preferred for oil and gas drilling, as the impact of such activities will be minimized in these areas.



Factor 2.4 - Mammal Richness Constraints

Map Analysis

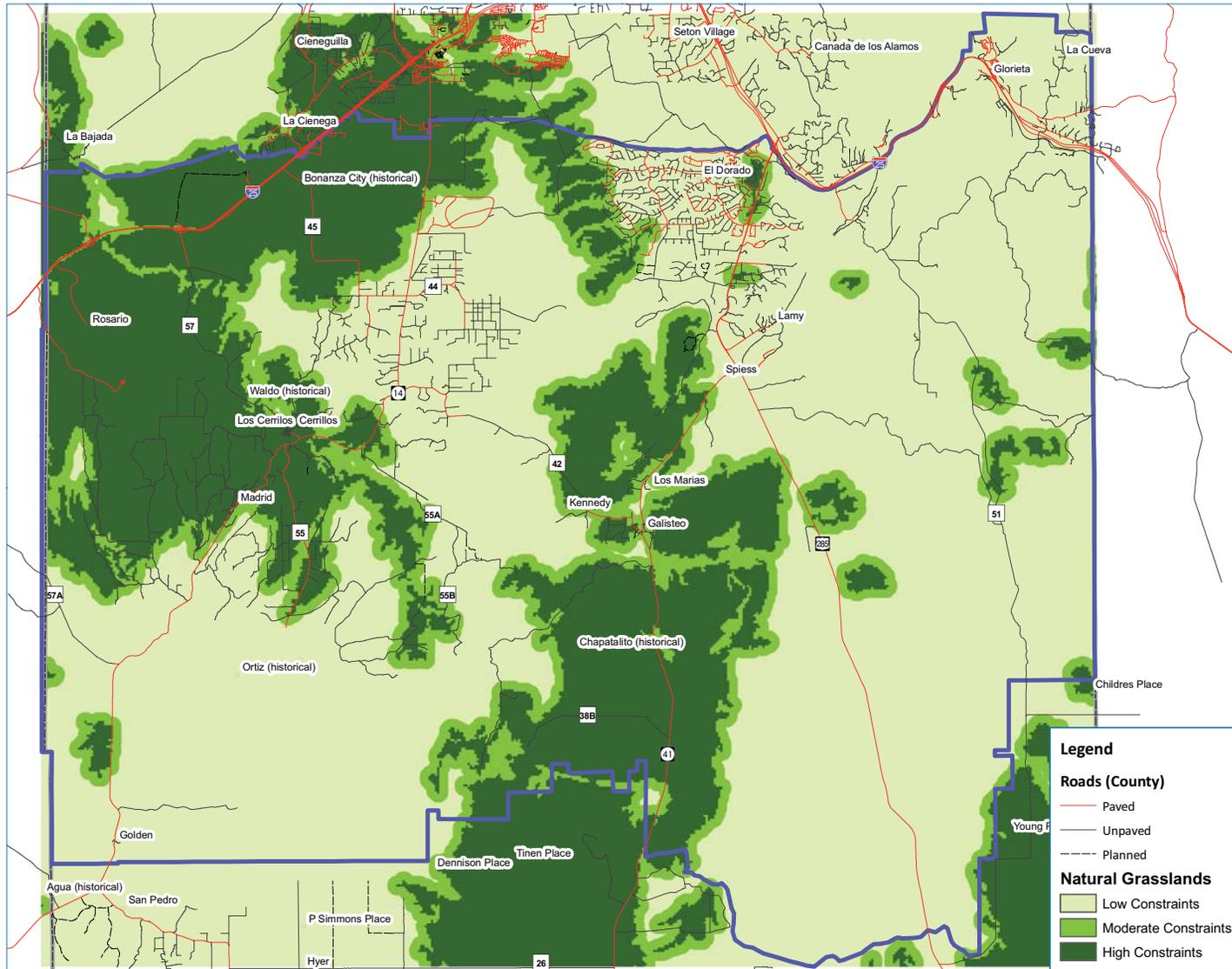


The Mammal Richness dataset came from the New Mexico Gap Analysis Program (NM-GAP), a division of the New Mexico Fish and Wildlife Research Unit.

GAP provides an assessment of the conservation status of native mammal species and natural land cover types. 138 different mammal species were considered in GAP's mammal richness dataset. "Low Constraints" are areas where few mammal species are predicted to be located, while "High Constraints" are locations of a predicted abundance of species types. Areas of "Low Constraints" are therefore preferred for oil and gas drilling, as the impact of such activities will be minimized in these areas.



Factor 2.5 - Natural Grasslands Constraints



Map Analysis

The Undisturbed Natural Grasslands dataset came from the New Mexico Fish and Wildlife Research Unit.

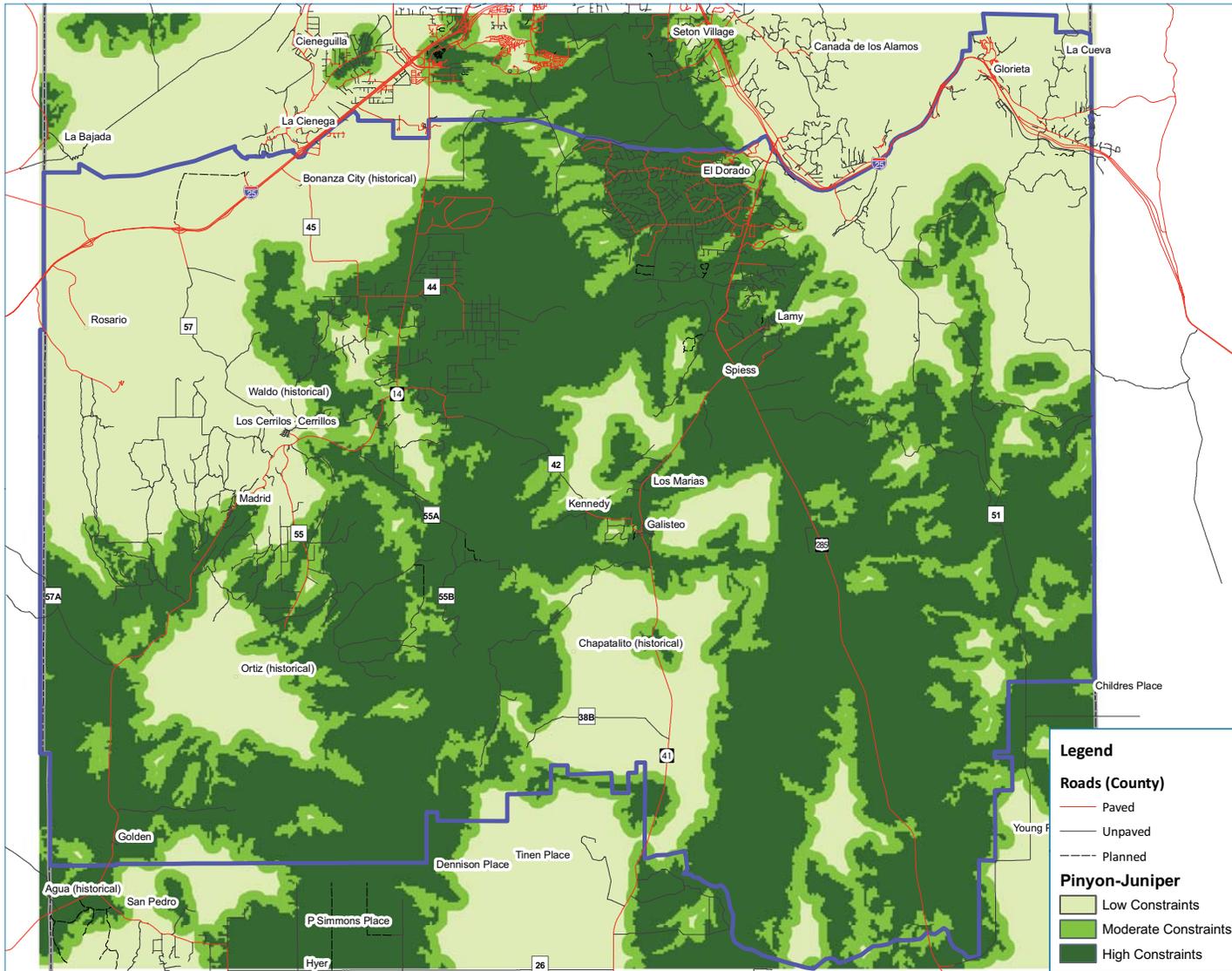
This coverage was prepared from Landsat TM imagery for integration in the national Gap Analysis Program. "High Constraints" are those areas where Grassland vegetation is very likely to exist. "Low Constraints" are areas where grassland vegetation is not likely to exist.

Oil and gas development is discouraged from areas of High Constraints, as such activities might harm the natural vegetation.



Factor 2.6 - Rocky Mtn Conifer Woodlands Constraints

Map Analysis



The Undisturbed Rocky Mtn Conifer Woodlands dataset came from the New Mexico Fish and Wildlife Research Unit.

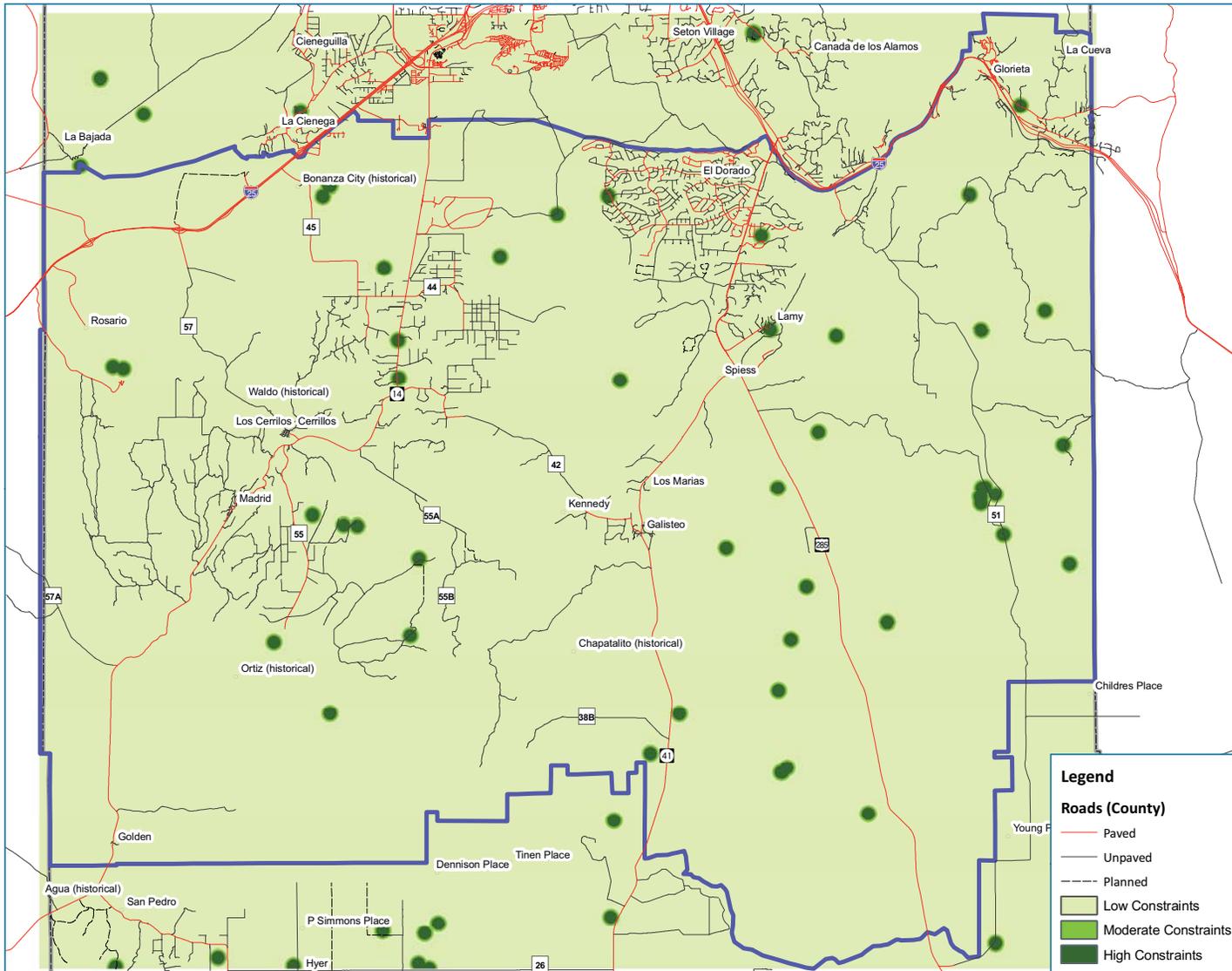
This coverage was prepared from Landsat TM imagery for integration in the national Gap Analysis Program. "Low Constraints" are areas where Rocky Mtn Conifer Woodlands vegetation is not predicted likely to exist, while "High Constraints" are areas where Rocky Mtn Conifer Woodlands vegetation is predicted likely to exist.

Areas of "High Constraints" are discouraged for oil and gas drilling, as such activities might harm the natural vegetation.



Factor 3.1 - Natural Spring Proximity Constraints

Map Analysis



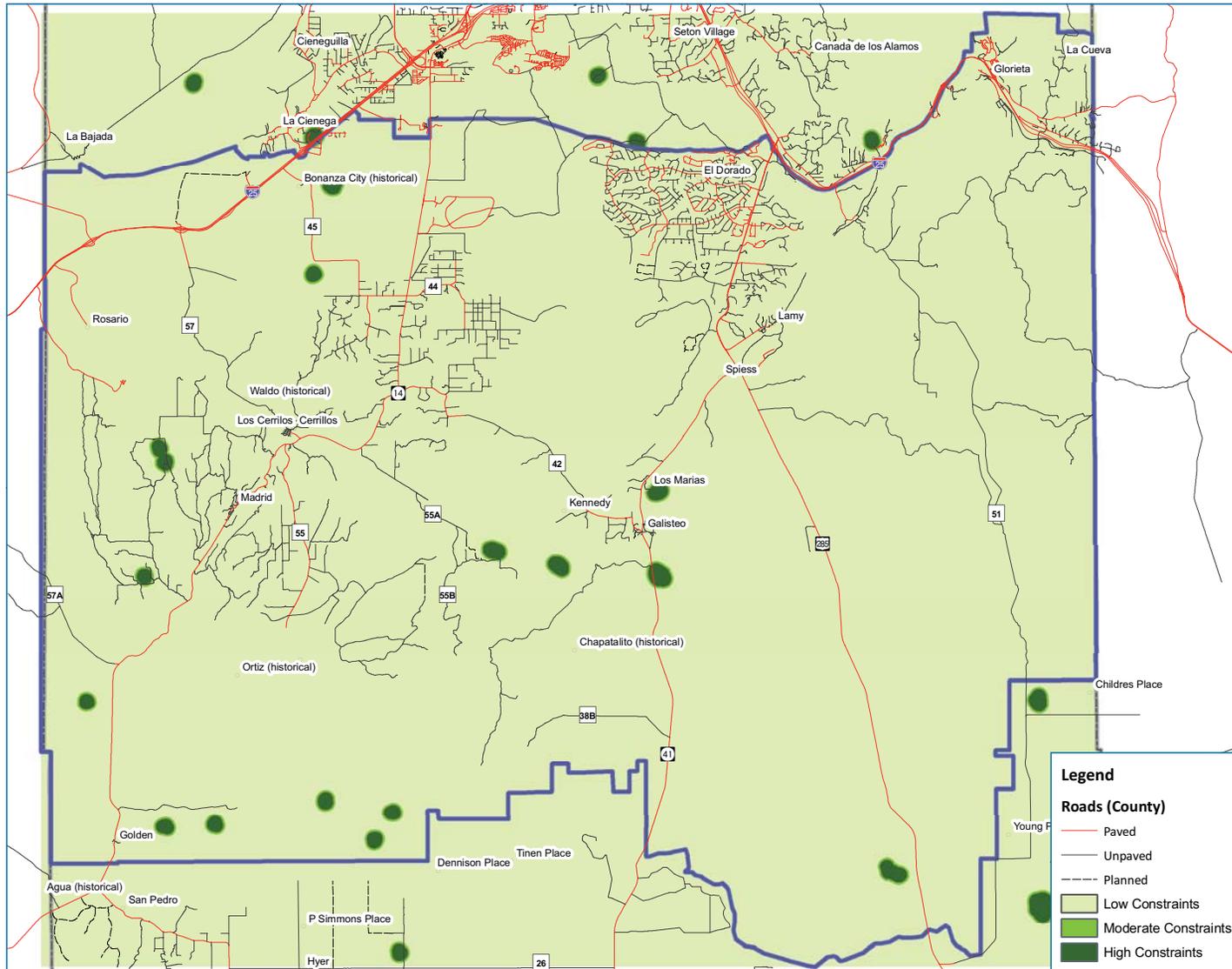
Natural Springs were taken from the the U.S. Geological Survey's National Hydrography Dataset (NHD). It is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD is a high resolution data set and was used to identify natural springs or sources of water in need of protection.

"High Constraints" are areas within 1,000 feet of natural springs. Moderate areas are within 1,000 feet and one quarter mile from natural springs. "Low Constraints" are greater than one quarter mile from natural springs and are most suitable for oil and gas development.



Factor 3.2 - Water Body Proximity Constraints

Map Analysis



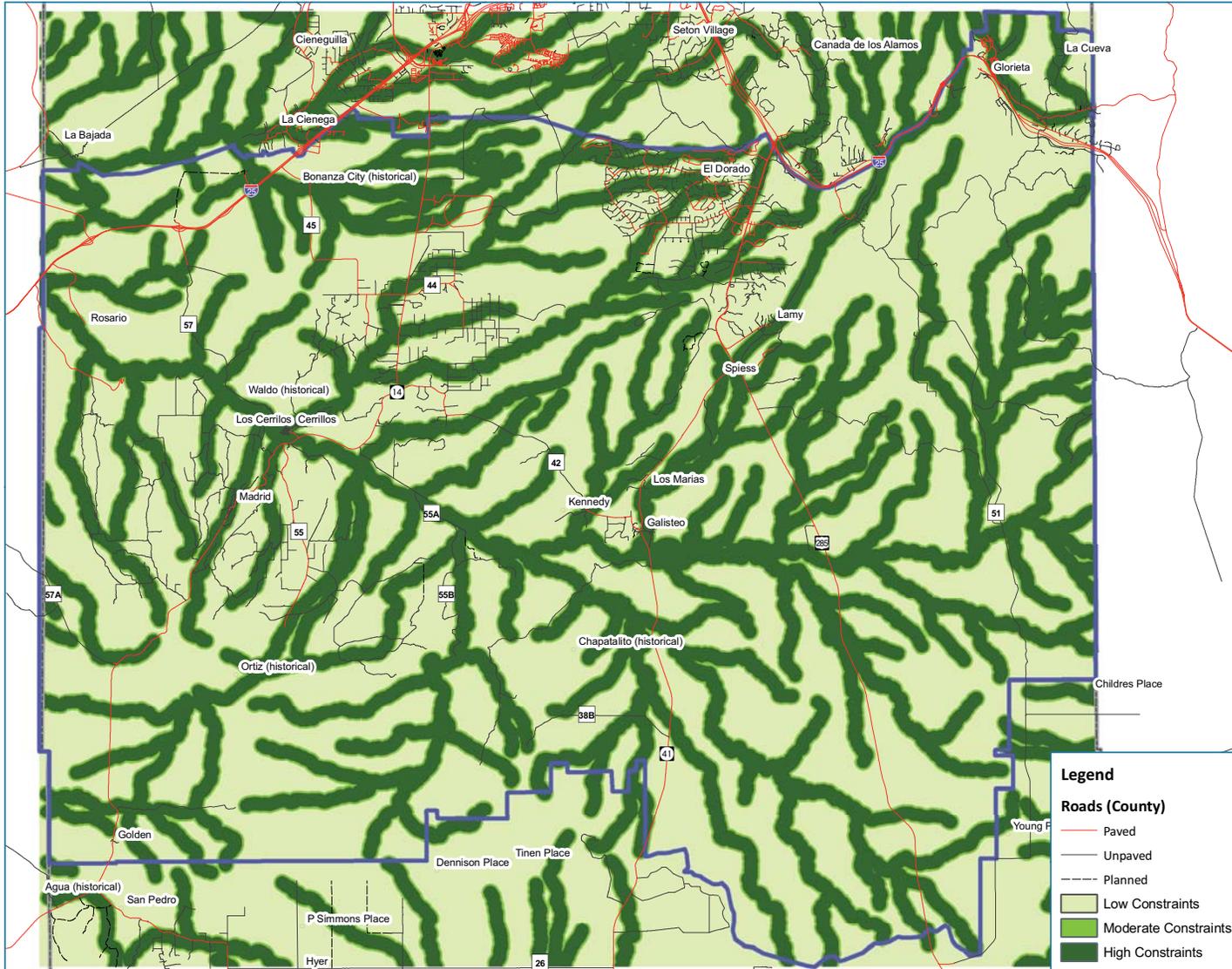
Water Bodies were taken from the the U.S. Geological Survey's National Hydrography Dataset (NHD). It is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD is a high resolution data set and was used to identify water bodies which should be protected.

"High Constraints" are locations within 1,000 feet of water bodies. "Moderate Constraints" are within one thousand feet and one quarter mile from a water body. "Low Constraints" are greater than one quarter mile from water bodies and are most suitable for oil and gas development.



Factor 3.3 - Drainage Proximity Constraints

Map Analysis



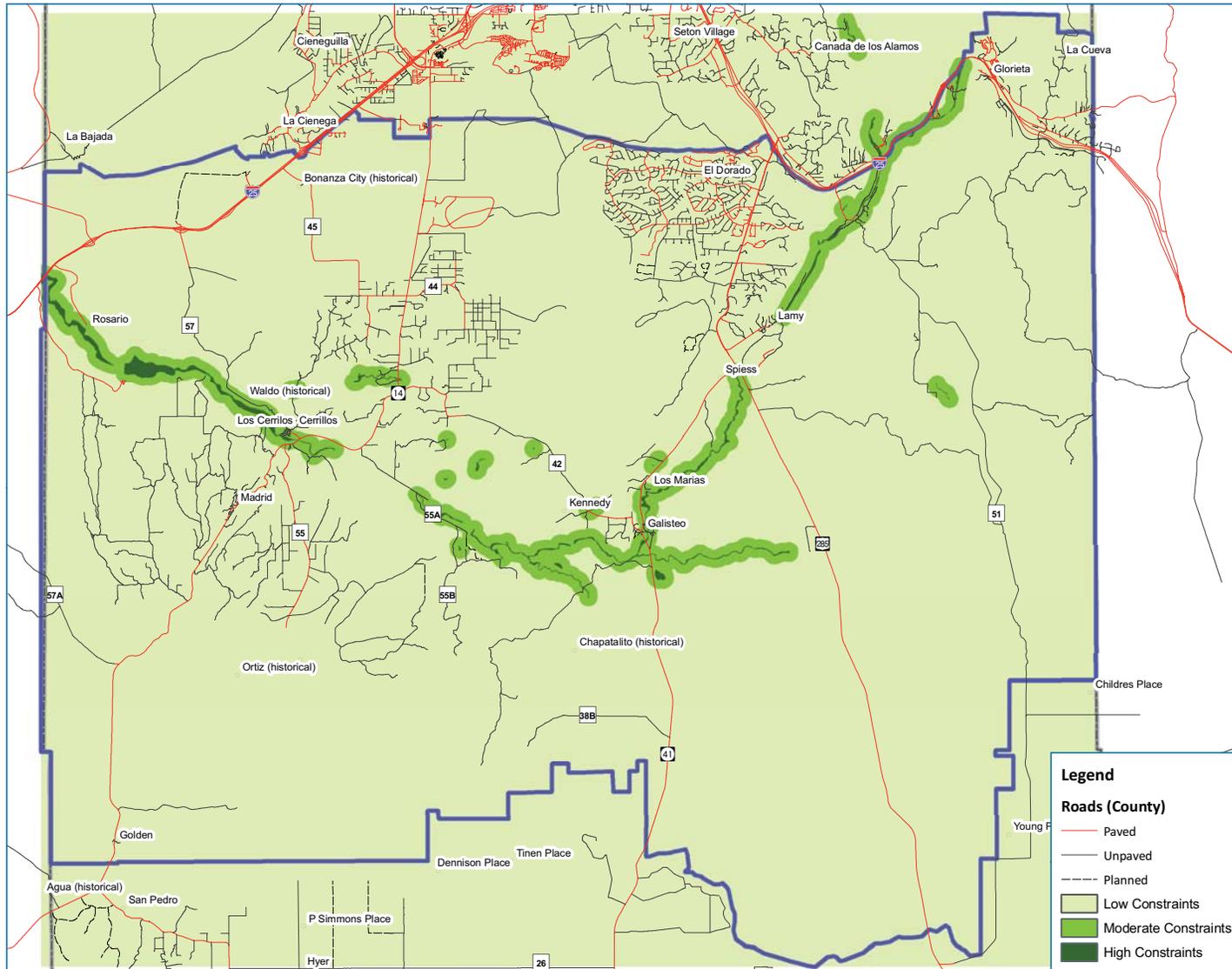
Drainage features were taken from the U.S. Geological Survey's National Hydrography Dataset (NHD). It is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD is a high resolution data set and was used to identify NHD flowlines or drainage features. NHD flowlines include: streams, rivers, canals, ditches, pipelines, artificial paths, coastlines, and connectors.

"High Constraints" are locations within 1,000 feet of drainage features. "Moderate Constraint" are between 1,000 ft hundred and one quarter mile of drainage areas. "Low Constraints" are outside the 1/4 mile buffer and are most suitable for oil and gas development.



Factor 3.4 - Riparian Area Constraints

Map Analysis



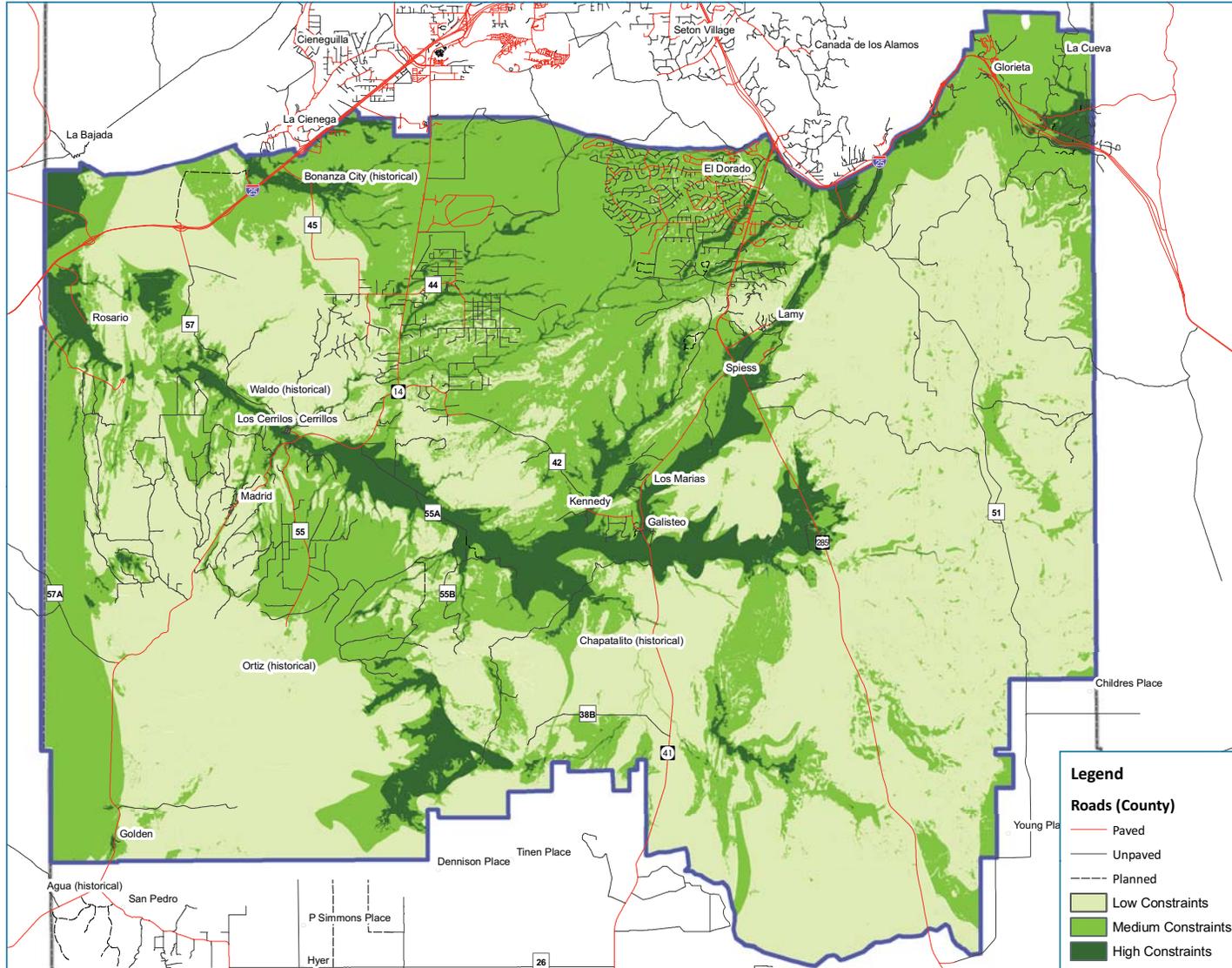
Earth Works Institute and Earth Analytic, Inc created an inventory of riparian zones. Riparian zones are areas located around streams. Riparian zones are significant because of their role in soil conservation, their biodiversity, and the influence they have on aquatic ecosystems.

"High Constraints" are those located in riparian zones. "Moderate Constraints" are located within a 1/4 mile buffer of riparian zones. "Low Constraints" are outside the 1/4 mile buffer.



Factor 3.5 - Groundwater Sensitivity Constraints

Map Analysis



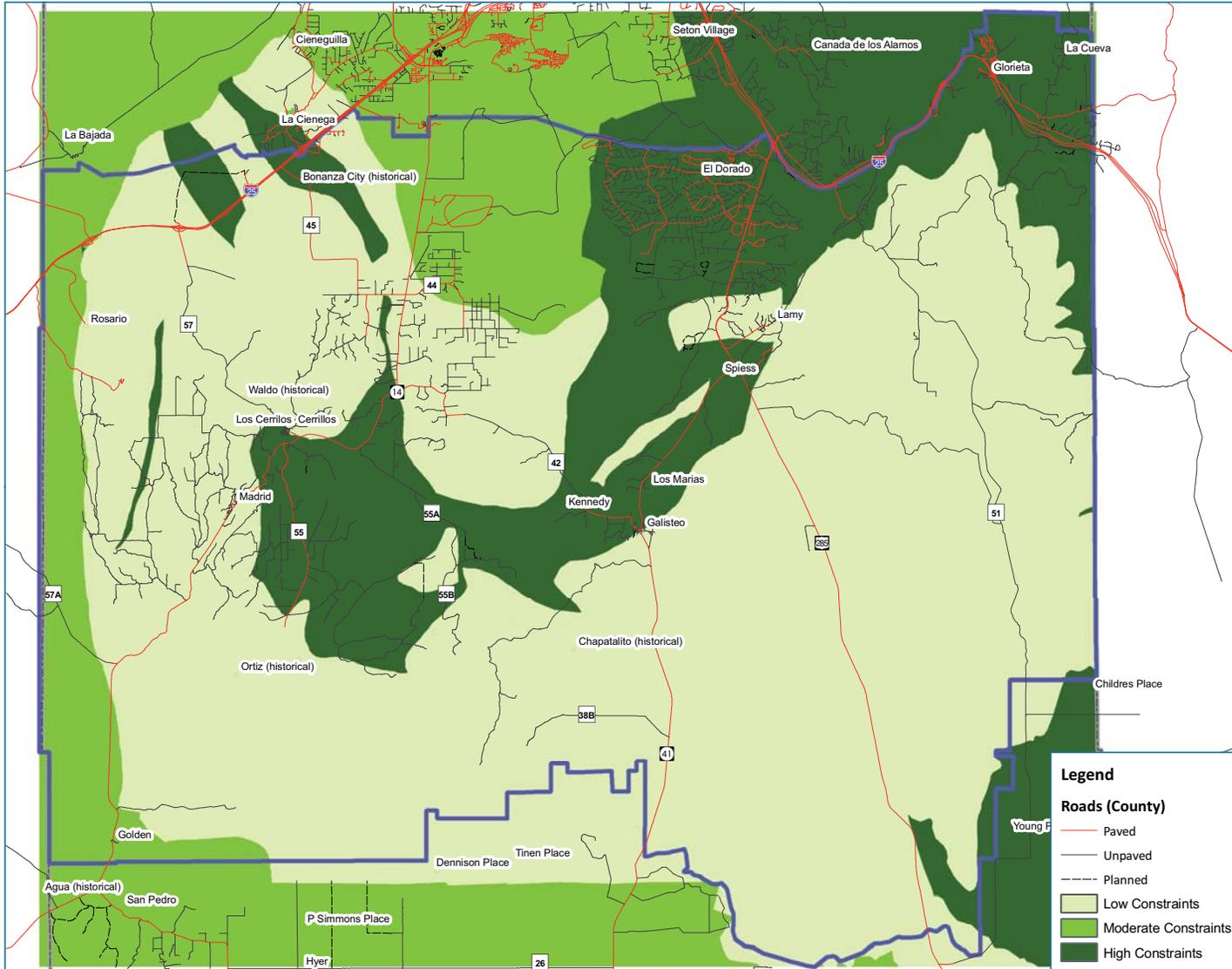
The DRASTIC model for assessing groundwater sensitivity includes seven criteria: Depth to water table, Recharge rates, Aquifer permeability, Soil type, Topography, Impact of the Vadose Zone, and Conductivity of the Vadose Zone (Aller, 1985). DRASTIC evaluates pollution potential based on weighted combination of these hydrogeologic settings.

"High Constraints" are those identified by the DRASTIC model as being highly vulnerable groundwater sites. "Low Constraints" are areas considered by the computer model to be least vulnerable to ground water pollution.



Factor 3.6 - Aquifer Susceptibility Constraints

Map Analysis

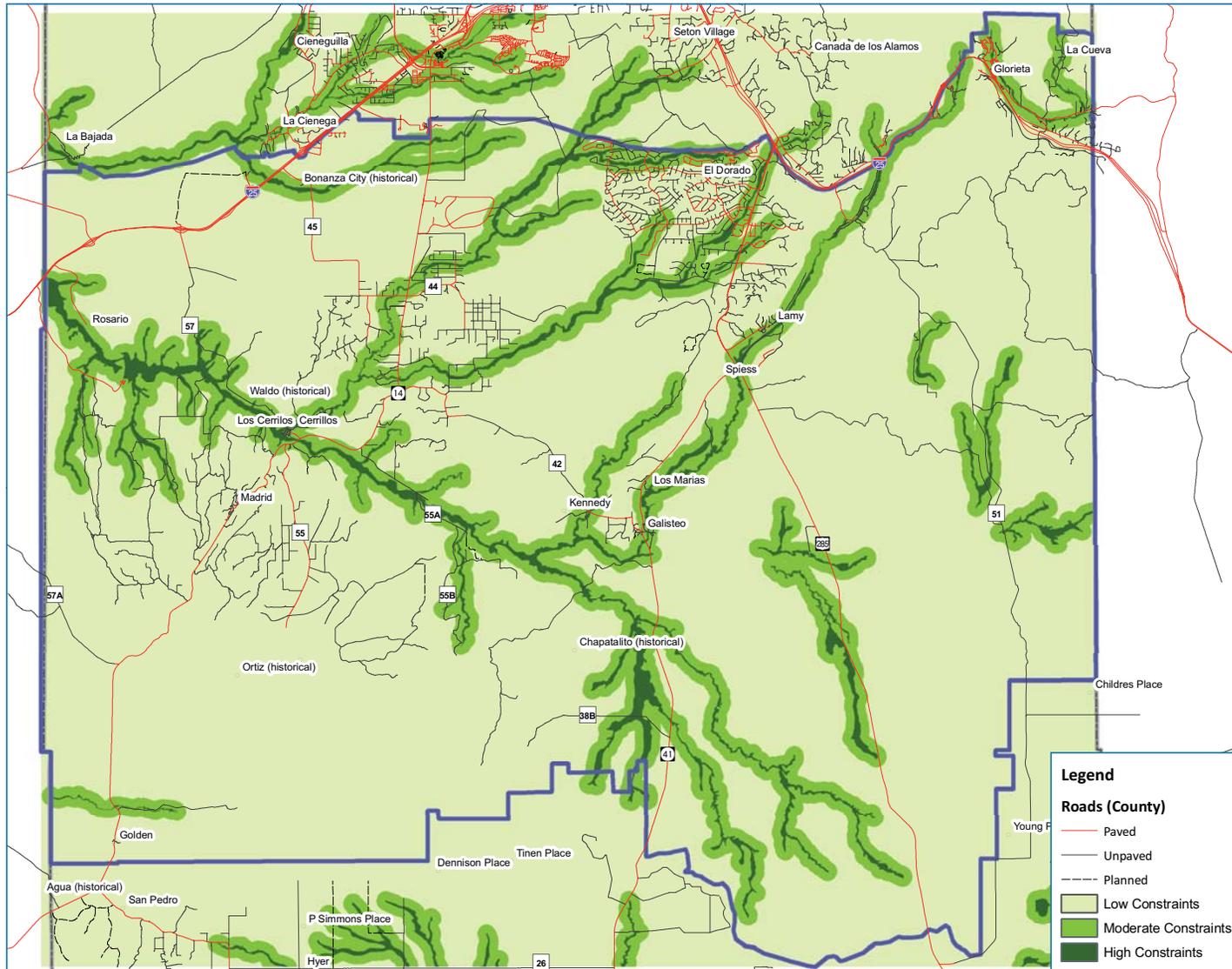


An aquifer is an underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt, or clay) from which groundwater can be usefully extracted using a water well.

For this dataset, aquifers were ranked by County staff with input from a geologist consultant to rank areas that were most susceptible to point source pollution.



Factor 4.1 - Floodplain Constraints



Map Analysis

This dataset came from the Federal Emergency Management Agency (FEMA) 100 year floodplain.

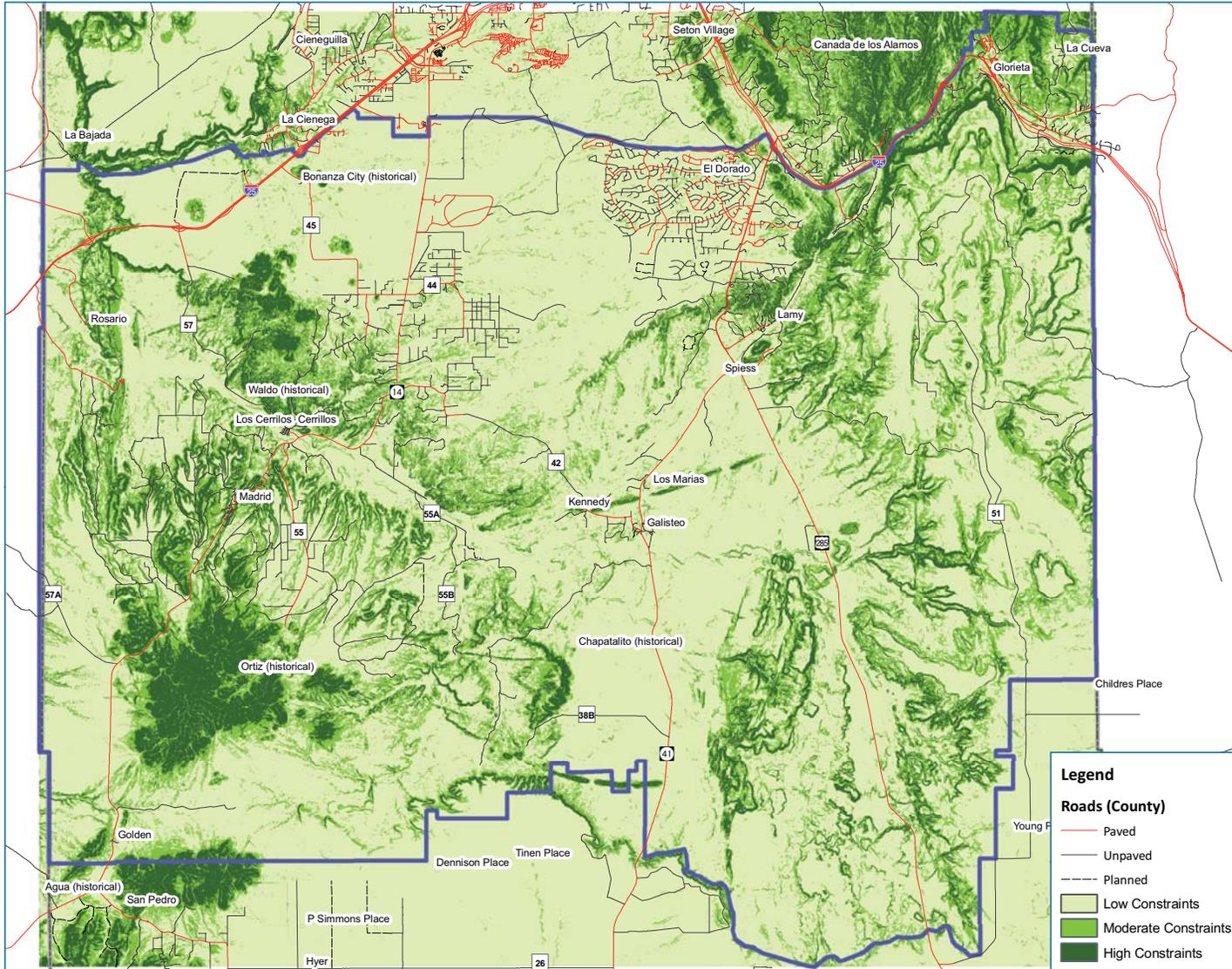
FEMA defines a 100 year flood as: a flood that has a 1% chance of being equaled or exceeded in any given year. The 100-year flood, which is the standard used by most Federal and State agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. A structure located within a special flood hazard area shown on a NFIP map has a 26% chance of suffering flood damage during the term of a 30 year mortgage. Mortgaged property within areas designated in the 100 year floodplain are required to carry flood insurance.

"High Constraint" locations represent those areas within FEMA's 100 year floodplain. "Moderate Constraints" are within a 1/4 mile buffer of the 100 year floodplain, and "Low Constraints" are outside the 1/4 mile buffer.



Factor 4.2 - Slope Constraints

Map Analysis



Slope data was derived from a Digital Elevation Model (DEM) of Santa Fe County. The New Mexico Resource Geographic Information System Program (RGIS) supplied the DEM.

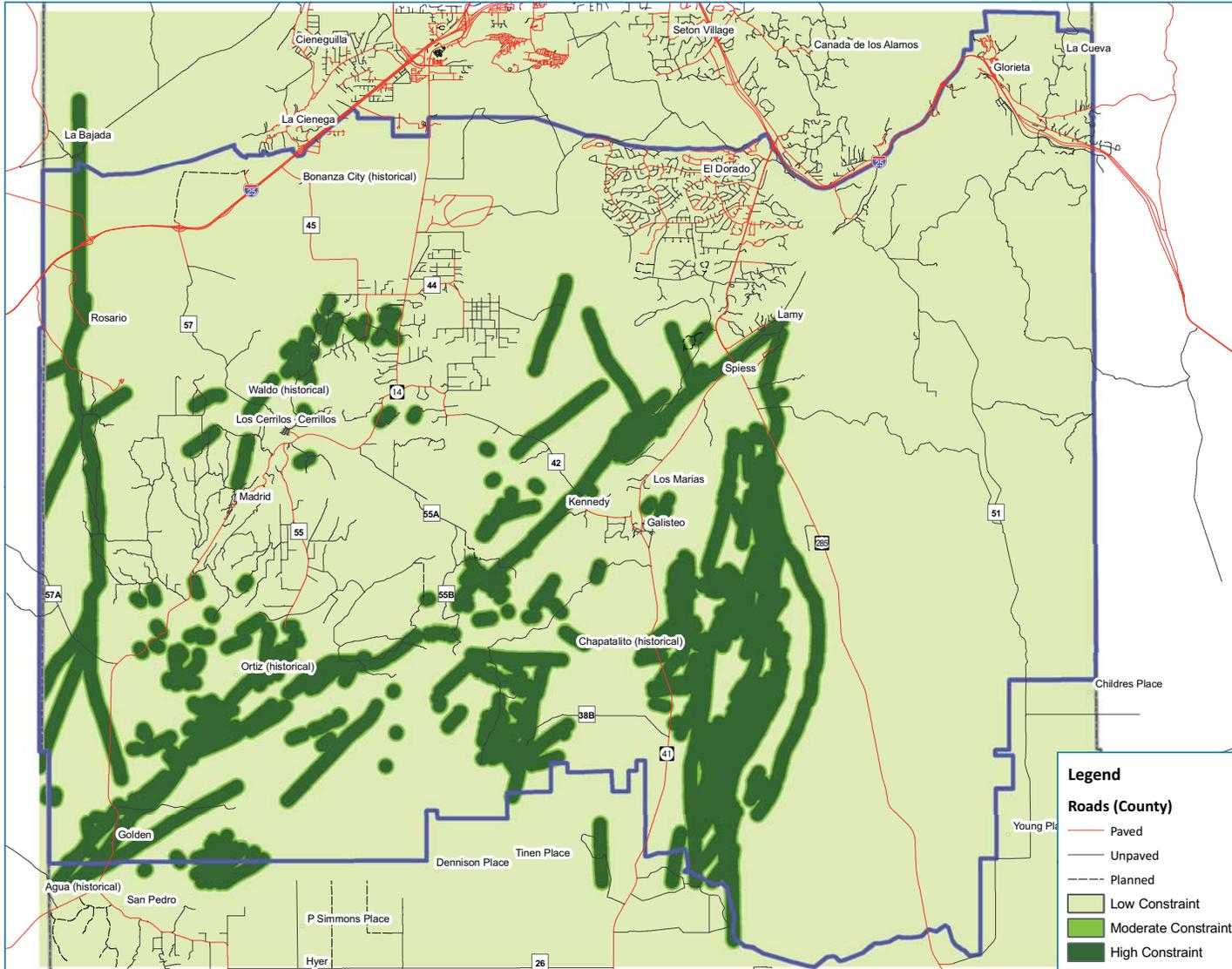
DEM is the terminology adopted by the USGS to describe terrain elevation data sets in a digital raster form. The standard DEM consists of a regular array of elevations cast on a designated coordinate projection system. From the DEM GIS software calculated the slope of every grid cell within Santa Fe County.

"High Constraints" are those with a slope greater than 25%. "Moderate Constraints" are locations with a 10-25% slope, while "Low Constraints" have less than a 10% slope. Development of all types are discouraged from sloping land.



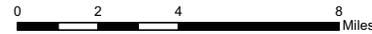
Factor 4.3 - Fault Line Constraints

Map Analysis



Faults are breaks in rocks of the Earth's crust formed when great pressure causes earthquakes and the slippage of the fault walls. There are numerous faults in the Galisteo region and they vary in length from a few hundred feet to many miles.

Fault lines were digitized from State fault maps and verified by a geologist. Areas located within one thousand feet of a fault line are considered a "High Constraint". "Moderate Constraints" are located between one thousand feet and one fourth of a mile, and "Low Constraints" are greater than one fourth of a mile from a fault line.



Factor 5.1 -Archaeological and Historical Constraints



Map Analysis

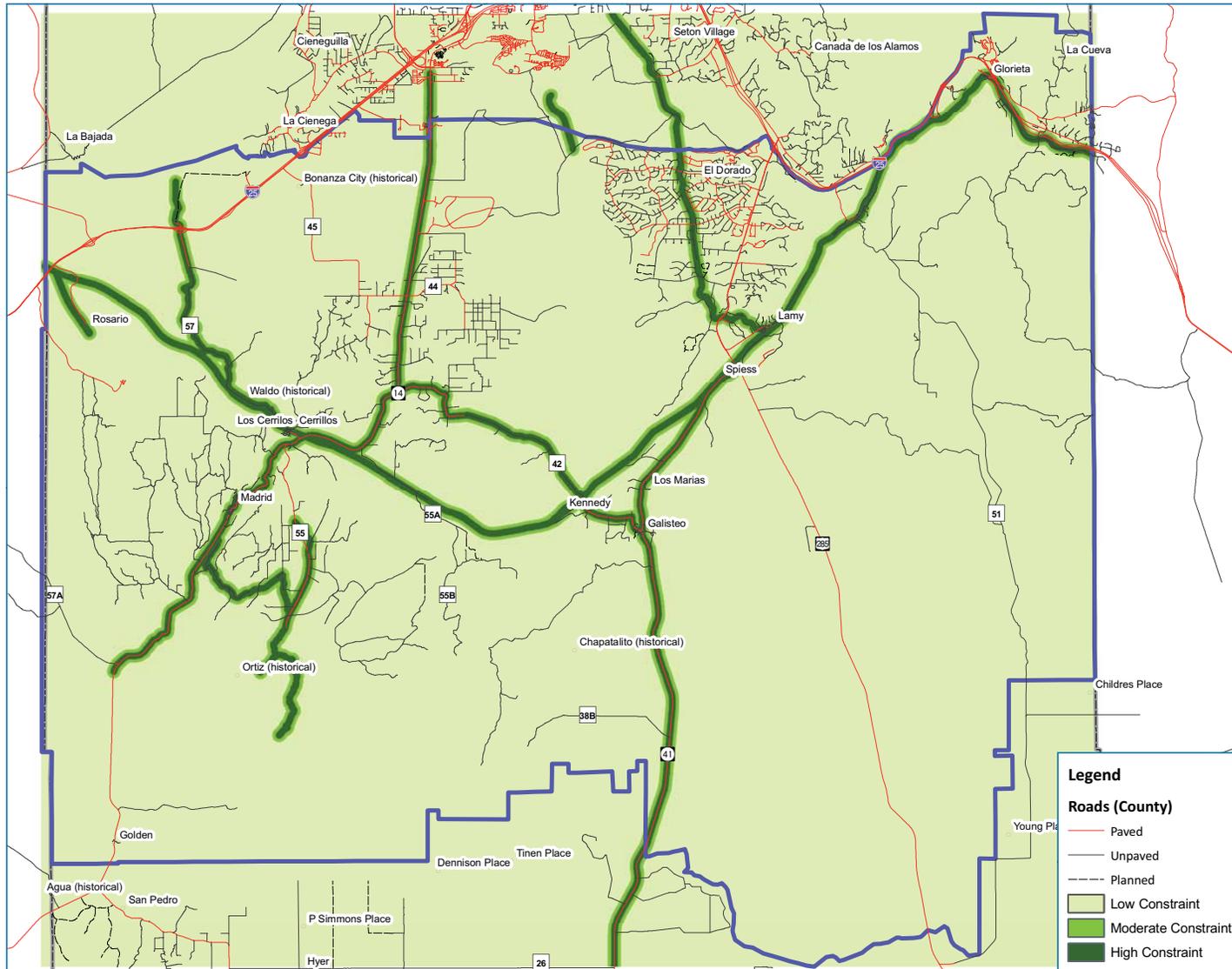
This data includes sites of archaeological and historical features. Earth Works Institute provided the data, which came from County and State sources.

While this information is factored into the suitability model, individual site data remains confidential due to state law.



Factor 6.1 - Scenic Byway and Railway Constraints

Map Analysis



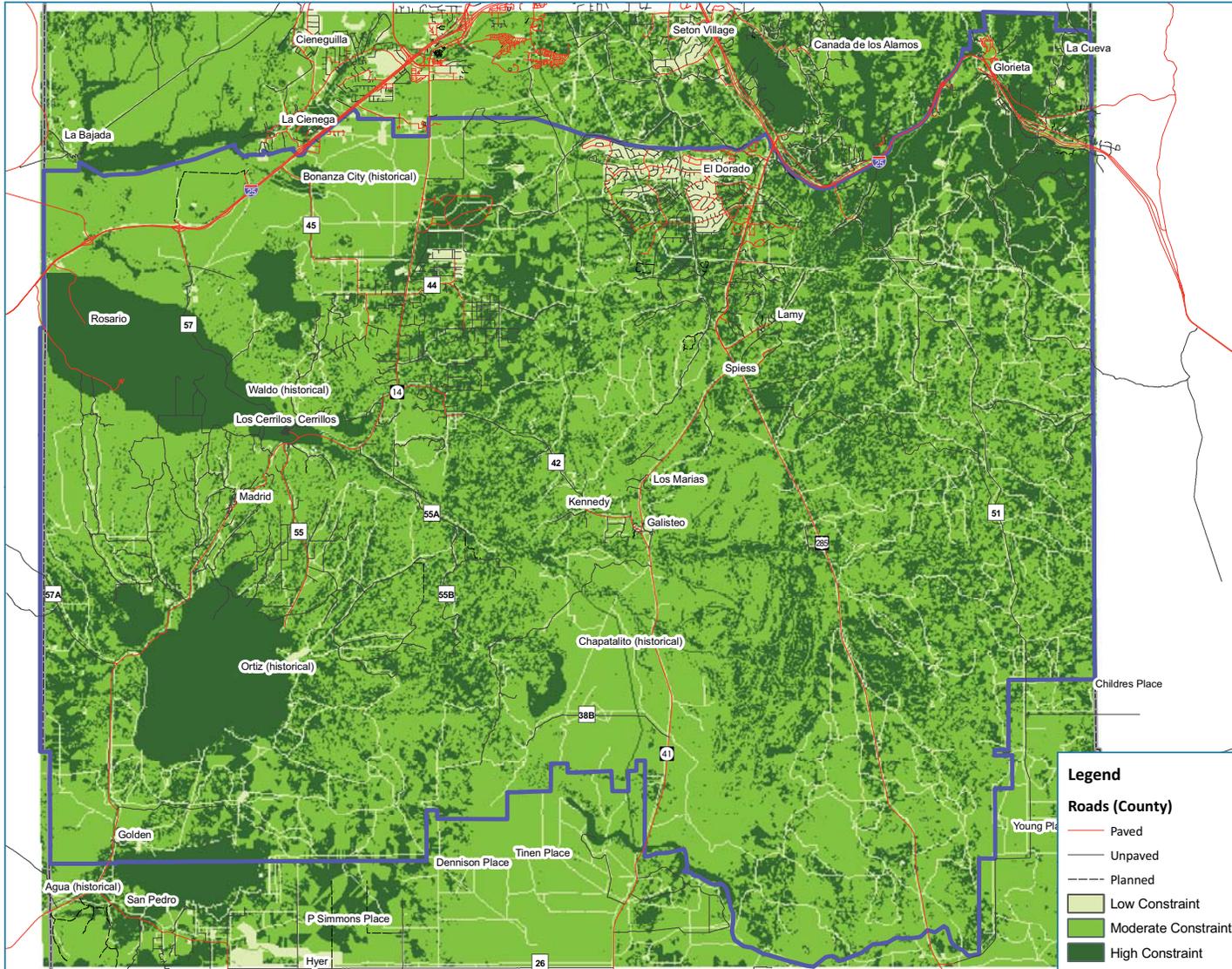
Scenic Byways were compiled by Earth Works Institute based on the State of New Mexico's approved scenic byways. The designation of a scenic byway is based on six intrinsic qualities: cultural, historic, archaeological, recreational, natural, and scenic. The Scenic and Historic Byways Council (SHBC) recommends byways to the State of New Mexico Transportation Commission for approval. Scenic Railways are also included in this Constraint

Areas designated "High Constraint" are within five hundred feet of the centerline of scenic byways or railways. Areas designated as "Moderate Constraint" are five hundred to one thousand feet from centerlines and "Low Constraint" areas are greater than one thousand feet from centerlines.



Factor 6.2 - Visual Resources Inventory Constraints

Map Analysis

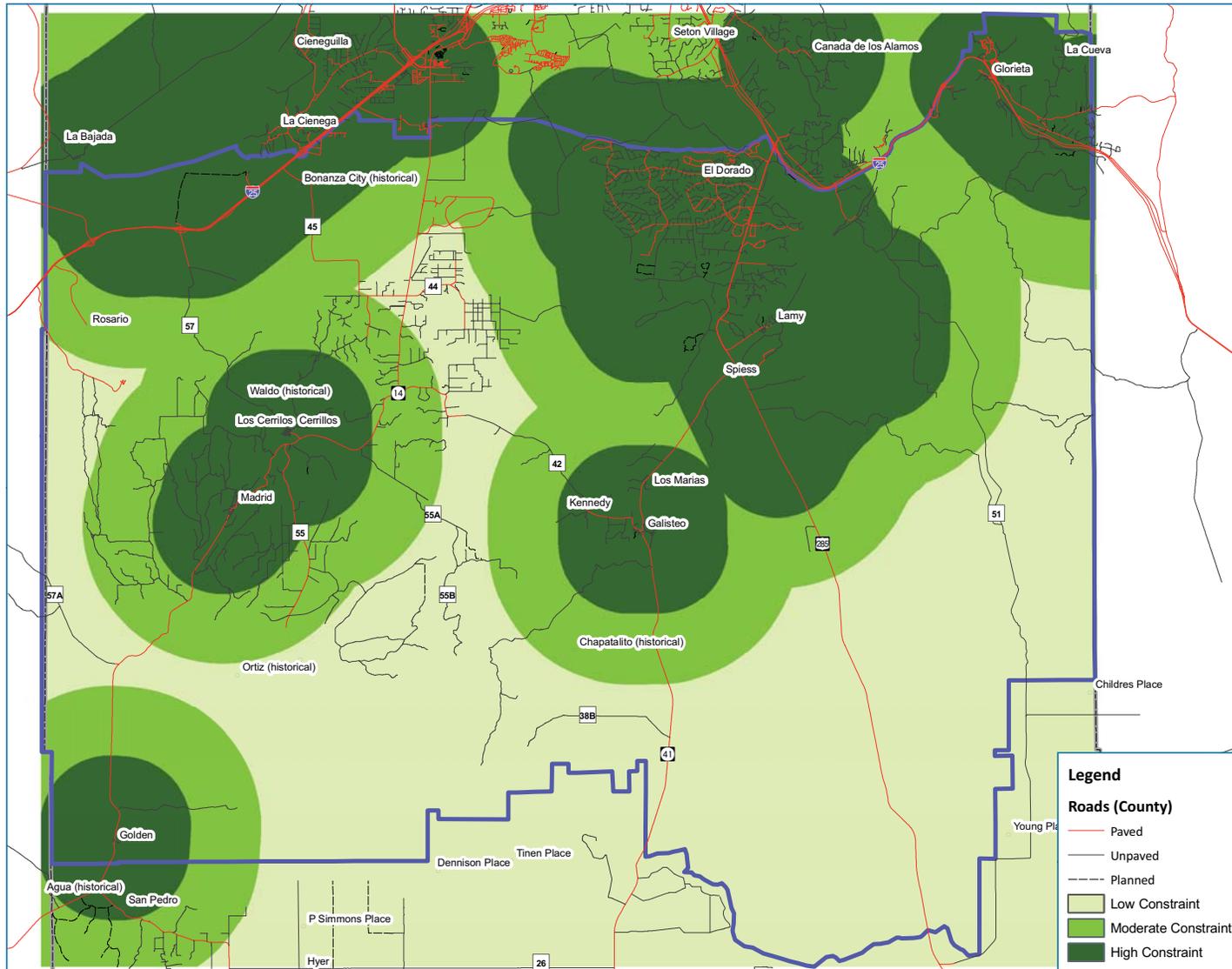


In 1995 a Visual Resources Inventory Analysis was done by Design Workshop, Inc. Areas where there is a "combined scenic quality" are included in this Visual Resources Inventory Constraints. "Combined scenic quality" is a combination of both the "intrinsic scenic quality" of different landscape types, as rated by a sample of the public, as well as "relationship scenic quality," which reflects the degree to which adjacent landscapes are seen as enhancing each other.



Factor 7.1 - Public Water System Constraints

Map Analysis



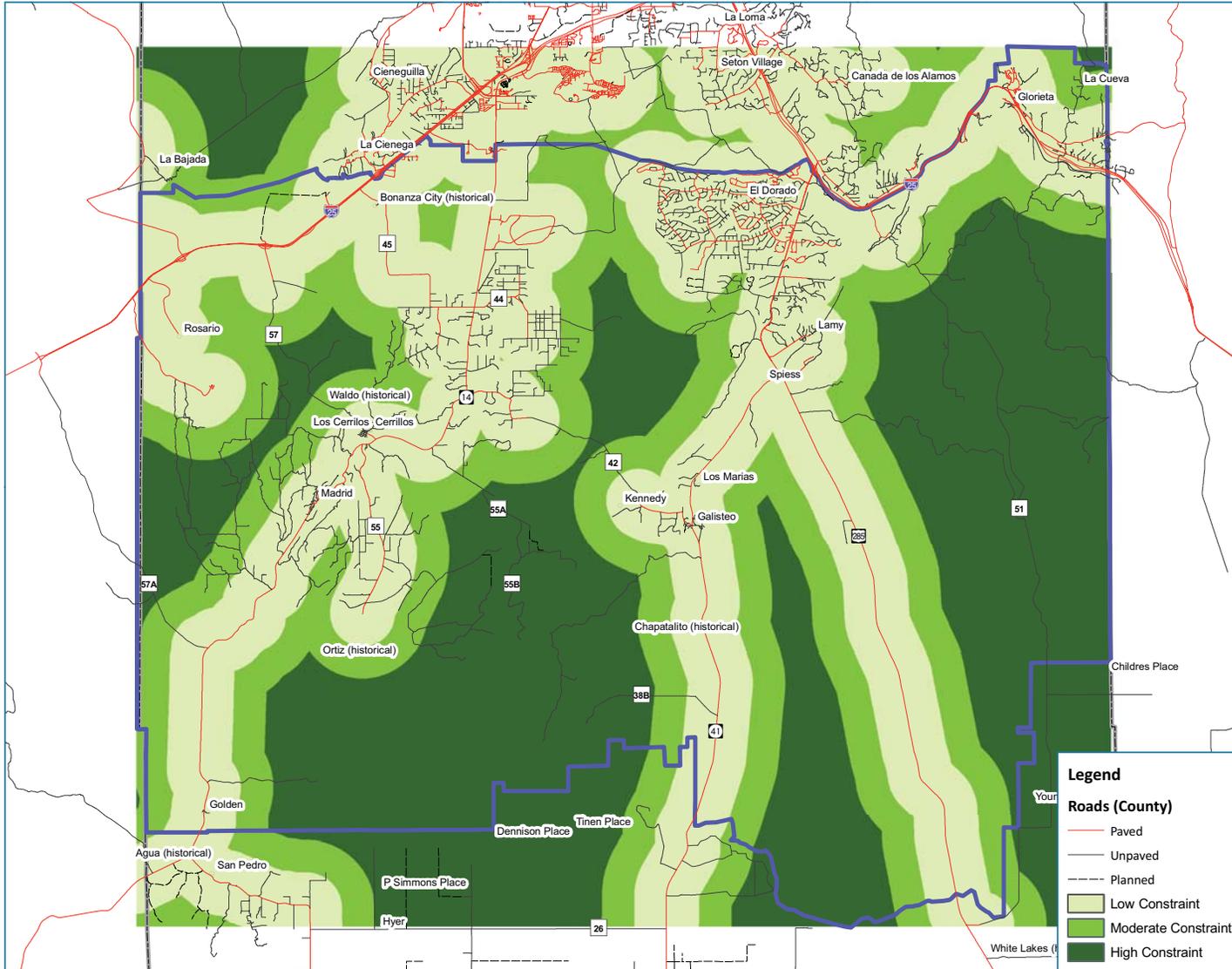
Proximity to Community Water Systems (CWS) was included as a factor to identify areas of urban and semi-urban levels of development. Encroachment by oil and gas facilities upon urban areas should be discouraged for a variety of reasons, including noise pollution, added air pollution and maintenance of property values.

Areas of "High Constraints" are located within 2 miles of a CWS, while areas outside a 4 mile buffer are considered to be the least constrained.



Factor 7.2 - Paved Roadway Proximity Constraint

Map Analysis



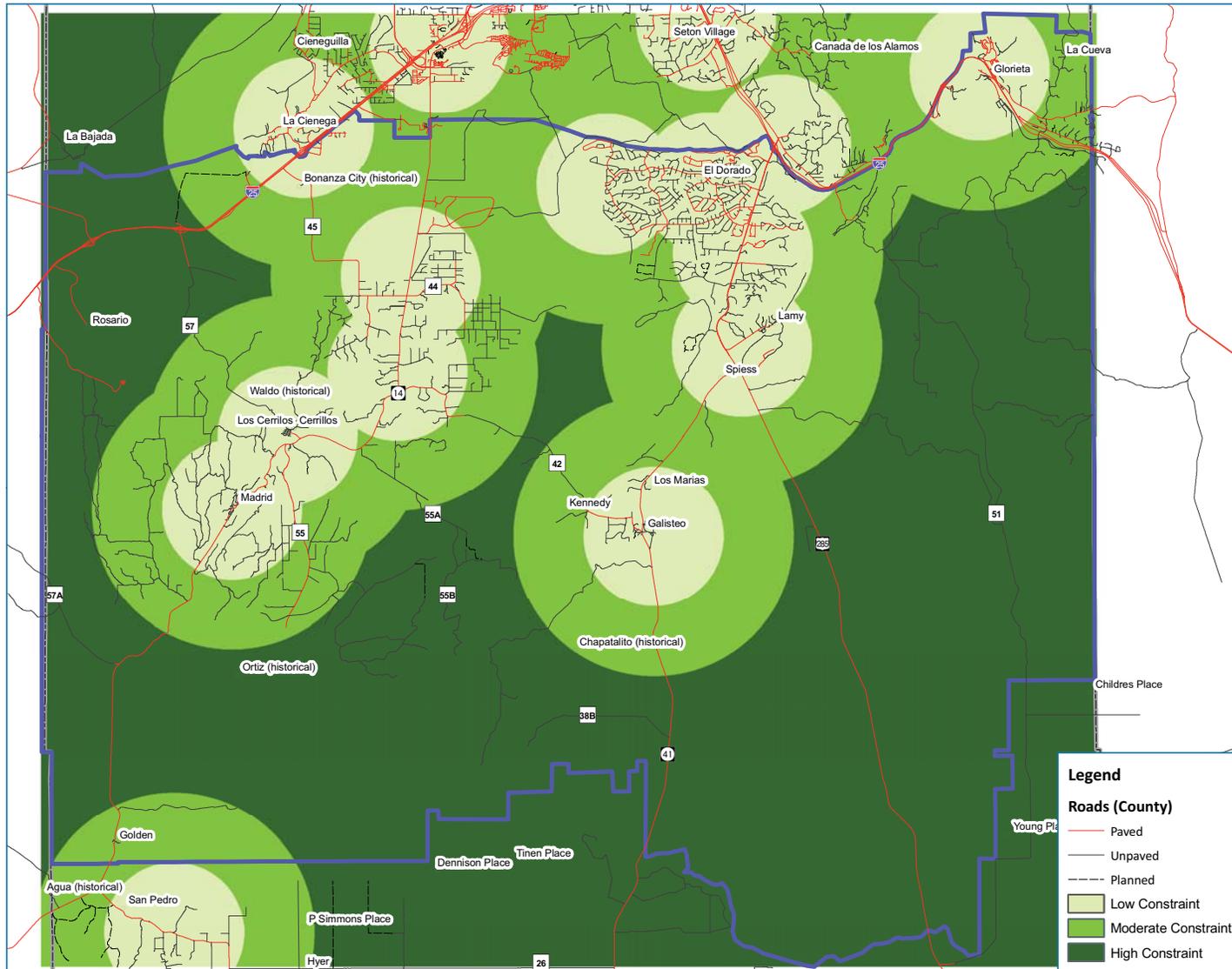
Paved Roadways data came from Santa Fe County's GIS database. It includes all paved roadways, including highways.

Transportation to and from oil and gas development sites creates extra pressure on roadways. Paved highways are best for this travel. "High Constraints" are areas greater than two miles from the centerline of paved highways. "Moderate Constraints" are areas from one to two miles from the centerline and "Low Constraint" areas are less than one miles from centerlines.



Factor 7.3 - Fire Station Constraints

Map Analysis

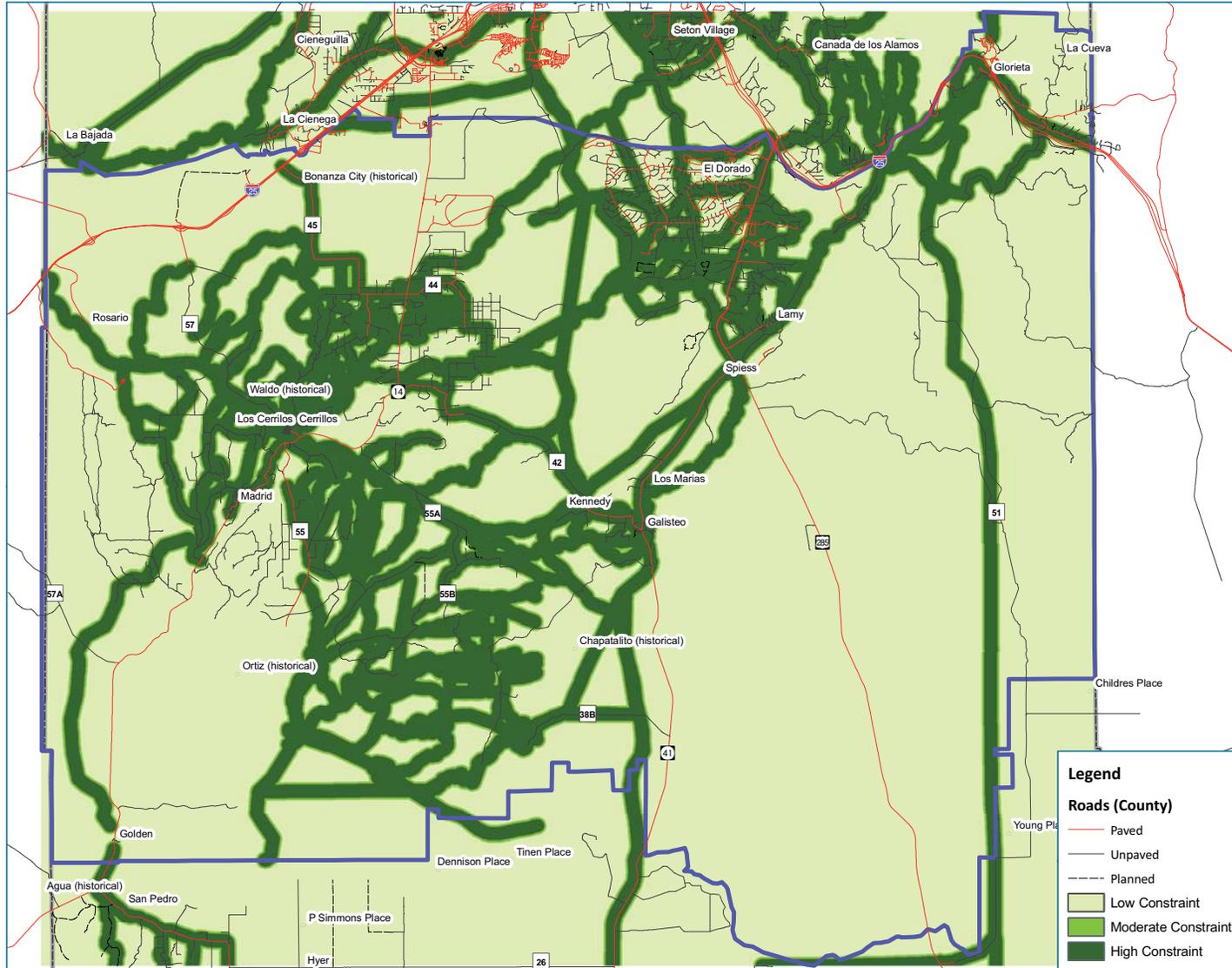


Fire station locations came from the Santa Fe County GIS database. Oil and gas development should be proximal to fire locations for fire protection.

"Low Constraint" areas are located within two miles of fire stations. "Moderate Constraint" areas are located between two and four miles. "High Constraint" areas are outside the four mile buffer.



Factor 7.4 - Trail Constraints



Map Analysis

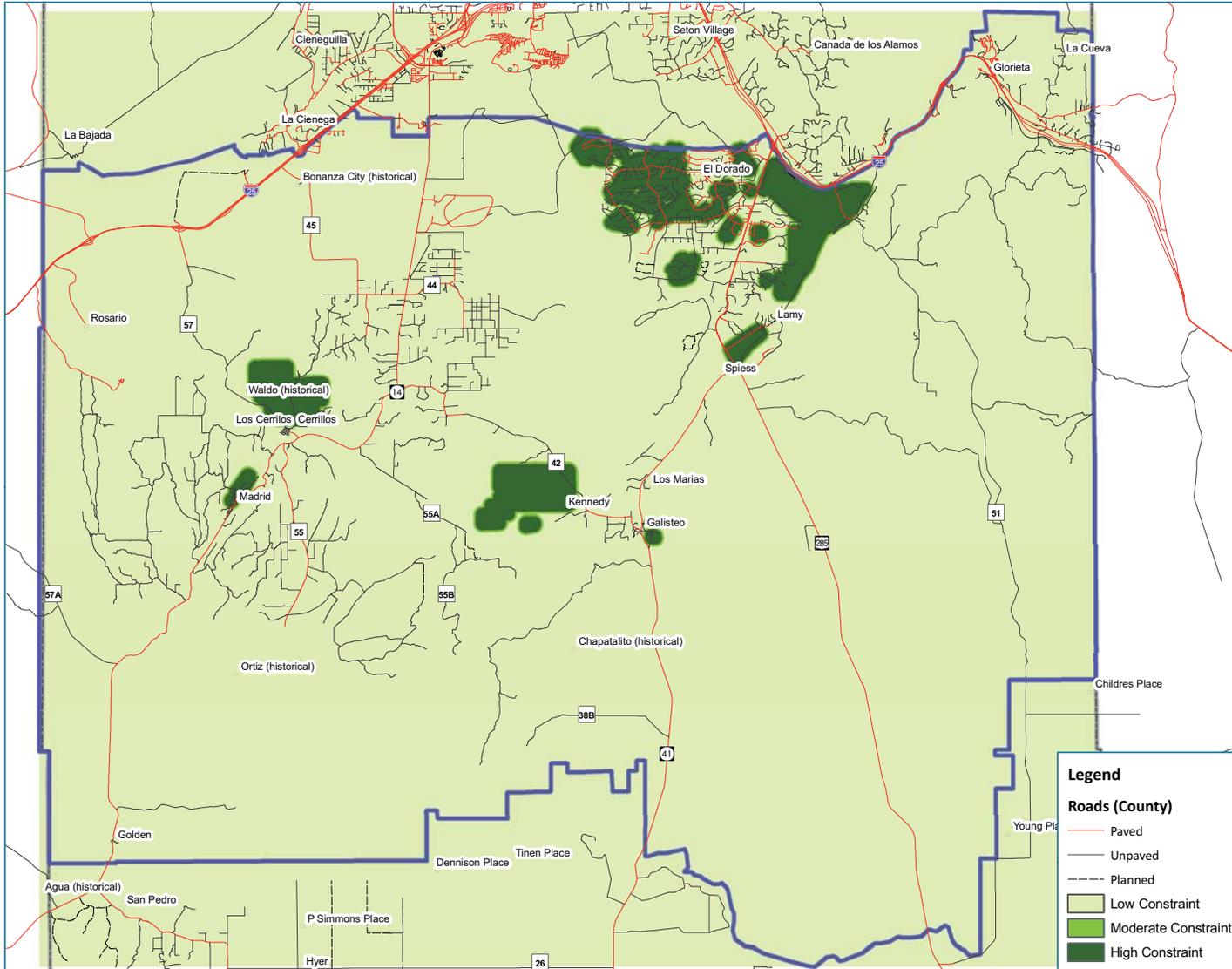
Trail locations came from the Santa Fe County GIS database. Oil and gas development should be proximal to fire locations for fire protection.

"Low Constraint" areas are greater than a quarter mile from park and trail locations. "Moderate Constraints" are those areas located between one quarter mile and one thousand feet of park and trail locations and "High Constraint" areas are within one thousand feet from parks and trails.



Factor 8.1 - Open Space Constraints

Map Analysis



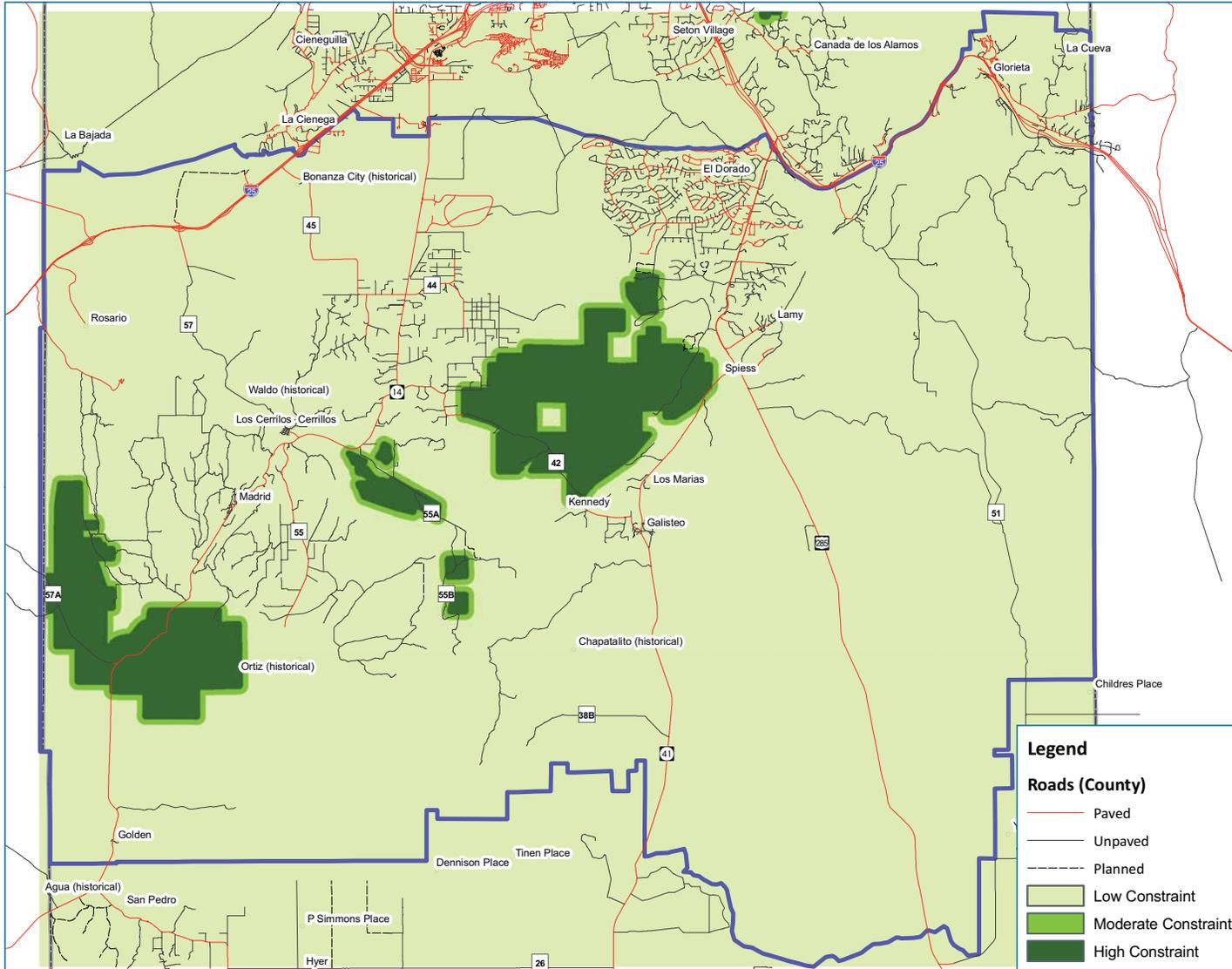
Open Space Areas were supplied by Earth Works Institute.

"High Constraint" areas are located within these conservation areas. "Moderate Constraints" are areas within a one thousand foot buffer of these areas and "Low Constraint" areas are located outside a one thousand foot buffer.



Factor 8.2 - Conservation Easement Constraints

Map Analysis



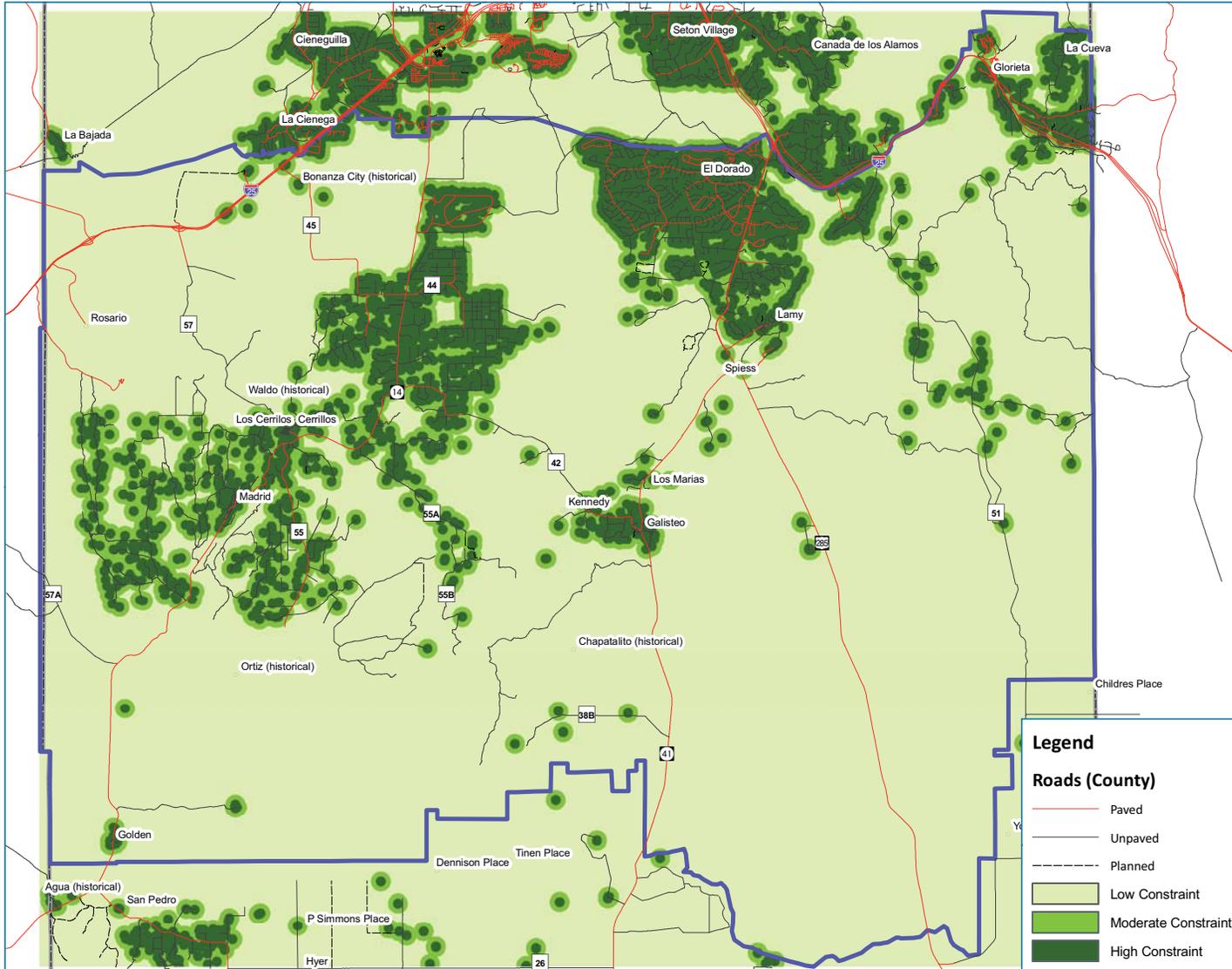
Conservation Easements are areas which are conserved through the restriction of development. These easement locations came from Earth Works, Inc., Santa Fe County, Commonweal Conservancy, and the Nature Conservancy.

"High Constraint" areas are within one thousand feet from Conservation Areas. "Moderate Constraints" are areas between five and one thousand feet of these areas and "Low Constraint" areas are located outside one thousand feet.



Factor 8.3 - Existing Residential Structure Constraints

Map Analysis



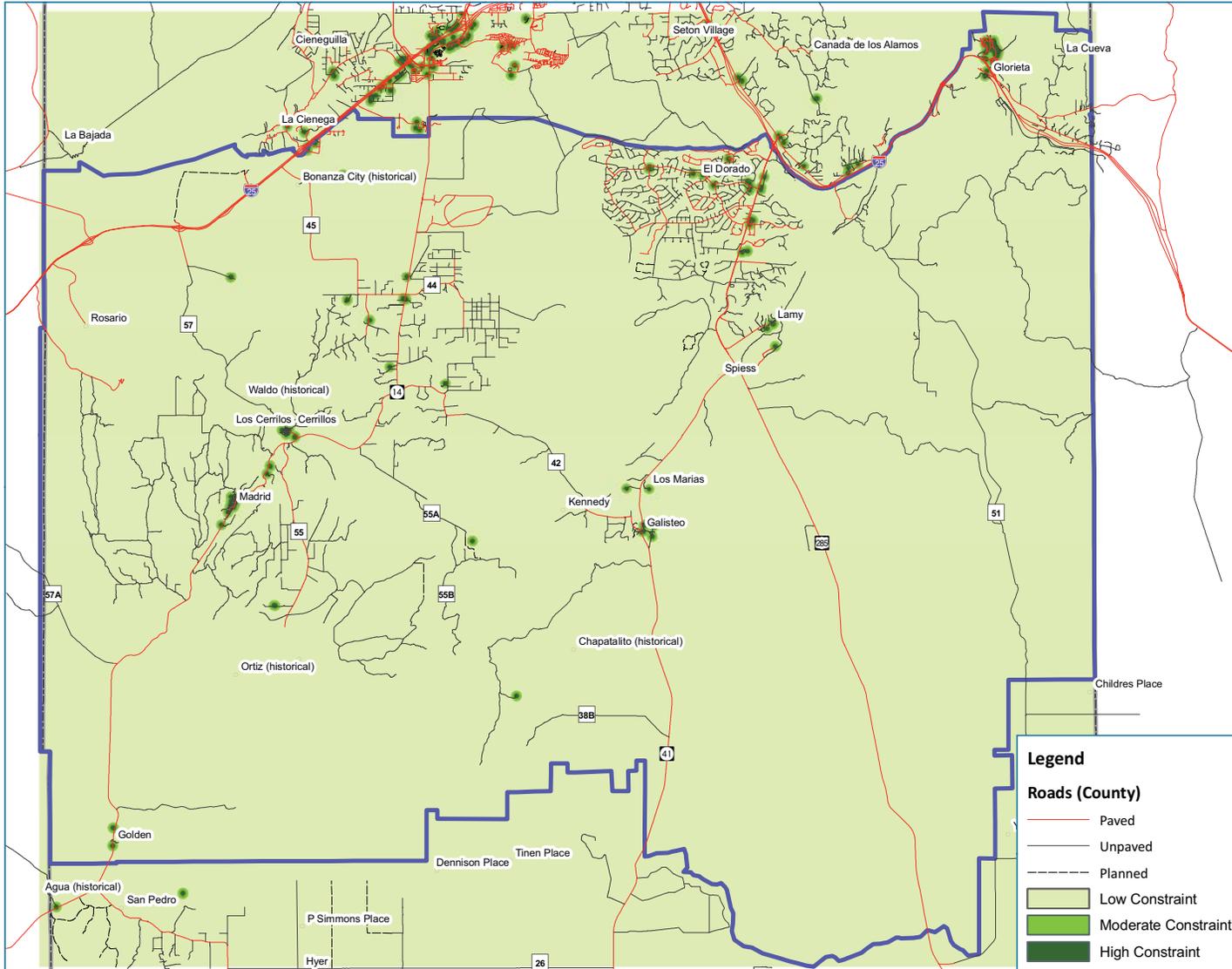
County staff maintains a GIS database of all structures and their usage type within the County. Residential and corresponding institutional uses, such as churches, were extracted and buffered to create a residential use constraint.

"High Constraint" areas are within 750 feet of existing residential structures. "Moderate Constraint" areas are located between 750 and 1,500 feet and "Low Constraint" areas are greater than 1,500 feet from residential structures.



Factor 8.4 - Non-Residential Structures Constraints

Map Analysis



Non-Residential structure locations were extracted from the Santa Fe County GIS database in order to create Non-Residential Constraints. All structures which are not residential were included in this dataset.

"High Constraint" areas are within 400 feet of existing residential structures. "Moderate Constraint" areas are located between 400 feet and 800 feet and "High Constraint" areas are greater than 800 feet from residential structures.



2B-4. Facilities and Services

Development of any kind, including oil and gas development, increases County costs in terms of infrastructure, facilities and service provision. Greater oil and gas development intensity increases traffic and demand for new or expanded roads, as well as the volume of emergency calls due to accidents, traffic incidents, wildland fires, medical and crime-related calls and other incidents. Oil and gas projects increase the workload of Fire/EMS, Law Enforcement and other County personnel. If new oil and gas projects go forward without a plan for recouping those additional expenses, existing tax payers subsidize those expenses. If proportional improvements are not made, the overall level of service declines.

2B-4.1. Levels of Service

Levels of service (“LOS”) standards define the County’s role as a service provider, and in partnership with other service providers, defines public and private responsibilities for the provision of facilities. In its most simplistic terms, a level of service standard is a locally desired ratio of service and facilities demand to supply. One of the best definitions of LOS is found in the Florida Department of Community Affairs’ Administrative Code, which reads,

“Level of service” means an indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service shall indicate the capacity per unit of demand for each public facility.”¹

Level of service standards for community facilities and services are most commonly presented in terms of the resident population served. Initially, LOS can be determined by investigating the existing levels of service that are provided to the existing resident population. Level of service indicators can be evaluated based on a service provider's LOS goals, performance data provided by other communities and/or professional standards. Levels of service typically are measured and projected in terms of service area population (*e.g.*, two police officers per 1,000 population). LOS also may be based on responses to calls for service. This measure frequently is used for police, fire and EMS services. Based on the level of service standards and the projected population to be served, costs can be projected for facility levels of service.

This concept applies to schools, public facilities, transportation networks, water and sewer, surface water discharge, police, fire, emergency response, parks and recreation, libraries, social services and any other public service provided by local governments.

Qualitatively, levels of service are indicators of the attractiveness of a community to existing and future residents and businesses. Adequate public safety provision, air quality, environmental preservation, recreational and cultural opportunities and accessible open space are just a few of the elements that the County influences that make Santa Fe County a desirable place to live. Counties that provide a high level of services project an image that attracts new residents and maintains property values, ensuring their ability to continue a high level of service provision.

The quantitative aspect of the relationship between levels of service and quality of life can be described in fiscal terms that can be proven empirically. For instance, levels of service for roadways would be described by traffic flow and measurable delays due to congestion. Traffic delays that make it difficult for employees to get to their jobs can result in a loss of productivity, making the region less desirable for workers and businesses alike.

2B-4.2. Adequacy and Concurrency

A number of regulatory, fiscal and administrative techniques exist that, if properly employed, allow communities to ensure that oil and gas projects are timed, located, designed and financed without negatively impacting the community. "Adequate public facilities" and "concurrency" are two similar techniques that tie development pace and location to the availability of public facilities and services. Both terms refer to land use regulations that are designed to ensure that the necessary public facilities and services, at adopted levels of service required to support new development, are available and adequate at the time that development is considered. An Adequate Public Facilities Ordinance (APFO) establishes level of service (LOS) standards for each major kind of physical infrastructure (*e.g.*, road, water, sewer, drainage, parks, community facilities) and service (*e.g.*, police, fire, EMT) that must be in place at suitable and adopted levels of service at the time that

the development occurs, often with some phase-in component. Concurrency and adequate public facilities ordinances ensure that the service levels enjoyed by existing development are not diluted below the adopted LOS due to new development.

APFOs control the timing of new development. If infrastructure capacity is limited, an APFO will require phasing of the development until the facilities are available.ⁱⁱ The major objectives of an APFO are:

- To link the provision of needed public facilities and services to the type, amount, location, density, rate and timing of new development;
- To ensure that new growth and development do not outpace the ability of service providers to accommodate such development at established level of service standards; and
- To coordinate public facility and service capacity with the demands created by new development.ⁱⁱⁱ

Concurrency regulations should be accompanied by a fully funded and prioritized capital improvements program.^{iv} Similarly, mitigation measures for alleviating public facility and service inadequacy should also be considered. Phasing, timing or sequencing later permits to ensure they are not issued before roads, stormwater management, fire, police or emergency service needed to achieve the LOS standard are constructed is one such option. Impacts may also be mitigated through the provision of improvements such as pavement widening, turn lanes, access controls or traffic signalization that allow the road network to function more efficiently, adding sufficient capacity to the off-site road system. Concurrency must also be based upon an integrated and comprehensive general plan.^v

2B-4.3. Funding Facilities and Services

The fiscal implications of providing facilities and services to meet new development demands must be estimated and weighed against the anticipated revenues of areas proposed for development. Fiscal impact analysis should not focus solely on developments with positive cash flow to a particular community or jurisdiction. The negative fiscal impact on adjacent communities or providers, as well as health, safety, environmental or other factors, must be considered and must override project- or community-specific fiscal considerations, and where there are inordinate impacts to the region as a whole, development approval must assure both short-term financial and long-term results in the regional interests.

The quality of life in Santa Fe County is contingent on the County's continued ability to provide quality services at a reasonable cost to taxpayers. If oil and gas development projects go forward without a plan for recouping increased service provider expenses, existing tax payers subsidize those expenses. To achieve equity and fairness in the funding and provision of public facilities and services, this Element recommends strategies to:

- Enhance the local property and sales tax bases more rapidly than the fiscal obligations for capital facilities, operations and maintenance;
- Ensure that new development funds the costs of capital facilities and services required to serve that new development; and
- Ensure that facilities and services are planned in a way that allows ongoing operations without significant increases in the costs to residents and businesses.

A key component of growth management techniques is maintaining fiscal responsibility and fiscal health. Fiscal stability is a cornerstone of a sustainable community. Existing residents should not suffer a decline in the quality of their services or be unduly burdened by costs of new growth. New residents and business should pay their fair share of the costs associated with extending infrastructure and urban services to new growth areas.

There are a wide variety of methods that can provide local governments with a greater financial capability to ensure the adequate provision of road construction and other infrastructure improvements required by new development. The following programs, which may be authorized under existing laws or may be established by amendments to state law, would help ensure that roads and other infrastructure are designed and constructed to serve development as it occurs. These strategies should be considered possible implementation tools for achievement of Plan goals, objectives and policies.

2B-4.3.1. Transportation Improvement Districts

A major source of funding for transportation corridor improvements is the transportation improvement district. In addition, a wide variety of other techniques and districts may be created to fund road improvements or construction. These include neighborhood improvement districts, business improvement districts, special road districts, transportation corporations and special road and bridge taxes. All of these special districts and techniques involve the designation of a geographic area and have statutory powers to raise revenue or impose charges for facilities and services within the defined geographic area to fund road improvements and construction.

2B-4.3.2. Special Assessments

Special assessments are fees collected from property owners for tangible public infrastructure improvements that a local government provides and that benefit the properties being charged. Special assessments are used to finance public facility improvements as well as public services.

Special assessments are revenue-raising devices designed to recover the cost of capital improvements that directly benefit properties within a designated "benefit area". They may be collected from oil and gas projects. Unlike impact fees and mandatory dedications imposed under a County's police and land use control powers, special assessments may be used to pay for improving existing infrastructure deficiencies.

For instance, in San Diego, special assessments and impact fees are integrated with the City's "tiered" growth management system in order to require new development within the "Planned Urbanizing Area" to participate in the financing of public infrastructure needs.^{vi} The tier system divides the City into three areas: (1) the Urbanized Area (UA), (2) the Planned Urbanizing Area (PUA), and (3) Future Urbanizing Areas.

The "Facilities Benefit Assessment" (FBA) is a special assessment applied to new development in the PUA that apportions the cost of traffic, park, library, school, fire and other facilities to each new unit of residential, commercial and industrial development. Payment of the FBA is postponed to the building permit stage and is enforceable by a lien on the property. The FBA was challenged on constitutional grounds and upheld in the California appellate courts.^{vii} The utilization of the FBA from 1979 to 1983 resulted in a major shift in development to the Urbanized Area, thus achieving one of the major goals of the 1979 General Plan. A similar structure could be used in conjunction with Santa Fe County's tiered land use system, described in the Growth Management Element.

Special assessments are available for capital improvements that "directly benefit" property within a delineated benefit area.

2B-4.3.3. Community Facility Districts

Community facility districts are a type of special assessment or special improvement district. Tax exempt bonds can be issued to pay the costs of the improvements, which would be secured by the real property in the area that benefited by the improvement. Properties benefiting from the road improvement would be assessed a fee to pay the principal and interest on the bonds.

2B-4.3.4. User or Impact Fees

"Pay-as-you-grow" programs help protect existing residents from growth-related costs. These programs include a variety of techniques that allocate the public costs of development fairly and do not unduly burden existing residents, such as development impact fees and exactions, or provisions for financing infrastructure and services in development agreements.

Communities across the country, including Santa Fe County, have adopted some form of development impact fees pursuant to statute to mitigate the impacts of new growth and maintain consistent levels of service for both existing and future residents. Development impact fees are one-time charges against new development to raise new revenues to pay for new or expanded public facilities necessitated by new development. Impact fees are local efforts to fund the gap between money available to build or expand public facilities and the money needed to do so.^{viii}

A road user or impact fee is a payment that a local government requires to provide new or expanded capital facilities to serve a new development. Impact fees typically require the developer to make a cash payment before the development is completed and are based on the cost of the public facility and the nature and size of the development. Local governments use impact fees to finance off-site improvements that benefit the development. Impact fees for transportation improvements must be spent for improvements to the road network that benefit those paying the fees.

The objectives of impact fee programs include:

- to allow traditional general revenue funding to be used for service, maintenance and repair of the existing highway system;
- to spread financial responsibility equitably;
- to maintain planned levels of service; and
- to meet the needs for public facilities and services, the need for which was generated by oil and gas projects.

2B-4.3.5. Exactions and Dedications

Before approving oil and gas projects, the County may required the developer to dedicate rights of way for streets within the project and abutting it. Typically, right of way exactions are imposed at the time of zoning or subdivision approval. These mandatory dedications would not be limited to rights of way for local roads, but would include dedications of land for arterials and state highways.

In *Dolan v. City of Tigard*, 114 S. Ct. 2309, 2319 (1994), the US Supreme Court held that any requirement to dedicate land as a condition of discretionary development approval must be "roughly proportional" to the contribution that development makes to the need for new public facilities. The Court further held that the local government must make an "individualized determination" of the proportionality between the exaction and the impact on public facilities.^{ix} At a minimum, there must be some methodology to quantify the impact of the development and the land dedication required to offset that impact. As an alternative to dedicating land to the local government, a property owner may be given the option of paying the city or county a fee. Those funds can then be used for road improvements that benefit the property.

In *Nollan*^x and *Dolan*^{xi} the Supreme Court upheld the use of exactions. Taken together, these cases stand for the proposition that an exaction will be upheld if there is a rational nexus between the need for additional capital facilities generated by the new and development and if the expenditure of the funds collected benefits the new development. This standard has been refereed to as the "dual rational nexus test." In essence, there must be an essential nexus between the nature of the exaction and the stated purpose of the exaction,^{xii} and the amount of the exaction must be roughly proportional to the impact that the exaction is intended to mitigate.^{xiii}

In the context of planning, *Nollan* and *Dolan* require that municipalities document the need for development exactions with studies that link the public purpose to be achieved with the nature and extent of the conditions imposed. This is most easily undertaken for on-site exactions, such as subdivision fee requirements and land dedications. The goal of providing adequate public facilities to serve a new development is a recognized valid purpose, and if the exactions will mitigate development impacts proportionally caused by the developer upon whom the exaction is levied, the *Nollan/Dolan* requirements will be met.

Where exactions are meant to fund off-site facilities called for by several development projects, both the remoteness and proportionality tests must be satisfied by studies 1) showing the future scope of growth, 2) naming the needed facilities, 3) defining facility costs allocated to new growth, and 4) specifying service units and service areas. The results of these studies are then inserted into a funded capital improvements program.

2B-4.3.6. Development Agreements

A development agreement is a contract between a local government and a developer, whereby the developer promises to pay for certain on-site or off-site improvements or perform certain obligations for the local government in exchange for some form of discretionary approval by the local government. Development agreements are different from other public contracts because they are executed in conjunction with police power actions regulating the zoning, subdivision or

development of private property. A development agreement may require payment for public road improvements or construction or obligate the developer to perform those improvements at its expense.

Development agreements are useful tools for a community because they:

- Provide a mechanism for the County and owners of mineral estates and oil and gas and lessees to form agreements, binding on all parties, regarding development, financing and land use of the oil and gas project;
- Promote land development regulation by allowing the County to adopt development agreements that include terms, conditions, and other provisions that may not otherwise be able to be mitigated or implemented without the use of a development agreement;
- Promote stability and certainty in oil and gas project regulation by providing for the full enforceability of such agreements by all parties;
- Provide a procedure for the adoption of such agreements that ensures the participation and comment of the public and elected officials; and
- Provide a partial mechanism for the financing of all capital facilities and public services as provided for in this Plan Element.

2B-4.4. Administrative Services

The development review process for oil and gas development is a multi-phase process that includes coordination and review of multiple submissions that include detailed technical information. The County's role in the process will take significant Staff resources and technical expertise. Among other responsibilities, the County must provide oversight of the review process, review applications, make site visits, manage public notification and opportunities for public comment, analyze the maps and corresponding land use models and identify necessary public improvements. Once a development is approved, the burden on the County's resources continues, as the County must ensure that oil and gas development complies with approved standards and meets on-going obligations in order to protect County resources and the public health, safety and welfare. The County must recoup the expenses of development review, inspections and other implementation costs for the management of oil and gas development. The County must manage oil and gas development while ensuring that the existing levels of service provided through its other various functions do not decline. Tasks that the County must undertake to manage oil and gas development, including the following tasks:

- Development Review:
 - Hydrology / Geology
 - Fiscal Impact Analysis
 - Environmental Impact Report
 - Location / Land Use Analysis
 - Performance Standards
 - Siting and Design
 - Site Visits
 - Public Hearings
 - Outreach and Notification
- Inspections:
 - Construction
 - Operations
 - Reclamation
- On-going Monitoring:
 - Water Quality
 - Compliance with Approved Standards

2B-4.5. Roads

Transportation is one of the most important components of the County’s infrastructure base. Consideration of traffic demands is a critical aspect of the oil and gas regulatory scheme. Traffic generation from oil and gas projects above the capacity of the transportation system can only be approved when there are funded capital improvement programs to provide mitigating capacity at the time of development approval. Pollution and congestion will have harmful affects on the quality of the natural environment and the County’s quality of life if these improvements are not funded by the development responsible.

Oil and gas development will have an extreme impact on the safety and maintenance level of County roads. County roads in the area of the Galisteo Basin that has been proposed for oil and gas development are inadequate to handle the heavy truck traffic generated by oil and gas development. In many areas the roadway is considered inadequate to meet existing demands. Narrow, unpaved roadways in the County do not have adequate width to allow safe passing of heavily laden oil trucks and tankers as well as vehicles and residents. Heavy, speeding trucks that cause excessive noise cause both a safety and public nuisance concern. While truck traffic is a necessary component of most residential and economic development, the impacts of that traffic are exacerbated in rural areas with substandard roadways. Conflicts among users of County roads must be minimized in order to promote safety and a high quality of life.

This Plan Element recommends policies for public and private investments, oil and gas project decisions and infrastructure capital and operating costs in ways that:

- Maintain adequate road capacity and minimize delays due to traffic congestion;
- Maintain road safety, so that roads are safe for drivers, pedestrians and bicyclists, as well as the residents and businesses located along the roads;
- Improve primary road corridors to handle greater numbers of trips; and
- Prevent premature or inappropriate development due to the availability of roadways meant to serve oil and gas development.

The existing level of service for roads is shown in **Table 3**.

Table 3: County Road Level of Service

	Level of Service (LOS) per 1,000 Residents*
Road Capacity	LOS “C”
Road Design	See Subdivision Regulations (§8.2, App 5.A, App B.1-B.3)

As shown in the Roads CIP (**Map 33**), the impact from oil and gas development on roads will be substantial:

- The overall plan to improve network access for oil and gas development is based on a comprehensive, long-range plan that identifies includes two east-west corridors, with access from interior locations to the Interstate (refineries are located north of the County) and State Highways (waste disposal sites are located south of the County).
- The CIP incorporated a two-tiered roadway demand model based on the type of oil and gas development activity -- preliminary (exploratory) and ongoing (extraction / production) oil and gas transportation demand.
- The exploratory roadway network will provide direct access to an oil/gas site via an improved chip-seal County road. These roads will be functionally equivalent to collectors.
- The extraction/production roadway will provide long-term access to a site and will be provide access to the Interstate and State Highway systems. These roads will be asphalt and functionally equivalent to connectors.

- Funding for SR 41 (Project D) is a state-owned and controlled highway. Though it is not included in the County CIP (it is maintained through state funding), there may be interchanges that would include County participation.

2B-4.5.1. Oil and Gas Transportation Impacts

In addition to the concerns about the inadequacy of County roadways, concerns exist about the maintenance that will be required to respond to increased truck traffic. Oil and gas projects involve the use of large and heavily laden vehicles, larger and heavier than pickup trucks and passenger cars. Drilling and construction phases involve transportation of equipment to and from the site by way of multiple-axle vehicles such as tractor-semi trailers and three-axle trucks. A producing well involves transportation of oil and other byproducts to and from the site by way of multiple-axle vehicles. Over the course of the producing life of a well (often several decades) the number of trips by multiple-axle vehicles for each well reaches a significant number.

The weight carried by oil and gas vehicles significantly multiplies the impacts to a road. Using AASHTO (American Association of State Highway Transportation Officials) metric equivalency calculations, the typical oil and gas related semi has “hundreds of times more road impact in one pass than a full-size pickup.”^{xiv} This multiplied impact makes roadway maintenance, resurfacing and improvements necessary on considerably earlier timetables, and at a larger scale, than would occur with only passenger traffic. Thus oil and gas projects increase the maintenance costs for County roads.

Oil and gas development necessitates roadway improvements and can have negative impacts by generating traffic and traffic congestion, especially near prime agricultural/ranching land and culturally and environmentally sensitive areas. Pollution and congestion have harmful effects on the quality of the natural environment, the public health and the area’s quality of life, which must be prevented and mitigated. Oil and gas development projects on improved roadways be managed to prevent negative impacts to County roadways.

2B-4.5.2. Traffic Impact Assessment

One objective of this Oil and Gas Element is to ensure that new oil and gas projects contribute to the expenses of road improvements and maintenance necessitated by such development, and that the negative externalities of trips generated by oil and gas development are fully minimized and mitigated. A traffic impact assessment (TIA) is used in the development review process to ensure that the impacts and costs that accrue to public roadways are calculated and funded. A TIA assesses the effects that oil and gas project traffic will have on the transportation network in the community. Traffic impact studies will help Santa Fe County:

- Establish a baseline of existing traffic counts, movement and existing level of service for roadways and intersections;
- Forecast trip generation due to proposed oil and gas projects;
- Determine improvements needed to maintain the existing level of surface and serve proposed oil and gas projects;
- Identify funding needs for capital, operating and maintenance expenses;
- Ensure safe and reasonable traffic conditions on roads after the oil and gas project is complete;
- Reduce the adverse effects and impacts created by oil and gas projects;
- Provide direction to community decision makers and developers of adverse effects and impacts; and
- Protect the substantial community investment in the transportation system.

A traffic impact assessment generally includes, but is not limited to:

- Description of the project proposal;
- Description of the existing road network;
- Existing trip generation for roadways and intersections;

- Existing level of service for roadways and intersections;
- Existing community standards for LOS and volume/capacity ratios;
- Assumptions for trip generation from proposed oil and gas projects;
- Trip generation assumptions for proposed projects for roadways and intersections;
- Trip generation and distribution for site for average weekday for AM peak hour, PM peak hour, and 24 hour period (entering, exiting, and total for all three);
- Traffic patterns (proposed entry and exit locations, turning directions); and
- Summary of improvements that will be needed due to proposed oil and gas projects, estimated costs and proposal for responsibility (developer and/or County role).

Through the traffic impact assessment the County will determine what improvements are necessitated by oil and gas projects, including the need for new roads, expanded or improved roads, turning lanes, signalization, passing lanes or other improvements. Avoiding adverse effects and impacts to the transportation network is critical. Traffic congestion and incompatible use of roadways can result in a number of problems, including energy costs due to increased vehicle miles traveled, air pollution and accidents.

In addition to the issues listed above, oil truck and tanker trips generated by oil and gas projects will create a significant maintenance issue on County roadways. This Oil and Gas Element recommends that the Traffic Impact Assessment include an overview of potential maintenance needs and costs as well as a plan for recovery of those maintenance costs funded by oil and gas projects.

2B-4.6. Law Enforcement

The Santa Fe County Sheriff's Department provides crime prevention, response, investigation and prosecution services in Santa Fe County. The Department also provides animal control services. The mission statement of the Department is as follows:

"The Office of the Sheriff exists to serve the community.

The protection of people and their property is our primary responsibility.

Honor, Courage, Commitment, Leadership and Teamwork shall be the core values employed as we serve the citizens of Santa Fe County. In partnership with our communities, we will provide the highest quality public safety services. Our Department is dedicated to the health, safety and welfare of the public we serve and working with the citizens of our county to ensure the quality of life and the preservation of peace for future generations. Our mission is to deter, detect, apprehend and prosecute persons who violate county, state, or federal laws. We are committed to provide investigation of all criminal activity in Santa Fe County. We will ensure that the animal ordinance is enforced, to educate the public about animal ownership, to capture loose animals, and patrol the county. We are totally dedicated to this mission, to the County we serve and to accept the responsibility of attaining our goal of achieving excellence within our profession."

2B-4.6.1. Calls for Service and Response

As is shown in **Table 4**, the Sheriff's Department responded to a total of 40,103 calls in 2007, with 17,885 calls initiated by Officers in the field and 22,218 calls for service by the community. With 78 officers and animal control personnel, exclusive of administrative staff (**Table 6**), this equates to approximately 514 calls for service per officer or animal control personnel. **Table 5** illustrates the average response time per call, based on the call priority.

Table 4: Sheriff’s Department Calls for Service

Total Offenses (Aug 1, 2007 - July 31, 2008)	9,717
Number of Calls Dispatched (2007, not officer initiated)	22,218
Number of Calls Dispatched (2007, officer initiated)	17,885
Total Calls Dispatched (2007)	40,103

Table 5: Sheriff’s Department Average Response Time (2007)

Call Priority	Average Response Time (HH:MM:SS)
Priority 1	0:26:14
Priority 2	0:24:15
Priority 3	0:40:55
Priority 4	0:27:10
Priority 5	0:21:10
Priority 7	0:36:31

2B-4.6.2. Levels of Service

The Sheriff’s Department operates out of the Santa Fe County Public Safety Building at 35 Camino Justicia in Santa Fe, NM. **Tables 6, 7 and 8** show the Sheriff’s Department personnel, vehicles and building space. **Table 9** shows the level of service per thousand population, based on the unincorporated population in the County in 2006.

Table 6: Sheriff’s Department Personnel (2008)

Commissioned Officers	72
Non-Commissioned Officers	1
Administrative	17
Animal Control	5
Total	95

Table 7: Sheriff’s Department Vehicles (2008)

Patrol Vehicles	97
Administrative Vehicles	4
Investigative Vehicles	15
Special Ops/Misc	4
Total	120

Table 8: Sheriff’s Department Building Space (2008)

Main Station	6000 sq. ft.
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Table 9: Sheriff’s Department Level of Service

Facilities and Services	Level of Service (LOS) per 1,000 Residents*
Vehicles (Number)	1.82
Building (GSF)	91
Personnel (Number, Career)	1.44
Average Response Time (2007; approx):	
Priority 1	26 mins
Priority 2	24 mins
Priority 3	41 mins
Priority 4	27 mins
Priority 5	21 mins
Priority 7	36 mins

* The 2006 unincorporated County population of 65,806 was used to calculate the LOS.

2B-4.7. Fire Protection and Emergency Medical Services (EMS)

Fire protection, suppression and emergency response services are integral public safety services provided to Santa Fe County residents. In 1997, the Santa Fe County Fire Department was created by the Santa Fe County Commission by S.F.C. Ordinance 1997-11, effectively consolidating the existing fifteen county volunteer fire districts and the County Fire Marshal’s office into the new County Fire Department. The Fire Department’s Five Year Plan (2005-2009) and updated 2008 Capital Improvement Plan (together, “Fire CIP”) as well as discussions with the Fire Department informed this report.

The Fire Department works proactively to adopt mutual aid agreements and joint powers agreements with other governmental agencies to improve the availability of emergency services to Santa Fe County citizens. Mutual Aid Agreements have been adopted between San Miguel County, Rio Arriba County, Torrance County, Bernalillo County, City of Moriarty, and Sandoval County. Joint Powers Agreements have been approved between the City of Santa Fe and Edgewood Fire District for Fire, Rescue, and EMS services as well as for Regional Emergency Communication Services.

Santa Fe County received a national award for its efforts in the pilot program of the Firewise Communities USA program. Through this program, the Fire Department developed a wildland-urban interface hazard assessment model that has also garnered national recognition for its effectiveness and innovation. The development and implementation of the first Wildland-Urban Interface Code in New Mexico has improved the County's prevention and response to wildland fires.

One of the on-going challenges for the Santa Fe County Fire Department is provision of training opportunities for professionals and volunteers. The lack of efficient, effective, and readily available training venues for emergency services personnel has been, and continues to be, problematic for the department's firefighters.

2B-4.7.1. Funding

In 1997, Santa Fe County Fire Department implemented its first five-year plan utilizing several revenue sources to not only fund the operational needs of the department but also to fund its capital improvement plan. Funding mechanisms of the Santa Fe County Fire Department are described as follows:

The **State Fire Protection Fund** is administered by the State Fire Marshal's Office and funding is provided to the County for specific operational use by a specific County Fire District. These funds are restricted funds, meaning they can only be used for the operational and capital needs for the fire district; they cannot be used for payment of salaries or personnel benefits.

The **State EMS Fund** is administered through the State EMS and Primary Care Bureau of the Department of Health. These funds can only be used to purchase emergency medical services equipment and supplies and cannot be used for personnel salaries or benefits.

The **County Fire Protection Excise Tax**, more commonly referred to as the one-quarter percent fire tax, is a gross receipts tax approved by the County Commission and by the county voters via a county referendum.

Santa Fe County Fire and Rescue Impact Fees were imposed in 1995 by the County Commission on all new development in Santa Fe County. These impact fees, imposed under the authority of the State Development Fee Act, are collected and spent in each fire district where the development occurs. These fees are for capital infrastructure expenses secondary to the growth and development within a specific fire district. The fees can only be utilized for capital infrastructure expense such as building fire stations or buying fire apparatus or equipment with a life expectancy of ten years or more. The fees cannot be utilized for personnel salaries or benefits. Additionally these fees can only be spent in conjunction with a capital improvement plan for the department.

In 1998, a **Revenue Bond** was approved by the County Commission, raising \$2.2 million dollars to significantly improve the capital infrastructure of the county fire districts and the department based on the five-year plan. This Bond has been retired.

General Obligation Bond monies, derived from the approval of the voters for specific purchases or expenditures, have been utilized to help support the capital improvement plan of the department. These monies are spent for the purchase of capital infrastructure items, buildings and apparatus. A General Obligation Public Safety Bond in the amount of \$4.5 million approved by voters in November 2000 has provided a Public Safety Building and Regional Emergency Communications Center (RECC) communications equipment.

Existing County general funds for personnel are considered insufficient to meet the growing demand of services expected from the fire department by the public. Growth in the County will increase capital needs over the next six years as well as the need for staffing, which has not kept up with labor needs. Significant growth in the department is needed to meet level of service expectations. Volunteers are in short supply and responses to calls are very often provided by the station that is capable of sending staff. The Fire Department is in the process of training and hiring additional career firefighters and EMTs on an annual basis to increase the County’s level of service and shorten response times. The use of development agreement funding for staff and personnel needs generated by oil and gas projects should be utilized.

Impact fees collected by individual fire districts have been spent more rapidly in some districts than in others. Some smaller and less active districts have surplus funds that could be, at least in part, utilized by districts with greater needs. However, current law mandates that fees collected must remain and be spent in the individual district in which they are collected. Districts that collect lower levels of impact fee funding often find it necessary to reserve the funds from year to year until enough funding is available to purchase a large piece of equipment. The use of development agreement funding for staff and personnel needs generated by oil and gas projects should be utilized.

2B-4.7.2. Emergency Medical Service

Emergency Medical Services (EMS) comprise a majority of the Fire Department call volume countywide. Regional paramedic ambulances offer 24-hour Advanced Life Support (ALS) coverage throughout the County. The regional ALS teams consist of a professional Paramedic Firefighter and a professional EMT-Intermediate Firefighter. The five ALS regional medic units exist to augment and support the services of the volunteer fire districts. The fire districts of Edgewood, Turquoise Trail, El Dorado, Hondo and Pojoaque also offer ambulance transport services. The Fire Department also works cooperatively with Espanola Hospital to ensure that the closest ambulance service is dispatched to emergencies in the Pojoaque area.

2B-4.7.3. Personnel

Since the fall of 1998 the Santa Fe County Fire Department has used paid professional staff to support local volunteer personnel to ensure that the mission of the department is successful. The paid staff augments those services provided by the volunteers of each fire district and additionally provides a higher level of emergency medical service (Advance Life Support or Paramedic level) than can be typically provided by a county-wide volunteer-based service.

The volunteer personnel of the fifteen fire districts of Santa Fe County Fire Department are responsible for responding to fire, rescue and EMS emergencies twenty-four hours a day, three hundred and sixty-five days per year. These personnel must undergo the same training, licensure and certification required of career (paid) personnel.

The Department has been working to increase the number of career staff to overcome the difficulties of recruiting and retaining volunteers, as well as to increase the level of service and response times. Given the geographic extent of the County, it is unrealistic to transition to an entirely professional staff, and emergencies and fires at oil and gas projects sites are too complex to be handled by volunteers. While the Department will continue to rely on the high quality service provided by volunteers, it will require major funding by oil and gas projects to meet the professional fire and emergency response personnel need which is generated by those projects. **Table 10** enumerates the professional and volunteer staff of the Fire Department.

Table 10: Fire Department Personnel (2008)

Position	Number
Full Time Uniformed Career Positions (Cross Trained Firefighter/EMT or Paramedic)	73
Volunteers	204
Administrative (Civilian) Staff	12
Total	289

2B-4.7.4. Calls for Service and Response

Table 11 shows the Fire Department’s calls for service for 2006, 2007 and 2008. The 2008 calls for service are projected. Sixty-three to sixty-six percent of those calls were for emergency medical service. The annual increase in calls from 2006 to 2007 was 8.6 percent, and a similar annual growth rate is expected for 2007-2008. The average response time, based on 2006 data, was ten minutes and forty-six seconds. While the Department considers the average response time to be adequate, especially considering the geographical extent of the County area served, it strives to constantly improve response. To improve response time, the Department is in the process of adding additional career staff. Additionally, increasing the number of stations and equipment can improve response time.

Table 11: Fire Department Calls for Service

Year	Fire (Number)	Fire (Percent)	EMS (Number)	EMS (Percent)	Total	Annual Increase
2006	1,469	34%	2,819	66%	4,288	
2007	1,723	37%	2,934	63%	4,657	8.6%
2008*	1,758	35%	3,309	65%	5,067	8.8%

*Projected.

2B-4.7.5. ISO Rating and Levels of Service

As per the Fire CIP, fire districts are rated by the Insurance Services Office (ISO) for insurance purposes on a scale of 1 to 10 with 1 being the highest and 10 the lowest. A district rating of 1 indicates an urban area with a sound municipal water system and ample vehicles and stations to accommodate the district population; a rating of 10 indicates a rural area with no community water system, inadequate equipment, and no stations. The Fire Department CIP established a minimum service level in order to determine the vehicle and station improvements that are attributable to growth versus existing inadequacies.

The Santa Fe County Fire Administration has determined that a reasonable minimum level of service (MLOS) is the equipment and station equivalent of an ISO rating of 7/9. This indicates a rating of 7 in the more densely developed portions of rural areas and a rating of 9 in the less densely developed portions of rural areas. This rating is the *minimum* required LOS; a district may have a higher ISO rating. The ISO rating of 7/9 is not dependent on a community water system.

It is the goal of the Santa Fe County Fire Department that all County Fire Districts receive an official ISO rating of 7/9 or better. While determination of ISO ratings is often subjective and dependent largely on the unique circumstances of each district, an ISO rating of 7/9 generally requires that, in addition to a station, the district be in possession of an engine, a tanker with tanker-shuttle capabilities, and a rescue vehicle. These needs will be further exacerbated by responses to oil and gas explosions and fires, which require sophisticated equipment and rapid response times.

As part of the Fire CIP, an inventory of fire apparatus and fire stations for each County fire district was conducted which included both existing apparatus and stations and those needed to meet MLOS. **Table 12** documents the Department’s existing, deficient and replacement vehicles (or apparatus) – engines, tankers, brush trucks, ambulances, rescues and aerial/quints. **Table 13** shows square footage of existing and needed stations. **Map 34** shows the locations of existing stations and response times, based on an unencumbered speed of 35 miles per hour. The response times are based on a distance/speed radius and do not take into account the road network, stopping time or preparations prior to leaving the station.

Table 14 shows the Levels of Service per thousand unincorporated County residents (including Edgewood) for Fire and EMS personnel, vehicles, and building space.

Table 12: Fire Vehicles – 2007-2012 CIP

Type of Vehicle	Existing	Deficiencies	Replacements
Engines	33	3	11
Tankers	29	2	8
Brush Trucks	21	3	2
Aerial/Quint	0	2	0
Ambulances	8	0	4
Rescues	14	0	4
Total	105	10	29

Table 13: Fire Department Stations – 2007-2012 CIP

	Existing	Deficiencies
Number of Stations	37	6
Gross Square Footage (GSF)	133,650	21,672

Table 14: Fire Department Level of Service

Facilities and Services	Level of Service (LOS) per 1,000 Residents*
Vehicles (Number)	1.55
Building (GSF)	1,977
Personnel (Number, Career and Volunteer)	4.27
Average Response Time (2006; approx)	10 mins
Fire Station Service Area (est)	4 miles
ISO Rating	7/9

*The 2006 County population of 65,806 plus the Edgewood population of 1,810 were used to calculate the LOS since the Santa Fe Fire Department provides first-response service to these areas.

2B-4.7.6. Adverse Effects and Impacts of Oil and Gas Development

Since oil and gas drilling in Santa Fe has been minimal with no major resources discovered, the Santa Fe County Fire Department hasn't previously dealt with the adverse effects and impacts of oil and gas development. Two issues of the Fire Department for responding to oil and gas emergencies are access and water. To respond to an incident, the Fire Department must quickly navigate heavy trucks and equipment to sites in rural areas with limited access and roadways developed to only a rural standard. For the Fire Department to respond to such incidents, access roads must meet minimum County standards for all weather road surfaces and crossings.

Water availability is also critical to the Fire Department's ability to respond to oil and gas incidents in rural areas. The Fire Department and Oil and Gas Industry should work together proactively to identify fire prevention and suppression strategies, including identification of water sources to be used to suppress fires on oil and gas development sites. The greater amount of communication and cooperation among all service providers and industry, the greater opportunity there will be to prevent issues and minimize incompatibilities.

In terms of catastrophic events, the Fire Department does not have the capacity, training or equipment to suppress oil well fires or other catastrophic events related to oil and gas drilling. Oil and gas projects must be required to pay for the professional staff and specialized equipment and training needs generated by oil and gas projects.

Oil and gas projects must adhere to the standards for the Wildland Urban Interface code in order to prevent wildland fires and risks to surrounding surface land uses and residents. Oil and gas operations shall provide facilities or equipment, such as helicopter landing pads, in order to facilitate emergency response.

2B-4.8. Emergency Management

The Santa Fe Office of Emergency Management (OEM) was established in 1994 under a joint resolution between the City and County of Santa Fe. It is located in the Santa Fe County Public Safety Building under the direction of the County Fire Chief.

2B-4.8.1. Adverse Effects and Impacts of Oil and Gas Development

From wildfires to hazardous liquid spills, proper emergency planning and preparation is integral to maintaining the health and safety of the County and its residents. Oil and gas operations pose a unique hazard to the environment and public safety, requiring careful storage of hazardous materials and adequate safety warnings, information and signs. Significant damage may result from such operations, both in scope and/or toxicity. Oil and gas project operators must prepare for such potential emergencies and develop appropriate emergency plans.

2B-4.9. Public Health

2B-4.9.1. Existing Service

Health and Human Services play a critical role in the quality of life through involvement in hospital relations and public health policy at the local, state and federal level.

The Health and Human Services Division has a number of affiliated advisory groups which make recommendations to the Division and Board of County Commissioners concerning health issues, public policy, proposed legislation and rules, and funding recommendations among other duties. These groups include the Santa Fe County Health Policy and Planning Commission (HPPC), DWI Planning Council, MCH Planning Council, and the Care Connection Advisory group.

The primary healthcare provider for emergencies and major medical care in Santa Fe County is Christus St. Vincent Regional Medical Center, located in the city of Santa Fe. It has a Level III Trauma Center rating. Emergencies above this level are transferred to University of New Mexico Hospital in Albuquerque via air or ground. There is a surgical hospital, Physicians Medical Center of Santa Fe, located in southeastern Santa Fe that performs some surgeries, as well as the Espanola Hospital, owned by Presbyterian Healthcare Services.

The healthcare system in Santa Fe County also includes private and non-profit practitioners and clinics, including Federally Qualified Health Centers, but is considered to be barely sufficient, due in part to the inability of patients to use the system due to lack of financial resources and a lack of healthcare coverage. The same is true for hospital capacity in the event of a large public emergency. Essentially, the current system is insufficient to serve the County's existing population and incapable, at current funding, personnel and equipment levels, to meet the needs generated by oil and gas projects in the event of emergencies.

2B-4.9.2. Impacts of Oil and Gas Development

Protection of the public health, safety and welfare is a key purpose of County land use regulation. Oil and gas development poses significant risks and human health hazards. Seepage that may occur during drilling, fracing, re-injection and storage and related contamination of groundwater and soil; air pollution from dust and combustible materials; excessive noise and noxious odors are among the typical hazards of oil and gas development.

The largest public concern is contamination of water used for human and wildlife consumption, in surface waterbodies, aquifers and domestic wells. Chemicals used in oil and gas operations have been associated with cancer, reduced fertility, birth defects, and neurological problems. Air quality is also a major public health concern. During the drilling process, nitrogen oxides, sulfur oxides, particulate and hazardous substances, such as benzene, can be emitted. Flare-offs that regulate gas pressure may release heavy metals and other toxic substances into the air. Particulate matter and dust are stirred up by increased road traffic of heavy weight and load. Ground-level ozone and smog may lead to an increase in asthma and other respiratory illnesses – especially among vulnerable populations, such as children and the elderly. Other chemicals and toxins released during the drilling process can cause asthma, cancer, severe and permanent neurological damage, pulmonary reduction, coronary problems, endocrine disruption and debilitating headaches. Environmental noise pollution and artificial light can have physical, psychological, and emotional effects that are difficult to measure.

Oil and gas well and wildland fires, explosions, severe and/or life-threatening accidents from equipment failure, safety breaches and other accidents are a major risk.

In addition to the extreme negative impacts from oil and gas development other risks from less obvious hazards create further cumulative adverse effects and impacts. The pollution that occurs on a daily basis from oil and gas traffic in the County will be an on-going problem. Oil drip on the road, exhaust, rubber particulate from tires and other contaminated dirt and debris coats roadways and runs off into the surrounding environment through the air or in stormwater run-off. This Plan Element therefore recommends numerous strategies the County must implement to prevent and mitigate threats to the public health. These strategies include, but are not limited to limiting the use of dangerous chemicals; limiting the use of chemicals in fracing operations; requiring the use of close-loop systems; increasing requirements for well bore casings; requiring water and air quality monitoring; requiring setbacks from surface and groundwater resources; buffering of drill sites and access roads; limiting use of re-injection wells; requiring emergency mitigation and response planning; and other best management practices.

2B-4.10. Capital Improvements Program (CIP)

Short- and long-range Capital Improvements Programs (CIPs) and Operating Budgets are important tools that ensure the County has the capacity to provide and maintain necessary public facilities and services and that the facilities and services are cost-effectively planned and equitably financed. The short-range CIP / Budget should identify and estimate costs of capital improvements and annual obligations (for staffing, training, *etc.*) required to serve oil and gas development for the next 5 years. The long-range CIP / Budget should identify and estimate costs of improvements and annual obligations needed to serve oil and gas development for years 6 through 20. This plan is not an engineering document, but estimates capital improvement and annual operating costs based on baseline data provided by County staff.

The short-range CIP should be updated annually. The long-range CIP should be updated at least once every five years or when significant changes occur that impact the County's long-term capital investment strategies (*e.g.*, changes in service areas, significant changes in the Future Land Use Plan, changes in service demand or delivery patterns).

The Oil and Gas Plan Element Capital Improvement Plan identifies system-wide improvements necessary to accommodate a moderate amount of oil and gas development. Moderate activity is not determined solely by the number of wells, but considers the cumulative impacts of well activity, including volume, frequency, location, concentration, timing, production results, presence of dry gas, production of water, and other factors.

Capital improvements and expenditures for services have been identified for public safety, roads and administration, and are summarized in the CIP (with annual operating expenditures) in **Table 15**, which indicates:

- Total capital costs to accommodate oil and gas development are almost \$61.25 million.
- Transportation improvements, to accommodate oil and gas development, for exploratory- and extraction/production-grade roads is the largest capital improvement cost type, at \$56.6 million. However, that cost does not include any grading, cut and fill or right-of-way acquisition, only construction costs.
- Capital costs for the short-range CIP, for years 1 through 5, are almost \$33.7 million; capital costs for the long-range CIP, for years 6 through 20, are almost \$27.5 million.
- The CIP includes a 20,000 square foot Public Safety and Civic Center, to provide space for fire facilities, sheriff facilities, administrative facilities and as a combination civic meeting space and County staff training facility.
- Total annual operating costs, for services and training, are \$1.66 million per year.
- The largest annual operating cost type is for 18 full-time fire safety personnel (currently much of the County is served by voluntary fire fighters), for over \$1 million per year.

2.10.1. CIP Implementation

The CIP shall be implemented through an *ad hoc* process based on the projected actual impact of each oil and gas project. Initial improvements will be negotiated with the preliminary oil and gas project proposals, based on the system-wide level of service framework established in the CIP. Specific implementation program improvements will be individualized based on the impact of the proposed project on public facilities and services. Negotiations to establish the costs to be paid by an applicant should occur between County Staff (Sheriff, Fire Chief, and representatives from the Legal, Planning, and Public Works Departments) and the applicant. The analysis also should consider that some improvements are mandatory (such as roadway improvements to handle the additional weight of oil and gas traffic), while others may be phased (such as the 27 staff members to handle oil and gas development impacts).

The CIP improvements can be fully implemented when it is determined by the Public Works Director, Sheriff, and Fire Chief that the amount of oil and gas development in the County has reached a point at which system-wide improvements have become necessary for the County to provide and maintain an adequate level of service. As development occurs and improvements are provided or funded, the CIP will be updated. As additional local level of service data is enhanced, a method to proportionately allocate CIP costs should be established.

Roadway Impacts

Using the CIP for Roads as a guide, negotiations to determine costs for roadway impacts should focus on the roadways directly impacted by the proposed project. To determine the actual impact of a proposed project to roadways, the findings of the Traffic Impact Analysis should be referenced.

The Traffic Impact Analysis shall focus on the actual impact to roadways which will be created by the project. This analysis should include not only the number of trips to be created by the proposed project, but also an analysis of how these trips will affect roadways. Because oil and gas projects involve heavy trucks with heavy loads, the impact of each trip has a far greater impact on the road surface than a typical passenger vehicle trip. To make accurate decisions as to a project's impact to County roadways Staff must have a calculation which represents the cumulative impact of a project. Such a calculation is the total ESAL (equivalent single axle loads) for a development.

To determine the total ESAL for a project, the Traffic Impact Analysis shall following the following process. First, the Traffic Impact Analysis shall calculate the 18 kip ESAL for each trip generated by the project over the course of the CIP (20 years). To perform this step, the traffic engineer preparing the Traffic Impact Analysis should determine the ESAL for each vehicle and load variation (including both empty and full loads). This baseline ESAL for each vehicle and load variation should then be multiplied by the number of trips to be generated for each vehicle and load variation, creating a total ESAL for each vehicle and load variation. Finally, the total ESAL for the project should be determined by adding together the total ESAL

for each vehicle and load variation. As noted above, the resulting total project ESAL shall be used by Staff, in correlation with the CIP for Roads, to negotiate a fair and equitable fee for roadway impacts.

Example

H&M gas development proposes a project which will produce traffic impacts on two roadways targeted by the CIP for upgrades to handle oil and gas truck traffic (CR 45 and CR 26).

Through the Traffic Impact Analysis process, the total ESAL for the project is determined to be 15,000 ESAL.

According to the CIP, the two affected CIP roadways (CR 45 and CR 26) are each to be paved with asphalt with a design ESAL of, for purposes of this example, 100,000. Because there are two roadways affected, the total design ESAL of roadways affected by the project is 200,000 (100,000 + 100,000).

The total oil and gas project ESAL (15,000) may be divided by the total design ESAL of project roadways (200,000) to determine proportionate share. In this example, H&M related traffic will account for 7.5% of the design ESAL (15,000/200,000). Using this methodology, the proportionate share to be paid by H&M should be 7.5% of the total cost to improve both roadways.

The two affected CIP roadways (CR 45 and CR 26) will cost a total of \$17,720,000 to be completed (according to the CIP - \$11,000,000 + \$6,720,000). Using the analysis above, H&M's proportionate share of this cost (7.5% of \$17,720,000) equals \$1,329,000.

Public Safety Impacts

Using the CIP as a guide, negotiations to determine costs for non-roadway impacts should focus on obtaining specific capital outlays, and contributions to capital outlays, based on the proposed project's actual impact.

As noted earlier, because not all of the facilities and improvements listed in the CIP are necessary to begin oil and gas development in the County, negotiations should consider an appropriate phasing of the improvements. For an exploratory well, or when only a few drill sites are in operation in the County, it is possible that the County can service these sites with its current equipment and staff. However, special training and equipment may be needed from the very first well, such as safety training or special communications equipment for emergency personnel. To provide these improvements necessary to begin oil and gas development, negotiations with initial applicants for oil and gas projects could involve costs, for example, for two firefighters to attend a special oil and gas training program, or a new truck for law enforcement patrol, or for special communications equipment needed for the County to provide service to oil and gas projects.

In addition to improvements required to begin oil and gas development, the oil and gas applicant should also contribute towards the Public Safety/Civic Center and staff costs occasioned by oil and gas development in the County, even if these facilities and staff are not established right away. Oil and gas producers should contribute to a fund, in an amount proportionate to the project's impact on County services, which will be used to provide these system-wide improvements when the development of oil and gas within the County reaches a point at which system-wide improvements become necessary for the County to provide an adequate level of service.

Table 15: Capital Improvements and Services Plan

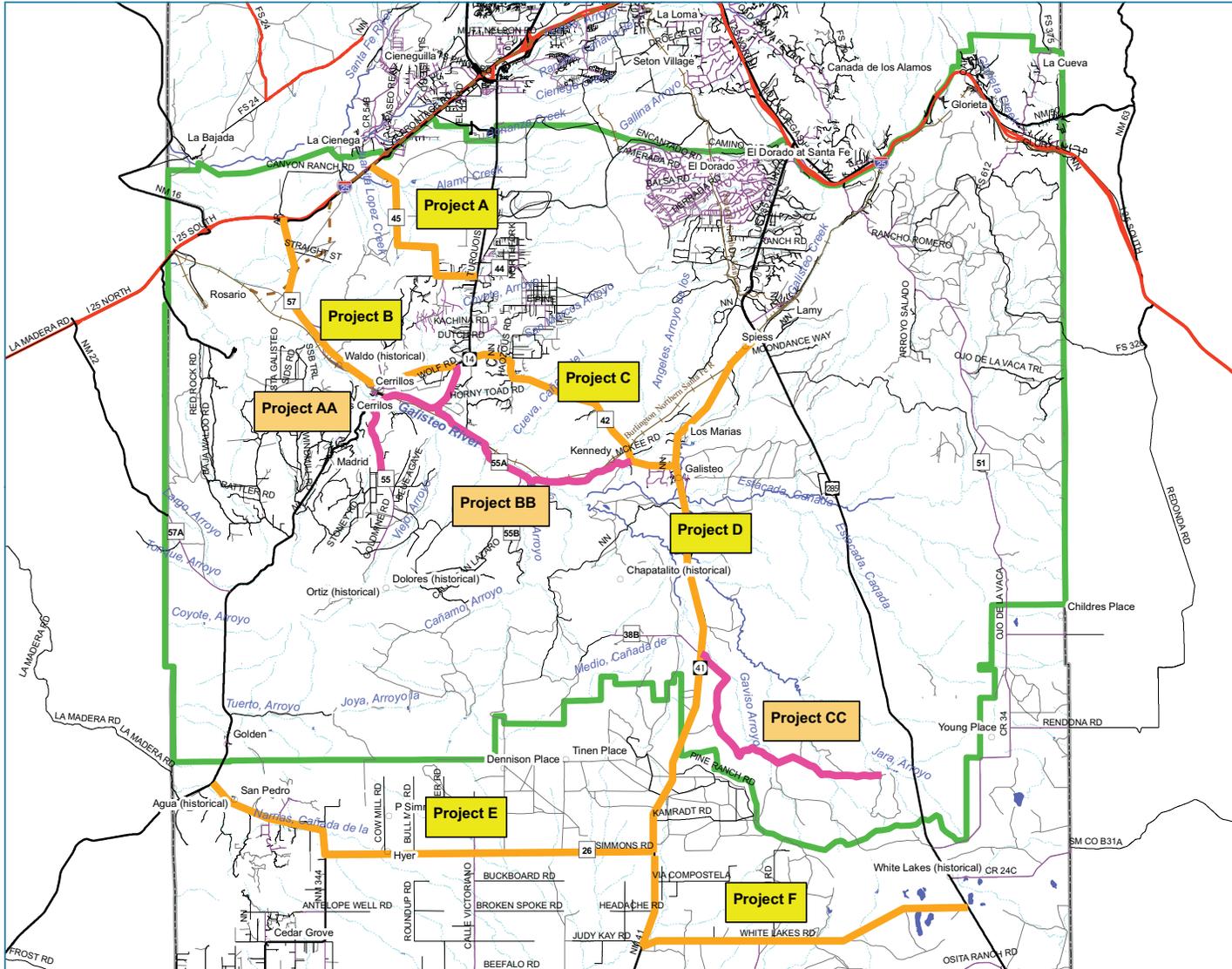
	Roadway	Length (miles)	Cost Per Mile	SF GFA	Cost Per SF	Vehicles	Cost Per Vehicle	Staffing	Cost Per Staff	Total Capital Cost	Total Annual Operating Cost	Capital Costs, Yrs 1-5	Capital Costs, Yrs 6-20
ROADS													
Extraction/Production Routes													
Project A	CR 45	6.72	\$1,000,000							\$6,720,000		\$6,720,000	
Project B	CR 57	6.83	\$1,000,000							\$6,830,000		\$6,830,000	
Project C	CR 42	9.33	\$1,000,000							\$9,330,000		\$9,330,000	
Project D	SR 41	22.50											
Project E	CR 26	11.00	\$1,000,000							\$11,000,000			\$11,000,000
Project F	CR 20B	11.22	\$1,000,000							\$11,220,000			\$11,220,000
Exploration Routes													
Project AA	55A	9.33	\$500,000							\$4,665,000		\$4,665,000	
Project BB	55	6.72	\$500,000							\$3,360,000		\$3,360,000	
Project CC	(unnamed)	6.72	\$500,000							\$3,360,000			\$3,360,000
Total										\$56,485,000		\$30,905,000	\$25,580,000
FIRE, EMS													
Public Safety/Civic Center													
				12,000	\$200					\$2,400,000		\$2,400,000	
Vehicles													
Engine						1	\$250,000			\$250,000			\$250,000
Ambulance						1	\$135,000			\$135,000		\$135,000	
Tanker						1	\$200,000			\$200,000		\$200,000	

	Roadway	Length (miles)	Cost Per Mile	SF GFA	Cost Per SF	Vehicles	Cost Per Vehicle	Staffing	Cost Per Staff	Total Capital Cost	Total Annual Operating Cost	Capital Costs, Yrs 1-5	Capital Costs, Yrs 6-20
Administration/Inspection Vehicle						1	\$30,000			\$30,000		\$30,000	
Equipment										\$25,000		\$25,000	
Staffing, Fire (FTE)								18	\$60,000		\$1,080,000		
Staffing - Oil/Gas, Admin (FTE)								1	\$60,000		\$60,000		
Training											\$25,000		
Total										\$3,040,000	\$1,165,000	\$2,790,000	\$250,000
SHERIFF													
Public Safety/Civic Center				2,000	\$200					\$400,000			\$400,000
Vehicles													
Patrol Car						2	\$31,000			\$62,000		\$31,000	\$31,000
Administration/Investigation Vehicle						1	\$25,000			\$25,000		\$25,000	
Equipment										\$10,000		\$10,000	
Staffing, Deputies (FTE)								6	\$60,000		\$360,000		
Staffing - Oil/Gas, Admin (FTE)								1	\$60,000		\$60,000		
Training											\$10,000		
Total										\$497,000	\$430,000	\$66,000	\$431,000
ADMINISTRATION													

	Roadway	Length (miles)	Cost Per Mile	SF GFA	Cost Per SF	Vehicles	Cost Per Vehicle	Staffing	Cost Per Staff	Total Capital Cost	Total Annual Operating Cost	Capital Costs, Yrs 1-5	Capital Costs, Yrs 6-20
Public Safety/Civic Center				3,000	\$200					\$600,000			\$600,000
Vehicle						1	\$25,000			\$25,000		\$25,000	
Staffing - Oil/Gas Coord (FTE)								1	\$60,000		\$60,000		
Training											\$5,000		
Total										\$625,000	\$65,000	\$25,000	\$600,000
COMMUNITY SERVICES													
Public Safety/Civic Center				3,000	\$200					\$600,000			\$600,000
TOTAL										\$61,247,000	\$1,660,000	\$33,786,000	\$27,461,000

NOTE: All costs are estimates; based on existing level of service and data/information provided by County staff; also based on experiences of other New Mexico counties with significant oil and gas development.

Road CIP



Legend

Priorities CIP

- Production / Extraction Route
- Exploratory Route
- Railroads
- - - Railrunner Alignment

Roads

Ownership

- Federal
- State
- County
- Other
- Revised Galisteo GMA
- Sante Fe County Boundary

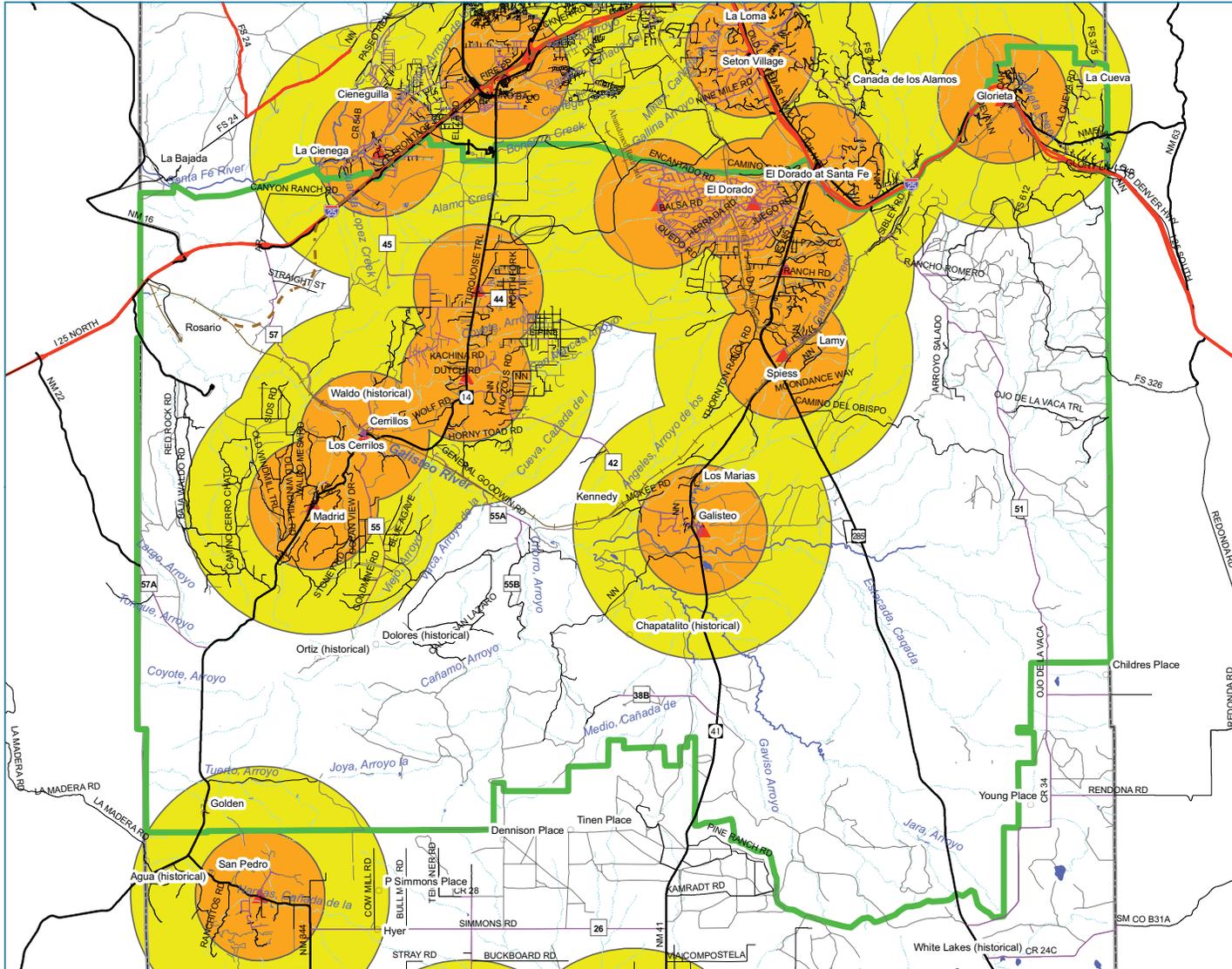
Hydrology

- Stream/River: Intermittent / Other
- Stream/River: Perennial
- Water Body

Please use this map as a guide and not as definitive information. The areas depicted by this map are approximate and are provided for illustrative purposes only. While every effort has been made to ensure the accuracy, completeness, correctness, and timeliness of information presented within this map, the burden for determining appropriateness for use rests solely with the user. This map is provided "as is" with no warranties, express or implied.



Fire Station Locations and Response



Legend

- ▲ Fire Station
- Response Area**
- Buffer Distance**
- Orange 2 Mile Buffer
- Yellow 4 Mile Buffer
- Railroads
- - - Railrunner Alignment
- Roads**
- Ownership**
- Red Line Federal
- Black Line State
- Purple Line County
- Grey Line Other
- Green Outline Revised Galisteo GMA
- Grey Outline Sante Fe County Boundary
- Hydrology**
- Blue Line Stream/River: Intermittent / Other
- Blue Line Stream/River: Perennial
- Blue Box Water Body

Please use this map as a guide and not as definitive information. The areas depicted by this map are approximate and are provided for illustrative purposes only. While every effort has been made to ensure the accuracy, completeness, correctness, and timeliness of information presented within this map, the burden for determining appropriateness for use rests solely with the user. This map is provided "as is" with no warranties, express or implied.



2B-5. Resource Protection

Natural and community resources and existing development must be protected from the negative impacts of oil and gas projects. The impacts of oil and gas projects must be minimized by using the best known tools and techniques to make development as sustainable as possible. Oil and gas development, if and where allowed, must adhere to the highest standards possible in terms of recovery techniques, safety, site location and design, cooperation with the community and overall environmental and natural resource sustainability. Santa Fe County requires sustainable, responsible oil and gas exploration and production, which limits harmful effects and impacts to the environment. This Element establishes policies and standards for oil and gas development to minimize impact, harm and risk to the environment and other County resources.

2B-5.1. Cultural, Historic and Archaeological Resources

Oil and gas development threatens the numerous historical, cultural and archaeological resources located in Santa Fe County. These resources not only provide insight into the past, but are part of a still living culture in the County. While these resources exist in sites across the County, the Galisteo Basin in particular is noted as having an abundance of archaeological, cultural and historic sites, ranking as an important area regionally and nationally for the quality and quantity of significant sites.

Members of Native American Pueblos throughout the County visit the Galisteo Basin area on a regular basis to participate in cultural and religious ceremonies and gather plant material to be used ceremonially. It is of utmost importance to the Pueblo members to protect their historic, cultural and archaeological sites, preserve the sanctity of unmarked burial areas, preserve places of importance for ceremonies and prevent the loss of important wildlife and vegetation areas of significant religious value. Protecting the vital groundwater of the Galisteo Basin is of utmost importance, as it is used ceremonially and is necessary for the preservation of plant, animal and human life in the Basin.

One of the primary challenges in protecting these sites is that only 15% of sites have been surveyed, documented and mapped. It is accepted that the majority of important sites have not been identified and recorded, and that if oil and gas projects are activated in the Galisteo Basin area it is likely that new sites will be “discovered” and unearthed. Oil and gas project operations will involve large amounts of site disturbance and impacts to the surrounding landscape, much of which contains these significant resources. The County must assess, identify and protect important these resources before and during the exploration, construction and production phases. As findings are documented and mapped, this data should be added to a County-wide data base in order to maintain an updated record. This Element establishes policies and strategies to identify, preserve and protect historic, cultural and archaeological resources from the negative effects and impacts of oil and gas development.

In addition to the cultural importance of maintaining historic, cultural and archaeological sites, artifacts and areas that are significant components of the heritage of the Pueblos located in the County, preservation of these assets is also important to the tourism industry. The richness of these resources was recognized by the passage of the Galisteo Archaeological Sites Protection Act (Public Law 108-208), which calls “for the preservation, protection, and interpretation of the nationally significant archaeological resources in the Galisteo Basin in New Mexico.” These resources include prehistoric and historic archaeological resources of Native American and Spanish colonial cultures, spectacular examples of Native American rock art, and ruins of Pueblo and Spanish colonial settlements. **Table 16** includes the Galisteo Basin Archaeological Protection Sites enumerated in the Act. According to the Act, these resources are threatened by natural causes, urban development, vandalism, and uncontrolled excavations. When funding becomes available, the general management plan for these sites is to be developed in consultation with the Governor of New Mexico, the New Mexico State Land Commissioner, affected Native American Pueblos, and other interested parties.

Table 16: Galisteo Basin Archaeological Protection Sites

Site	Acres
Arroyo Hondo Pueblo	21
Burnt Corn Pueblo	110
Chamisa Locita Pueblo	16
Comanche Gap Petroglyphs	764
Espinoso Ridge Site	160
La Cienega Pueblo and Petroglyphs	126
La Cienega Pithouse Village	179
La Cieneguilla Petroglyphs/Camino Real Site	531
La Cieneguilla Pueblo	11
Lamy Pueblo	30
Lamy Junction Site	80
Las Huertas	44
Pa'ako Pueblo	29
Petroglyph Hill	130
Pueblo Blanco	878
Pueblo Colorado	120
Pueblo Galisteo/Las Madres	133
Pueblo Largo	60
Pueblo She	120
Rote Chert Quarry	5
San Cristobal Pueblo	520
San Lazaro Pueblo	360
San Marcos Pueblo	152
Upper Arroyo Hondo Pueblo	12
Total Acreage	4,591

It is clear that protection of these resources is not solely a Federal undertaking and must also be achieved through County and State means and intergovernmental cooperation. This Plan Element recommends that Santa Fe County should petition Federal legislators and administrators to fund the preparation of the Galisteo Archaeological Site Management Plan, as provided for in Public Law 108-208. The County should work with the Pueblos, Department of Indian Affairs, Department of Cultural Resources, Tourism Department and landowners to develop and implement the management plan. The plan must fully document the location, nature, condition and preferred preservation techniques for the sites. The management plan should include specific actions and regulations to minimize soil and other disturbances within the environs of specific

historic, cultural and archaeological sites. Once the management plan is developed, local regulations should be amended to implement development and erosion related provisions. Implementation of the management plan may be funded in part through historic preservation funding through the New Mexico State Historic Preservation Office.

Historic sites are located throughout the County. **Table 17** lists the places in the County that are listed on the National Register of Historic Places.

Table 17: National Register of Historic Places (Santa Fe County)

Sites
Barrio de Analco Historic District
Don Gaspar Bridge
El Puente de Los Hidalgos
El Santuario de Chimayo
Fairview Cemetery
Glorieta Pass Battlefield
Jones, Everret, House
Kelly, Daniel T., House
National Park Service Southwest Regional Office
New Mexico Supreme Court Building
Palace of the Governors
Route 66 and National Old Trails Road Historic District at La Bajada
San Lazaro
Santa Fe Plaza
Schmidt, Albert, House and Studio
Seton Village

2B-5.2. Agriculture and Ranching

Santa Fe County has a resource-based economy with a history of agricultural production and ranching uses that includes an atmosphere conducive to artistic pursuits and tourism. The natural landscape attracts residents and visitors to Santa Fe County. Oil and gas projects must be located, designed and regulated to avoid negative effects and impacts on existing resource-based development and land uses in Santa Fe County.

2B-5.2.1. Agriculture and Ranching

Prospective oil and gas projects currently target a rural area that includes active agricultural operations and rangelands. The preservation of the County’s agrarian heritage and active agricultural uses contributes to the County’s eco-tourism and artistic character. Oil and gas, including the improvement and use of access roads and on-going operations projects near to agricultural uses and rangelands, threatens the viability of those operations.

Two of the largest threats to agricultural viability due to oil and gas project operations include the loss of productive surface acreage and injury or loss of life to grazing livestock. Typical drill sites vary in size due to site and environmental conditions, and full build-out of a productive field for oil and gas development can occupy significant land in terms of productive acreage. One technique for minimizing the impact of oil and gas development on agriculture is to co-locate drill sites and use directional drilling to access resources that are not directly below the surface drill site. The oil and gas industry is capable of using directional drilling to reach an average distance of 2,800 feet from the surface hole (over ½ mile). As technology continues to expand so will the distances capable of being reached through directional drilling. Co-locating drill sites can preserve significant acreage and increase the viability of agricultural operations. It is important to note that the

benefit of co-locating drill sites is not only to preserve surface area, but also to consolidate the location of access roads. Road construction and traffic have significant negative impacts and must be minimized.

There are many threats to grazing livestock and wildlife habitats from oil and gas development, which include:

- Animals may be exposed to dangerous chemicals that leak from equipment or are improperly stored;
- Animals may be exposed to open pits that contain contaminated or unsafe water;
- Animals may become trapped or tangled in well equipment;
- Animals may escape from enclosures due to careless management of gates and fences; and
- Animals may be threatened by truck traffic, and may be hit and killed by heavy trucks that are unable to avoid them.

This Oil and Gas Element establishes development standards for oil and gas operations to prevent degradation to agricultural and ranching operations. Co-location of drill sites; active management and oversight of well operations; proper fencing, screening and buffering of drill sites; use of closed-loop systems that eliminate open pits; and other techniques outlined in this Plan are intended to prevent the harms enumerated above as well as other unforeseen consequences of oil and gas development.

Related to agriculture and ranching is agri-tourism, a potential niche market in Santa Fe County's tourism economy. As urban populations have increased, there has been an increased interest in reconnecting with agriculture as reflected by "you-pick" operations and farm/ranch tours. Protecting the viability of on-going ranching and agricultural operations contributes to the development of agri-tourism as a component of Santa Fe County's character and economy.

2B-5.2.2. Ecotourism

Since the 1970's, the tourism industry in Santa Fe County has experienced explosive growth. Visitors are attracted to Santa Fe's archeological, architectural, cultural and natural beauty. Protection of these unique environmental, historical, archaeological, ranching and cultural resources from the deleterious impacts of oil and gas projects will enhance the viability of tourism in Santa Fe County.

A significant amount of tourist activity in Santa Fe County can be regarded as "ecotourism." Ecotourism includes all tourist activities that have a reduced impact on the natural environment, encourage education awareness of the environment and cultural significance of a place. These types of activities usually include visiting National parks and wildlife preserves, educational, scenic and awareness trips, guided tours, volunteer trips, canoeing, hiking, and other outdoor adventures. Ecotourism is increasing in popularity in concert with the growing popularity of green products, sustainable development and environmentally friendly alternatives to conventional standards of the past.

Bird watching, astronomy and observation of the night sky, kayaking, hiking and horseback riding, along with other wildlife and naturalistic pursuits draw tourists to Santa Fe County. The County's artistic communities, Native American Pueblos and historic sites are important tourism draws. Promoting ecotourism is only one component of a successful ecotourism development program. First and foremost, a healthy environment with connected, protected and accessible natural areas is critical. For the County to protect its ecotourism assets, it must prevent adverse oil and gas public nuisance effects and impacts from infringing on a critical mass of natural preserves.

In the Galisteo Basin Area, where much of the County's ecotourism assets are located and where specific oil and gas projects are proposed, there is a significant amount of open and recreation space. Three County open space parks and trails currently exist in the Galisteo Basin historic, cultural and archaeological region, and others are under development, including:

- Arroyo Hondo Open Space;
- Arroyo Hondo Trail;
- Lamy Junction site;

- Madrid Green Belt;
- Madrid Wilderness;
- Spur Trail;
- Thornton Ranch Open Space; and
- Three parcels around La Cienega: El Tanque, El Peñasco, and Las Golondrinas.

The County Open Land and Trails Planning Advisory Committee and private conservation groups have discussed designation of a National Monument that would include the Galisteo River with its wildlife habitat. Proponents of open space parks and trails believe that oil and gas project operations would be incompatible with these park and open space uses.

This Oil and Gas Element recommends the adoption of standards to limit the adverse effects and impacts of oil and gas projects on the natural landscape. Regulation shall include aesthetic standards, such as siting requirements, height limitations, fencing and screening with natural materials and use of regional design components to mitigate the visual impact of oil and gas operations and access roads. Additional standards must be imposed to fully mitigate the nuisance factors of oil and gas development and maintain the naturalistic setting of the County. These standards include noise, dust, buffering, hours of operation and other performance standards.

2B-5.3. Environmental Protection and Natural Resources

2B-5.3.1. Water

In the arid Southwest, water is of paramount consideration. Protecting water quality and quantity is absolutely critical to the sustainability of the region. It cannot be overstated – the viability of life in Santa Fe County is dependent upon a safe and available water supply. Oil and gas development must not only maintain and protect the available water, but also protect the aquifer recharge areas and the ability of the natural water system to maintain its function and refresh its supply.

The underground aquifer water supply located throughout the County is a fragile water system upon which all life in the region depends. The Espanola Basin Aquifer System has been designated a sole source aquifer by the EPA (Environmental Protection Agency). This designation means that the aquifer supplies at least 50% of the drinking water to persons living over the aquifer, that no alternative and feasible source of drinking water could replace the aquifer and contamination of the aquifer would create a significant hazard to public health. The Espanola Basin Aquifer supplies approximately 85% of the drinking water used in the area.

The Espanola Basin Aquifer System, encompassing approximately 3,000 square miles, includes the cities of Santa Fe, Los Alamos and Espanola, in addition to a number of smaller communities and areas, constitutes an irreplaceable resource, supplying water to residents, communities and agricultural operations. Any contamination would be catastrophic. All intermittent or perennial streams, creeks, arroyos and other waterways and aquifer recharge areas are vital to the water system and must be protected.

Oil and gas project operations involve major potential adverse effects and impacts on these water resources. These include, but are not limited to:

- the risk of pollution to surface and ground water due to chemical contamination and run-off;
- the risk of pollution and sedimentation of surface water due to increased erosion from drill sites and access roads;
- the risk of pollution to surface and ground water due to leaking storage pits;
- the risk of pollution to ground water due to faulty well casing;
- the risk of pollution to ground water due to fracturing fluid contamination;
- the risk of pollution to ground water due to produced water re-injection; and
- the risk of depletion of County water supply due to the extensive water needs created during the drilling and operating phases of oil and gas recovery.

To protect the water supply, this Element establishes mandatory safety limitations on oil and gas operations without which oil and gas projects must be denied. The standards include limitations on toxic chemicals and fluids that may be used in oil and gas drilling and recovery operations to prevent surface and groundwater pollution. Only clean, fresh water shall be used in fracing operations. Closed loop systems shall be used in order to eliminate potential contamination from surface pits. This Element specifies the need for proper handling and control of hazardous materials and assessment and mitigation of potential point and non-point source pollutants.

To preserve the County's water supply, oil and gas development shall supply its own supply of fresh water for drilling and operation activities. Oil and gas projects shall submit a water availability assessment that guarantees a 50-year supply of fresh water required for oil and gas operations. All produced water must be trucked off of drill sites, and re-injection wells should not be used.

Protection of domestic wells is an important issue. The County shall support the OSE's domestic well reduction of diversion and work with the State Engineer to establish "Domestic Well Management Areas" within the Galisteo Basin and its watershed. Water quality before, during and after drilling operations shall be monitored to ensure public health and safety and total avoidance of contaminated water supplies.

2B-5.3.2. Scenic Viewsheds

Santa Fe County is replete with a variety of visual resources, ranging from small, definable places to vast, almost limitless plains and vistas. Some of the County's most significant resources are the views from the Turquoise Trail Scenic Byway (State Highway 14). This highway offers a wonderful view of the basin for motorists who travel to and from Santa Fe and Albuquerque and make stops at local communities and tourist attractions. The development of mineral resources threatens the unique and valuable visual and natural landscape resources. Negative impacts to scenic viewsheds from oil and gas projects must be prevented.

This Element recommends standards to mitigate the impact of oil and gas project operations on visual resources, including the minimization of the number, intensity and size of drill sites through co-location (clustering), limiting access roads; use of siting and site design standards that emphasize natural features for screening and buffering; use of indigenous and natural materials and regional design elements for construction and screening, height limitations and other techniques.

2B-5.3.3. Wildlife and Vegetation Habitats

Santa Fe County lies at the convergence of four defined ecosystems: the Southern Rocky Mountains, Arizona/New Mexico Mountains, Southwestern Tablelands and Arizona/New Mexico Plateau. This unique convergence provides for a high level of biodiversity including larger mammals such as black bear, cougar, mule deer and pronghorn that live in the undeveloped lands within the Galisteo Basin and along tributaries. Natural features which allow for the presence and migration of wildlife shall be protected as ecological and eco-tourism assets.

The Galisteo Basin provides habitats for burrowing owl, long-billed curlew, black bear, mule deer, and pronghorn. Wildlife corridors have been identified for mule deer and black bears. The Biota Information System for New Mexico database identified 285 species of vertebrates known or suspected within the Basin. These include 24 species with a federal or state status of Endangered, Threatened, Candidate or Species of Concern/Sensitive. The Rio Grande silvery minnow and the southwestern willow flycatcher, two species that live in the Rio Grande River, are included on federal and state Endangered Species Lists.

As discussed in the Agriculture and Ranching section, oil and gas project operations pose threats to grazing livestock. Many of the same threats apply to local and seasonal/migratory wildlife, including:

- Animals may be exposed to dangerous chemicals that leak from equipment or are improperly stored;
- Animals may be exposed to open pits that contain contaminated or unsafe water;
- Animals may become trapped or tangled in well equipment;
- Animals may improperly escape from and/or become enclosed due to careless management of gates and fences; and

- Animals may be threatened by truck traffic, and may be hit and killed by heavy trucks that are unable to avoid them.

This Element requires protective measures to ensure protection of wildlife and wildlife habitat and corridors. Depletion of water supplies and disruption to wildlife corridors and crucial habitat must be prevented in order to protect native fish and wildlife. Provision of a connected critical mass of habitat must be accomplished to provide a viable ecosystem for wildlife. Preservation of connected open space and riparian corridors is a key element of wildlife protection. Monitoring is essential for assessing the impacts of development, as well as whether current management actions are effective.

The standards recommended within this Oil and Gas Element to protect wildlife are many of the same standards applied to protect livestock and water supplies, such as use of closed loop systems, contamination prevention, access control and drill co-location. Design standards for oil and gas projects shall minimize obstructions and hazards to the movement of animals. Riparian buffers should preclude all soil disturbances, construction and development activity and require maintenance of vegetation. The County shall continue support for the Earth Works Institute's Galisteo Watershed Restoration projects along with similar Watershed Restoration Action Strategy (WRAS) projects which are funded through the NMED Clean Water Act Section 319.

2B-5.3.4. Vegetation

Santa Fe County provides habitats for twenty-four rare plants, which have been designated by the New Mexico Rare Plant Technical Council. These include: *Abronia bigelovii*, *Astragalus cyaneus*, *Astragalus feensis*, *Astragalus siliceus*, *Cuscuta fasciculata*, *Delphinium sapellonis*, *Hackelia hirsuta*, *Mentzelia springeri*, *Mentzelia todiltoensis*, *Muhlenbergia arsenei*, *Opuntia viridiflora*, and *Rubus alicae*.

Native plants and existing groundcover provide important natural habitats, prevent erosion and provide natural stormwater run-off filtration and management. Native American Pueblos in Santa Fe County harvest native plants for ceremonial and practical use. Desert plants are extremely sensitive, requiring years to assure establishment. Disturbance of a site can permanently destroy native vegetation, reducing habitat and biodiversity. Road construction and other development activity threatens native plants. Roads built in previously undeveloped areas can lead to the spread of exotic plants; traffic spreads the seeds of these noxious weeds.

The standards of this Element are meant to ensure that the impacts of oil and gas project operations on vegetation are minimized and fully mitigated. In addition to minimizing the number and surface area of drill sites and access roads, this Plan requires that native plants be protected during oil and gas drilling and subsequent operations, particularly during the construction of facilities and access roads. Native plants on-site shall be harvested prior to construction and replanted post-construction on-site for natural screening, or in an acceptable alternate location. When oil and gas operations have ceased, reclamation standards must ensure that native plants are planted and maintained on-site until they are well established.

2B-5.3.5. Soils and Erosion Control

As with vegetation, desert soils are very delicate and prone to erosion. It is common knowledge in the desert that driving off the established road creates permanent damage. Minimizing soil erosion is a primary environmental concern. Significant soil erosion negatively impacts surface water quality due to turbidity and sedimentation. Topographical features can be destroyed and damage to transportation facilities can occur. Erosion causes changes to the paths and locations of arroyos and drainage facilities, threatening property and habitat. Within Santa Fe County, soil erosion results from three primary sources of soil disturbance: development activities (subdivision, building and street improvements); abandoned surface mining; and poor grazing management. Unmitigated erosion will adversely impact cultural, natural and economic resources.

A number of strategies to reduce and mitigate erosion are included within this Plan Element. Best management practices (BMPs) for oil and gas project operations shall be employed to control erosion. Buffer zones shall be created along riparian corridors and significant topographical and cultural features that are susceptible to the negative impacts of soil erosion. Oil and gas sites must include features to limit stormwater run-off during construction and operation, such as vegetative

buffers and limited site disturbance. Improvements to all roads shall employ strong erosion control measures during construction.

2B-5.3.6. Geology

The geology of the Galisteo Basin is complex, complicated by multiple faults and fractures. Faults are breaks in rocks of the Earth's crust formed when great pressures cause earthquakes and the slippage of the fault walls. Movement during individual earthquakes is a few feet at most, but offsets observed along faults vary from very little to several thousand feet.

Movement along faults may occur on a single surface or be distributed across a wide zone, creating many sub-parallel breaks, each carrying some portion of the overall movement, a crushed zone of broken fragments (called breccia), or a zone ground into clay (called gouge).

In some locations fault surfaces, breccia, or gouge may be observed directly. Elsewhere, faults may be obscured by soil or alluvial cover, but are recognizable by the juxtaposition of rocks of contrasting types or ages visible in exposures near to the covered fault. Some faults are recognized using geophysical techniques, e.g., seismic reflection (the interpretation of energy waves that bounce back from buried layers), gravity measurements (based on varying densities of rock masses), magnetic surveys, etc. Geologic maps are used to indicate the locations of faults. On such maps they are shown with thick black lines.

Potential Effects of Faults on Fluid Flow

Faults do not act in a single way as regards the flow of fluids within the earth. In some cases the breaks remain somewhat open and act as conduits. In others the fault zone is plugged and resists fluid movement either along or across it. The latter may result from clay ground up during fault movement or by plugging of the open breaks by cementation of calcite, etc. precipitated from fluid flow along the fault.

Faults which serve as conduits may allow upward flow of water or petroleum and the formation of springs. If faults are choked with clay or minerals, they may block fluid flow and serve to trap water or petroleum in porous layers at depth.

In addition to allowing the upward flow of fluids, faults have the potential to aid downward migration as well. This may locally assist the recharge of aquifers, but it also has the potential to allow downward migration of contaminants as well. Such contaminants include those related to oil and gas drilling and operations.

Faults of the Galisteo Region

The numerous faults of the Galisteo region vary in their map length from a few hundred feet to many miles. Based upon their length and the amount of movement (offset) along them they may be divided into three categories, large, medium and small.

Four large faults, or systems of faults, are present in the Galisteo region. Individual members of this group are several miles in length and have vertical offsets of as much as 2,500 feet. Such long faults represent deep breaks in the earth and may allow for deep downward percolation of surface waters: Such fluids may dissolve chemicals (e.g., salts, radionuclides, etc.) from the deeply buried rocks and allow their return movement to the surface.

La Bajada fault: This fault extends northward from the village of Golden to at least La Bajada. The western side has moved down during development of the Rio Grande rift.

Tijeras-Canoncito fault system: This fault system extends from Albuquerque on the southwest to a join with the Pecos-Picuris fault system near Canoncito. Within the Galisteo region it comprises four major faults which are, from the southwest to the northeast, the *Golden fault*, the *San Lazarus fault*, the *Los Angeles fault*, and the *Lamy fault*. Vertical movement along these steeply inclined faults is as much as 2,000 feet with the west side down. Movement has recurred numerous times during the past 80 million years along this fault system.

Glorieta Mesa Boundary fault (GMBF): The westward tilt of the red rock layers of Glorieta Mesa ends on the west at the GMBF. This fault extends southward from Canoncito for at least 11 miles. Near Lamy the west side is relatively down about 3000 feet relative to the mesa side.

La Jara fault: This fault extends southward from Rio Colorado, east of Galisteo, for at least nine miles to the plains of the Estancia Valley. It probably continues along the east side of this broad area, covered by stream wash, for many more miles.

Many medium and small faults in the Galisteo region extend for only a few hundred feet to one to two miles. North-south, northeast-southwest, and east-west are trends most common. Strong iron-staining along some of the smaller faults demonstrate that they were conduits for water flow in the past. In many cases the precipitation of brown, red, orange, and tan iron oxides appear to have cemented these faults and reduced their ability to promote additional water flow.

Adverse Effects and Impacts of Gas and Oil Development

While the presence of natural faults and fractures can make oil and gas recovery more probable, drilling near fault lines increases the risks of groundwater contamination and seismic events. The dry, rocky nature of the subsurface can make well casings particularly difficult to seal, leading to leaking and contamination. This Element requires that oil and gas drilling be limited in areas of known fault lines and fractures to prevent public nuisance harm to the public health, safety and welfare. It also recommends that oil and gas project applicants submit plans for review to the County that explicitly present the targeted formations as well as the localized geology in order to properly evaluate and manage risk. Standards for well casing materials and techniques must consider the nature of the subsurface geology and be designed to minimize risks.

2B-5.3.7. Waste Management and Reclamation

Oil and gas operations produce a myriad of wastes. From human waste generated by workers to toxic waste generated by exploration and production, each type requires proper disposal to maintain a healthy environment and avoidance of adverse public nuisance health impacts. This Element recommends adoption of standards to ensure that all solid, liquid and gaseous wastes are handled and disposed of properly and that waste reduction and recycling occur to the maximum extent possible.

Accessing mineral resources creates surface disturbance; leaving land in a disturbed, altered state increases erosion and soil degradation, visually scarring the landscape. To minimize land use, environmental and visual impacts, this Element recommends standards to ensure that oil and gas project sites are returned to pre-disturbance or better conditions through reclamation. Standards for reclamation include the safe, permanent closure of well sites; removal of concrete pads, equipment, tanks and unnecessary fencing; re-planting of native vegetation and other similar requirements.

2B-5.3.8. Other Potential Nuisances: Noise, Dust and Odors

Oil and gas operations involve the use of heavy machinery and equipment, causing noise, light, vibration, dust and odors that impact nearby development and other land uses, including the tourist and artistic uses of the County that are so important to the County's identity and quality of life. This Plan Element recommends strict performance standards to limit these nuisance factors through the use of high and low tech methods, such as the use of quieter electric engines and pumps, physical barriers and other best management practices.

2B-6. Implementation

Since the adoption of the Interim Ordinance (Santa Fe County Ordinance No. 2008-02) terminates on February 24, 2009, this Oil and Gas Element recommends adoption of an Oil and Gas Ordinance, Capital Improvement Plan and updates to the County's General Plan / Growth Management Plan. The Oil and Gas Element of the General Plan primarily will be implemented through the Oil and Gas Ordinance, which may permit the exploration and production of oil and natural gas in overlay zoning districts that have been specially designed for those activities and which will describe the processing of applications, development agreements, and mandatory co-location of oil and gas production facilities. The application to create an overlay zone will trigger a comprehensive review process that will include, but not be limited to, the following:

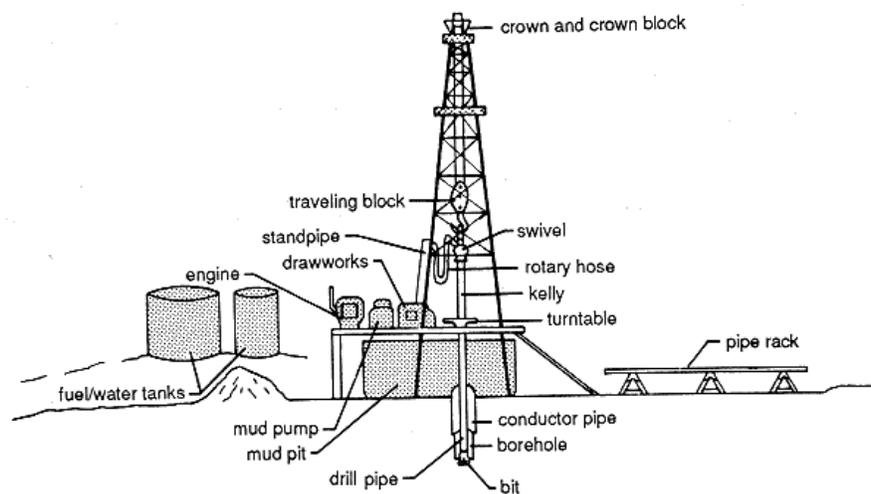
1. An Environmental Impact Report that will address air quality, water quality, toxic and chemical pollution and related diseases and health threats, wildlife and vegetation habitats, steep slopes, floodways and floodplains, stream corridors, historic, cultural, and archaeological artifacts and sites;
2. A water availability assessment;
3. A hydrologic and geologic assessment;
4. An assessment of the adequacy of existing public facilities (police, fire, stormwater detention, roads and emergency services) to serve the proposed development;
5. A fiscal impact assessment;
6. A traffic impact report;
7. An emergency preparedness plan; and
8. A beneficial use and value determination.

Appendix A – Oil and Gas Development

Description

Drill sites, the site on which wells and equipment are placed, vary in size depending upon site and environmental characteristics. All of the drilling and production phases of oil and gas development take place on a drill site. **Figure 1** illustrates the equipment and structures generally located on a well pad site.

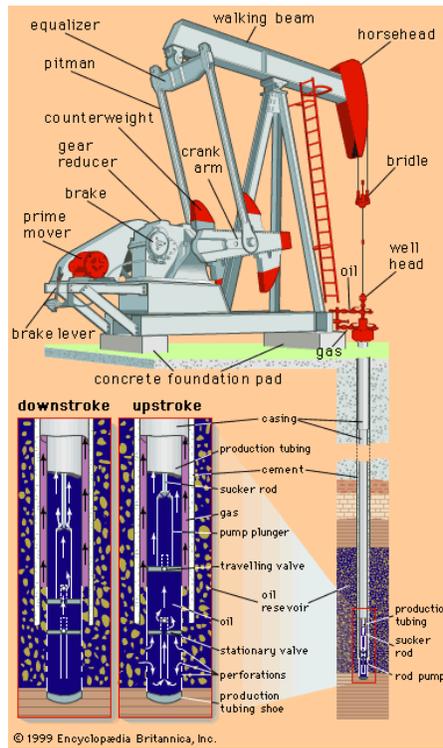
Figure 1: Typical Drill Site



Source: Kansas Geological Survey. <http://www.kgs.ku.edu/Publications/Oil/primer12.html>

During the stage in which the well is actually drilled, special drilling equipment is necessary. A typical setup is shown in **Figure 1**. The derrick, the tall structure used to produce leverage and torque on the drill bit, is the structure in the picture topped with a crown and crown block. The crown height of the drilling mast can range from 100' to 150' high. However, this rig is only in place during the drilling stage of a well (short-term). After the well has been drilled drilling equipment is removed, casing is inserted into the borehole, and a system to extract the resource is set up. In the primary production of oil, without any injection facilities, a pumpjack is likely to be installed to bring oil to the surface, as pictured in **Figure 2**. If natural gas is being produced a "Christmas tree" may be placed on the surface to serve as the gas wellhead. As shown in **Figure 3**, a typical Christmas tree has valves to control the flow of oil or gas from the well, which are connected to equipment that separates the oil, gas and water.

Figure 2: Primary Production



Source: Encyclopedia Britannica, 1999.

Figure 3: Gas Wellhead (“Christmas tree”)



During this stage (production), these facilities, along with any storage tanks, are the main visible characteristics of oil and gas production on the drill site. The derrick and other drilling equipment will have already been removed. “Christmas trees” are only a few feet high, while pumpjacks range in height depending upon the site and resource characteristics. Low-profile pumpjacks can be as short as five feet (as some parts operate underground) or as high as twenty-five or thirty feet.

Terminology

Oil and gas development involves many terms and processes unfamiliar to the general public. From drill sites to hydrocarbons to fracking, the average citizen needs some help distinguishing the terms and stages involved in the development of oil and gas resources.

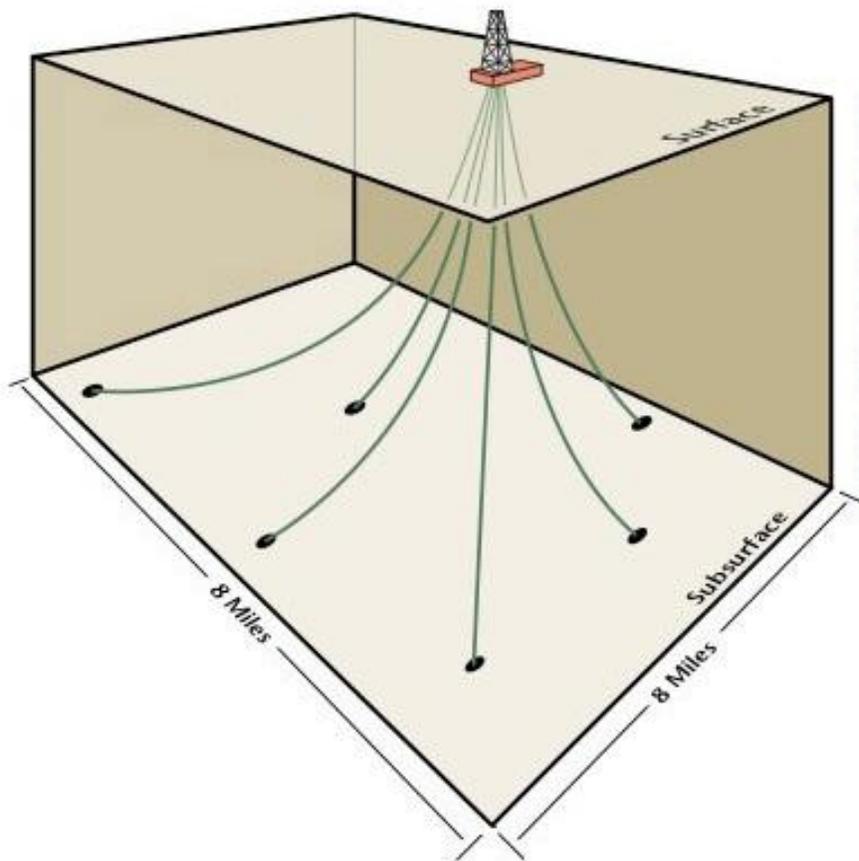
In general, oil and gas development is the extraction of hydrocarbons from the Earth’s interior. Two basic types of hydrocarbons are extracted: crude oil and natural gas. Crude oil, also known as petroleum, is a mixture of many different hydrocarbon compounds and other materials. Crude oil is processed into useable products such as gasoline, asphalt and home heating fuels. Natural gas is a mixture of hydrocarbons, such as methane, propane and butane, and other gases. A producing well may involve the extraction of primarily oil, primarily gas, or a mixture of the two.

The process of developing oil and gas resources involves two separate and distinct phases: exploration and extraction (or production). Exploration involves what the name implies, looking for hydrocarbons (oil, gas, or both) in sufficient quantities to make production economically viable to proceed with further development. After initial studies are completed and permits are obtained, an oil and gas operator will prepare a drill site, erect a temporary drill rig, and “spud in” (drill the actual hole, called a well bore).

If subsequent testing reveals the well is not likely to be economically viable, the hole will be plugged, ending development of the well. If the well is viable, production (bringing hydrocarbons to the surface and transporting them for processing) will begin after a casing is inserted into the well bore (the hole) and drilling equipment is removed from the site. The well is completed by inserting tubing into the casing to carry the oil and/or gas to the surface and production equipment is installed at the surface to control the flow of oil and/or gas from the well. If the natural flow rate of the hydrocarbons is too low (not rising to the surface fast enough) a process known as fracking may be used. Fracking is a technique used to create fractures that extend from the well bore (the hole) into formations where hydrocarbons are “trapped.” These artificially created fractures allow more hydrocarbons to escape from the formation and up to the surface.

In general, the County seeks to limit surface impacts from oil and gas development, while the state controls impacts below the surface. These impacts are typically governed by regulating two entirely different aspects of oil and gas production, drill sites and well bores. The drill site is an area of land on which all well bores are placed. The County will regulate the density, location and number of drill sites based on the surrounding environment. The only standards for well bores set by the County will involve co-location of well bores on a single drill site. Co-location (or, “clustering”) involves the origination of multiple well bores on a single drill site instead of on multiple drill sites to reduce the amount of surface disturbance, as illustrated in **Figure 4**.

Figure 4: Co-location



Source: www.anwr.org

Appendix B – Detailed Implementation

The following section includes a more detailed description of tasks included in the Strategies Matrix.

Table 18: Oil and Gas Roundtable Forum Tasks

Oil and Gas Roundtable Forum Tasks
1. Encourage cooperation and regular communication among regulators, service providers and the oil and gas industry to prevent problems and address challenges in an efficient and mutually supportive environment.
2. Support development of the Countywide Hazard Mitigation and Emergency Response Plan.
3. Proactively address potential conflicts among the oil and gas industry and residents and businesses in impacted areas.
4. Develop and implement an outreach program that focuses on community education and notification about oil and gas development activities.
5. Create a forum for the public to share their concerns about oil and gas development with industry representatives and regulators, such as semi-regular open meetings, a website, hotline and/or other methods.
6. Support the provision of safe, adequate and appropriate housing for oil and gas workers.
7. Identify and develop measurable “green” objectives for oil and gas development, such as reduction of waste products and use of recycled products, use of alternative energy sources and development of operator sustainability plans.

Table 19: Recommended Oil and Gas Amendments to the Land Development Regulations

Recommended Oil and Gas Amendments to the Land Development Regulations
1. Require permits, such as overlay district zoning and special use development permits, for oil and gas exploration, development and production.
2. Establish penalties and enforcement provisions related to oil and gas projects.
3. Use of closed-loop systems and prohibition of open pits.
4. Minimum setbacks from natural and cultural resources, existing development, and domestic wells and water sources.
5. Disclosure of all water sources used for oil and gas development, including drilling, production and general operations.
6. Requirements for fencing and gating.
7. Clustering and/or sharing of drill sites and use of directional drilling.
8. Performance standards for noise, dust, odors, lighting, hours of operation and other potential nuisances.
9. Limitations on outdoor storage.
10. Standards for height and size of facilities, structures and equipment.
11. Standards to ensure sites are free of trash, debris, weeds, etc.
12. Wildlife and wildlife habitat analysis, documenting existing wildlife and corridors, potential operational impacts and proposed mitigation.
13. Environmental Impact Report, documenting anticipated impacts and mitigation, including those to historical, cultural and archaeological resources.
14. Adequate public facilities assessment to determine compliance with level of service standards.
15. Traffic impact assessment, documenting anticipated impacts to roadways.
16. Geohydrological report, documenting anticipated impacts to local geohydrology.
17. Emergency response and preparedness plan requirements.

<p>Recommended Oil and Gas Amendments to the Land Development Regulations</p>
<p>18. Fiscal impact analysis, documenting the anticipated fiscal impacts of drilling upon county costs and revenues.</p>
<p>19. Establish Capital Improvements Program (CIP) specifically for oil and gas generated improvements, scheduling the funding, prioritization and cost of improvements.</p>
<p>20. Fire prevention standards and required equipment to be kept on site for fire protection.</p>
<p>21. Limitations on chemicals, disclosure of all chemicals used or stored on site and safety standards for storage, labeling, use and disposal.</p>
<p>22. Limitations on surface area to be disturbed for drilling, operations and access.</p>
<p>23. Require conformance to suitability of the surrounding land and environment.</p>
<p>24. Fracturing and acidizing standards.</p>
<p>25. Closed waste systems and site design standards provide waste containment in the event of a release of waste materials and petroleum products.</p>
<p>26. Screening and buffering of development sites.</p>
<p>27. Pipeline and truck/tanker VOC release reporting, public notification, mitigation and surety standards.</p>
<p>28. Standards for the flaring of gas.</p>
<p>29. Standards for storage tanks to ensure safety and prevent spills.</p>
<p>30. Water quality baseline data, monitoring and reporting standards. Monitoring shall occur on an annual basis at a <i>minimum</i>.</p>
<p>31. Standards to protect existing landscaping and require appropriate installation of new landscaping.</p>
<p>32. Visual impact reduction standards, including painting of equipment and facilities.</p>
<p>33. Abandoned site reclamation and re-vegetation, public notification and surety requirements.</p>
<p>34. Standards for the storage, handling and re-application of removed topsoil.</p>

Recommended Oil and Gas Amendments to the Land Development Regulations
35. Require development agreements for all oil and gas projects.
36. Establish a transfer of development rights (TDR) system for oil and gas development rights.
37. Establish the position of Oil and Gas Inspector as a position which monitors compliance with established oil and gas regulations.
38. Establish financial assurance and insurance requirements, including environmental damage insurance.
39. Establish annual updates to the suitability model.
40. Establish maximum drill pad sizes.
41. Provision of on-site security using the Santa Fe County Sheriff's Department during active drilling phases or when heavy traffic is a concern.
42. Best management practices for erosion control, including the use of vegetative buffers.
43. Require hazard identification on-site and protection of warning labels, including limiting their exposure to weathering.

Table 20: Fire Department Tasks

Fire Department Tasks
1. Work proactively with industry representatives to address fire and emergency prevention and response.
2. Designate a representative to participate in the “Oil and Gas Roundtable Forum.”
3. Collaborate with industry to fund needs related to fire prevention and emergency response, including capital and operating expenses for vehicles, equipment and outreach activities.
4. Collaborate with industry representatives to identify necessary equipment for emergency response, including vehicles and equipment.
5. Network and collaborate with Fire Departments in other Counties with oil and gas production for mutual learning and benefit, including techniques for working with the industry, preventing and responding to oil and gas-related emergencies, training for volunteers and other special topics.
6. Designate a representative to participate in the “Emergency Response Planning Committee.”
7. Work with the County and industry to ensure that all drill sites are designed, constructed and operated to minimize the risk of wildland fires.
8. Coordinate with the industry and the Association of Safety Engineers or other similar group to provide safety training to volunteers.
9. Coordinate with the industry to identify and receive notification of hazardous chemicals used or stored at drill sites and appropriate handling of such substances under various conditions.
10. Coordinate with industry to identify wells where Hydrogen Sulfide is present and provide appropriate monitoring and breathing equipment to safely respond to emergencies.
11. Encourage and support industry to subcontract only with firms that offer strong safety standards.
12. Coordinate with industry and local safety training and education providers to establish safety training for new industry employees and on-going refresher courses.
13. Encourage restriction of welding on drill sites to prevent fires.

Table 21: Oil and Gas Suitability Analysis Recommendations

Oil and Gas Suitability Analysis Recommendations
1. Update the model on an annual basis or more frequently based on the recommendation of County Staff.
2. Expand the model for Countywide application.
3. Add reliable data regarding the location of all private, local, state or federal parks, open spaces trails or recreation areas.
4. Add reliable data regarding the location of all lands held in conservation easement.
5. Add reliable data regarding the location of historic sites, scenic routes and other significant sites.
6. Add new or updated datasets as they become available through public or private sources, including the development review process, to improve the reliability and accuracy of the model.
7. Support public or private projects that result in improved data to update the model.
8. Revise natural springs data to reflect non-mapped seeps and springs. County hydrologist should undertake field verifications with GPS and photos.
9. County hydrologist should verify location of permanent water bodies using local knowledge and aerial photography.
10. County hydrologist should verify drainage buffer areas using local knowledge, aerial photography and a digital elevation model.
11. The University contract to map wetlands within Galisteo Basin should be expanded to cover the entire County.
12. Complete and expand the DRASTIC model using localized datasets created by County Staff.
13. The State geologist should complete the fault maps for the entire County. (To include faults in the model, maps from New Mexico Bureau of Geology and Mineral Resources were digitized. Not all Quads have been produced.)
14. Expand datasets related to recorded archaeological, historical, and paleontological sites of demonstrated or potential significance, major Pre-Columbian pueblo sites and areas of importance to Native American groups (traditional cultural properties) through public and private survey efforts.
15. Expand upon Galisteo Watershed Conservation Initiative effort to inventory scenic areas and roads using the Delphi method.
16. Map all water lines and water service areas.

Table 22: Sheriff’s Department / Rural Crimes Unit Tasks

<p>Sheriff’s Department / Rural Crimes Unit Tasks</p>
<p>1. Direct and handle all cases related to oil and gas development, including vandalism to oil and gas infrastructure, theft from oil and gas production sites and other crimes related to or occurring on an oil and gas site.</p>
<p>2. Work proactively with industry representatives to address crime prevention and enforcement.</p>
<p>3. Collaborate with industry to fund unit needs related to crime prevention and enforcement, including capital and operating expenses for vehicles, equipment and outreach activities.</p>
<p>4. Network and collaborate with Sheriff’s Departments in other Counties with oil and gas production for mutual learning and benefit, including techniques for working with the industry, preventing and addressing crime associated with oil and gas, training for officers and other special topics.</p>
<p>5. Monitor salvage and scrapyards to prevent purchase or sale of stolen materials from drill sites.</p>
<p>6. Support the fencing, screening and gating of drill sites to prevent crime and injuries.</p>
<p>7. Collaborate with industry representatives to identify necessary equipment, such as unmarked four-wheel drive vehicles, cameras, surveillance equipment, GPS tracking units, software and other needs.</p>
<p>8. Develop and support a “Rural Crime Watch” program for citizens and businesses to actively participate in creating a safe environment in rural parts of the County for residents, businesses, the oil and gas industry, agriculture and other rural uses.</p>
<p>9. Create tools for citizens and industry to report rural crimes, such as a website or hotline.</p>
<p>10. Support the location of compressors and other equipment to be located inside buildings when possible in order to prevent crime and aid in prosecution of crimes related to theft or vandalism of such equipment.</p>
<p>11. Encourage industry to install on-site or remote monitoring equipment at drill sites to aid in the prevention and prosecution of crimes.</p>
<p>12. Encourage industry to provide security during active drilling phases at sites where vandalism or other crimes are considered more likely.</p>
<p>13. Designate a representative to participate in the “Oil and Gas Roundtable Forum.”</p>
<p>14. Designate a representative to participate in the “Emergency Response Planning Committee.”</p>
<p>15. In addition to oil and gas related issues, the mission of the Rural Crimes Unit may also include prevention and prosecution of crime related to agricultural uses and other rural activities and places.</p>

Appendix C – Oil and Gas Suitability Analysis Technical Documentation

Background

The Oil and Gas Suitability Analysis (OGSA) is a geo-mathematical model for measuring areas in Santa Fe County in terms of suitability for future development of oil and gas exploration and extraction activity. Using a geographic information system (GIS), the analysis is designed to rank land based on a number of environmental and cultural attributes; some unique to Santa Fe County. The analysis considers several land characteristics from various local, state, federal and private entities. This calculated suitability can be weighted based on the priority or importance that the community places on each individual land characteristic in the model. The model is then used to create a comprehensive land suitability map which can be effectively utilized by the county to address future planning and make sophisticated decisions about land use and development. The Oil and Gas Suitability Map is an outgrowth of the broader Land Development Suitability Analysis (LDSA), incorporating datasets relevant to the Oil and Gas Element of the General Plan Update.

GIS Approach

Land suitability analysis involves the application of criteria to the landscape to assess where land is most and least suitable for development of structures and infrastructure. A geographic information system (GIS) is an efficient tool for organizing, storing, analyzing, displaying and reporting spatial information. GIS capabilities for spatial analysis overcome the drawbacks of the paper map overlay approach. The system enables planners to create and modify a land suitability analysis that makes the best use of available data. GIS supports methods to apply guidelines and criteria set by decision makers. In addition to storing, retrieving and displaying spatial data, a geographic information system enables the user to create buffers, overlays, intersections, proximity analysis, spatial joins, map algebra, and other analytical operations.

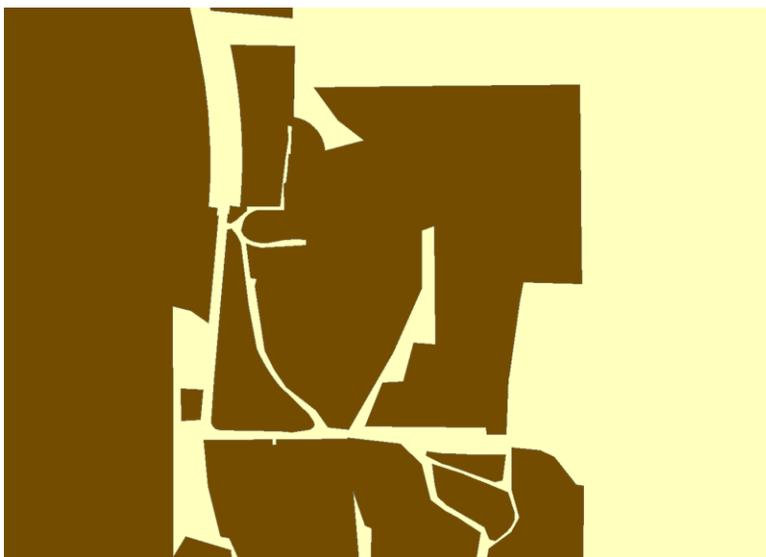
The steps in Spatial Analysis, discussed in further detail below, include:

- Define criteria for the analysis
- Identify relevant data
- Determine what GIS analysis operations should be performed
- Prepare the data
- Create a model
- Run the model
- Analyze results
- Refine the model as needed

Raster vs. Vector Approach

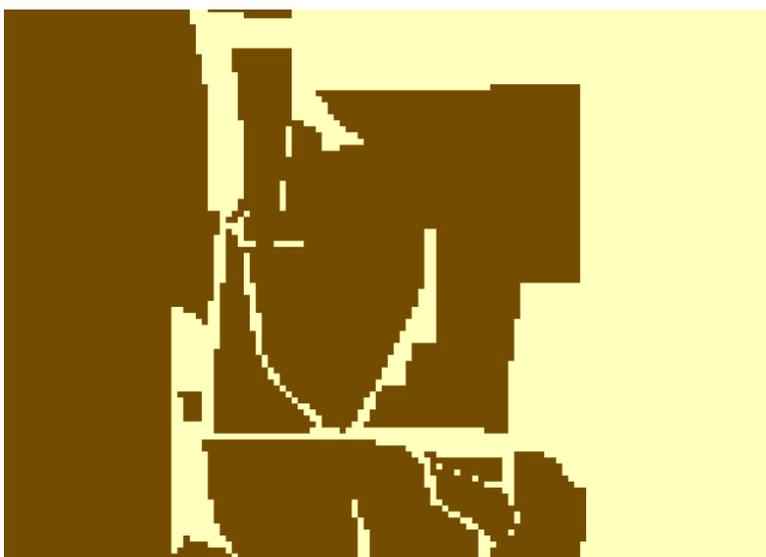
There are two possible data models that can be used in a GIS: vector and raster. Vector data consist of discrete points, lines, and polygons. These feature shapes are defined by x and y coordinates. There can be multiple attributes associated with each feature, such as road name and pavement type for a given road segment.

Figure 5: Vector Data Example

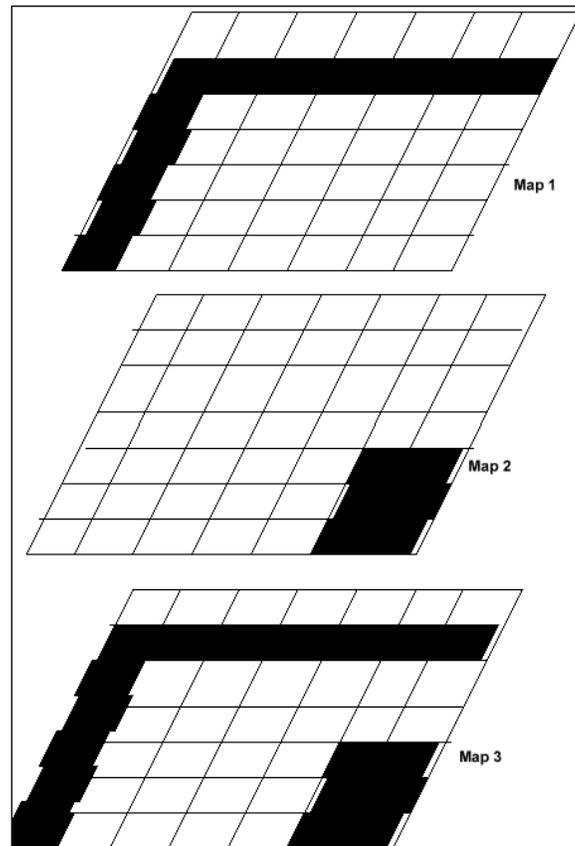


The raster data model represents features as a matrix of cells (pixels) in continuous space. Each layer represents one attribute (although other attributes can be attached to a cell). Most analysis occurs by combining the layers to create new layers with new cell values.

Figure 6: Raster Data Example



Raster data are used for land suitability modeling because analysis can be performed on several raster layers at once, as opposed to vector data which enable analysis of only two layers at a time. Raster data also provide continuous coverage of a geographic area and consume less computer resources for analysis.

Figure 7: Raster Overlay Example

Technical Issues with a Raster Data Model

Resolution

The cell size used for a raster layer will affect the results of the analysis and how the map looks. The cell size should be based on the original map scale and the minimum mapping unit. Using too large a cell size will cause some information to be lost. Using a cell size that is too small requires a lot of electronic storage space, and takes longer to process, without adding additional precision to the map. For this analysis, a 10 meter (32 foot) grid was utilized. This is congruent with the underlying digital elevation model dataset.

Pixels contain one value only. Only one item of information is available for each location within a single layer.

Multiple items of information require multiple layers. If, in a soils vector layer, there are two attributes - septic suitability and flood frequency - two raster layers will have to be created: one that contains septic suitability information and one that contains flood frequency information.

Introduction to Spatial Analyst

The ArcView Spatial Analyst extension enables the user to create, query, map, and analyze cell-based raster data and to perform integrated vector–raster analysis. The ArcView Spatial Analyst extension for Windows also includes *ModelBuilder* technology for building and sharing spatial models. Additional capabilities available through the standard user interface include queries on multiple grid themes, neighborhood and zone analysis, grid classification and display, summary histograms and more.

ArcView Spatial Analyst enables desktop GIS users to create, query, and analyze cell-based raster maps; derive new information from existing data; query information across multiple data layers; fully integrate cell-based raster data with traditional vector data sources; and create sophisticated spatial models using *ModelBuilder*. For the LDSA, and hence the OGSA, users can rate areas according to several factors with varying weights and values, and derive new information from existing data to determine land suitability.

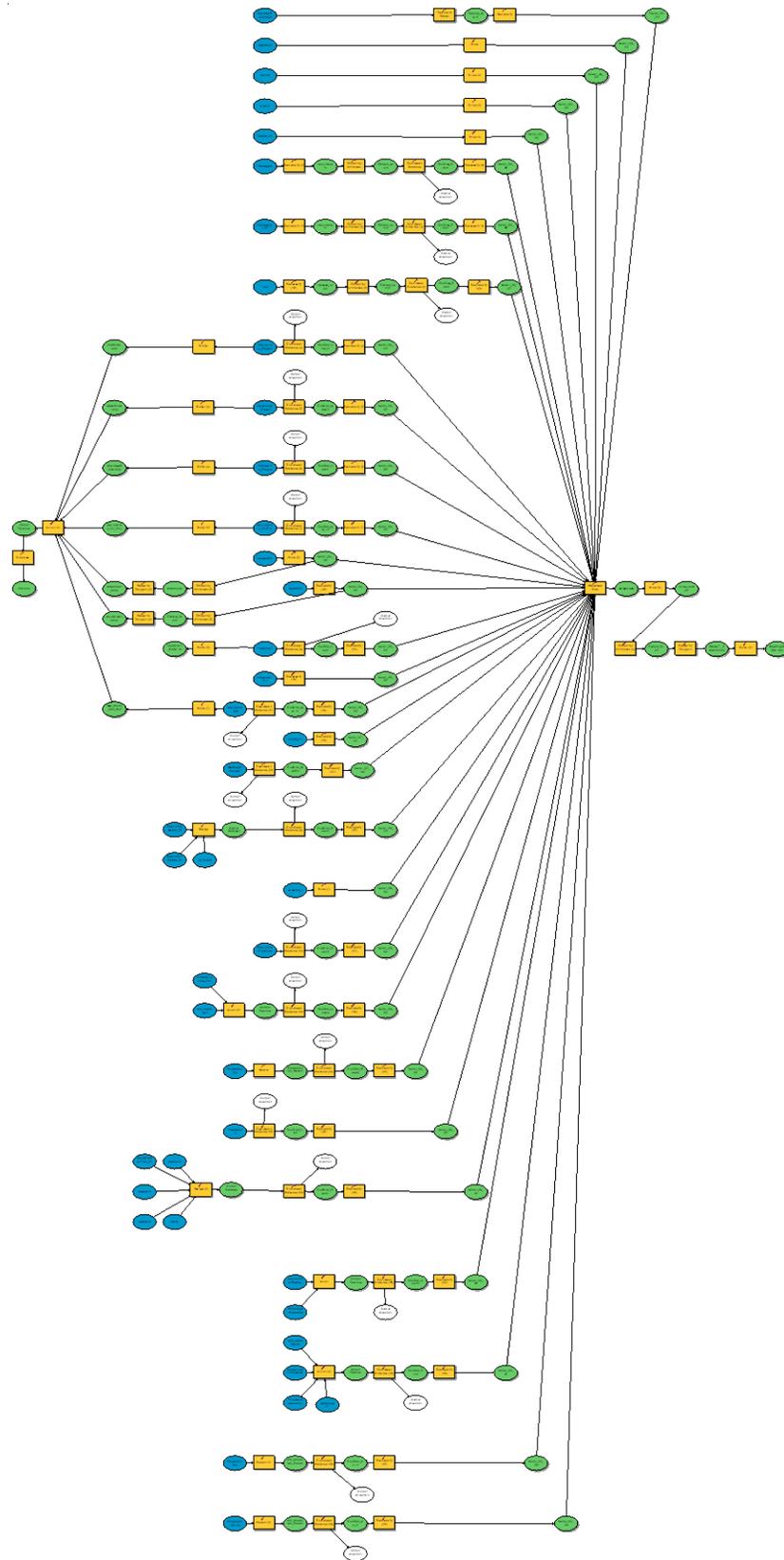
Introduction to Model Builder

ModelBuilder is a tool for creating and managing automated and self-documenting spatial models. *ModelBuilder* is an extension with Spatial Analyst 2 that enables users to create process-flow diagrams and scenarios to automate the modeling process. Users can change the data sets used by the model, modify the influence of each data set on the model, perform complex analysis functions, and generate maps that illustrate the results of an analysis. Data derived from one model can be used as input for another model. Users can run a model with a variety of parameters to assess data sensitivity or to evaluate geographically different but structurally similar data sets. Users can copy portions of their models within a model and smaller models can be combined to build larger models.

In the case of the OGSA, the layer weights can be changed, and the models may be re-run to evaluate the new results. *ModelBuilder* is ideal for this task because it allows users to automate and rerun the model in a time effective manner.

ModelBuilder creates a process-flow diagram that displays the layers and operations. For example, the land suitability model combines and classifies multiple GIS layers to produce a land suitability map as illustrated in the figure below.

Figure 8: Model Building Example



Computer Requirements and Getting Started

The LDSA project used ArcView® 9.3 desktop GIS software with the Spatial Analyst extension. The extension includes the *ModelBuilder* interface. Other software products are available, however ArcView was chosen because of its widespread use in County offices as well as due to staff familiarity. The model can be expected to run relatively quickly on any Windows XP or Vista computer manufactured within the past couple years. The OGSA computer model can be run directly from the DVD provided the computer is properly equipped. Relative path names were used throughout the model.

Data

Numerous Santa Fe County administrative departments make use of GIS for day to day tasks including, but no limited to, cartographic products, database maintenance and asset inventory. Data used for the model was obtained from the County GIS and Growth Management departments. All data used the NAD 83 State Plane New Mexico Central coordinate system.

History

The GIS department first sent data to Planning Works in the first week of June via upload to the Planning Works website. A short time later the Growth Management department sent data via the same method. Two DVD’s were sent, one in June and the other in July. Other datasets were delivered via the website periodically until September 20th. Planning Works and County staff members from various departments met specifically to discuss existing data as well as possibilities for other datasets. These discussions, held August 27th, led to a revision of the DRASTIC model as well as clarification of a variety of datasets used within the model. Logistics of the model were also discussed.

Factors

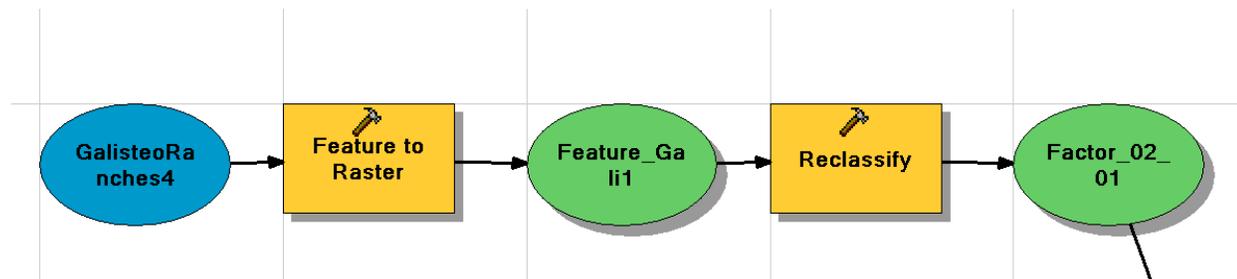
Below is a list of each factor input for the OGSA model. This discussion is meant to be more technical than the summaries contained in each of the OGSA model maps.

Factor 1.01

Staff selected ranches within the Galisteo basin. Size in acres was calculated for each ranch and appropriate size classes were determined to be:

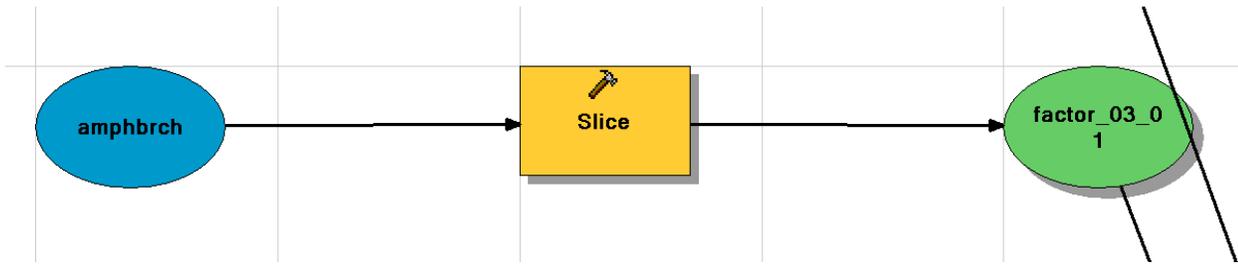
- under 40 acre parcel size were determined to have higher constraints to development of oil and gas
- parcels between 40 and 500 acres were determined to have moderate constraints to the development of oil and gas
- parcels over 500 acres were determined to have the least constraints to oil and gas development in terms of parcel size.

The size of farm or ranch parcels is a standard component of Land Evaluation and Site Assessment systems commonly used by Counties with rural character. Equivalent to LDSA factor 2.01.



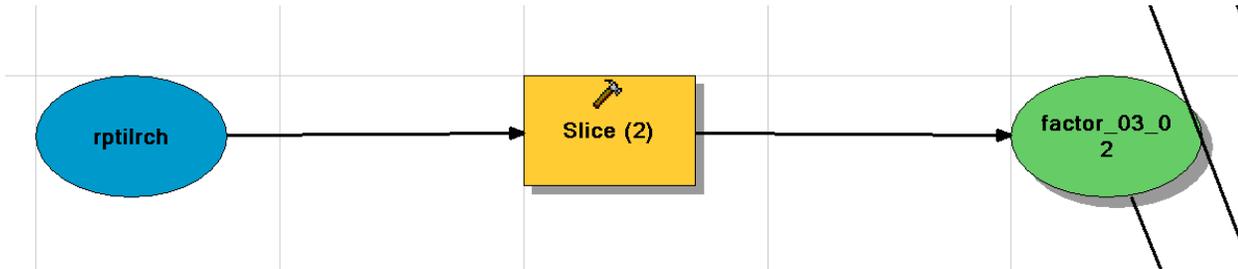
Factor 2.01

Amphibian richness data is derived from the New Mexico GAP program as used in the Galisteo Watershed Conservation Initiative (GWCI). The GAP dataset is a rather coarse 300 foot raster dataset. This data was reclassified according to 3 cohort group classification (natural breaks, -Jenks method) as defined by the software. Equivalent to LDSA factor 3.01.



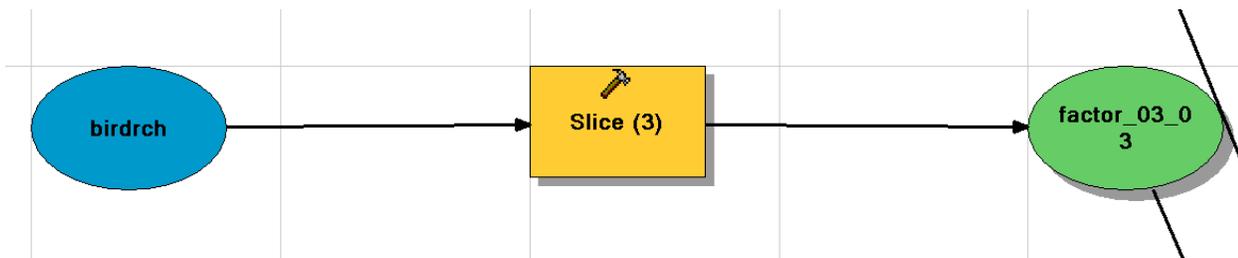
Factor 2.02

Reptilian richness data is derived from the New Mexico GAP program as used in the GWCI. The GAP dataset is a rather coarse 300 foot raster dataset. This data was reclassified according to 3 cohort group classification (natural breaks, -Jenks method) as defined by the software. Equivalent to LDSA factor 3.02.



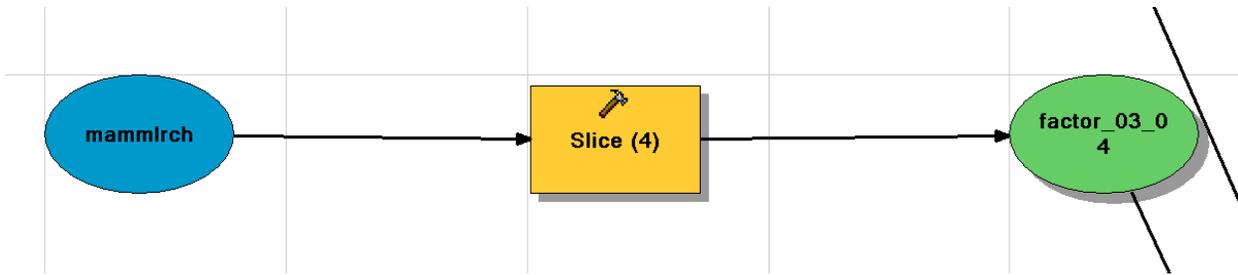
Factor 2.03

Bird species richness data is derived from the New Mexico GAP program as used in the GWCI. The GAP dataset is a rather coarse 300 foot raster dataset. This data was reclassified according to 3 cohort group classification (natural breaks, -Jenks method) as defined by the software. Equivalent to LDSA factor 3.03.



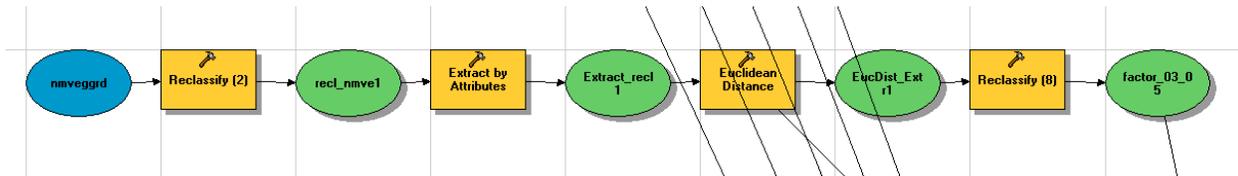
Factor 2.04

Mammal species richness data is derived from the New Mexico GAP program as used in the GWCI. The GAP dataset is a rather coarse 300 foot raster dataset. This data was reclassified according to 3 cohort group classification (natural breaks, -Jenks method) as defined by the software. Equivalent to LDSA factor 3.04.



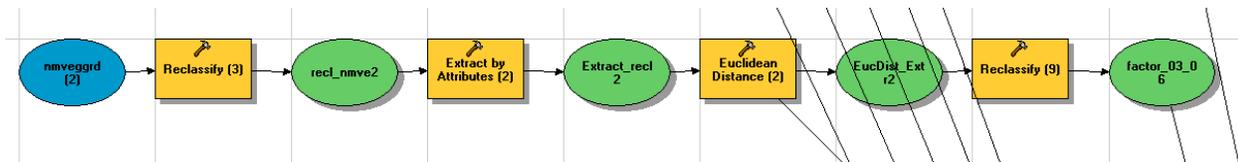
Factor 2.05

Lands with undisturbed natural grasslands includes areas of native grasses that have been mostly unaffected by urban development. This factor was used in the GWCI model.



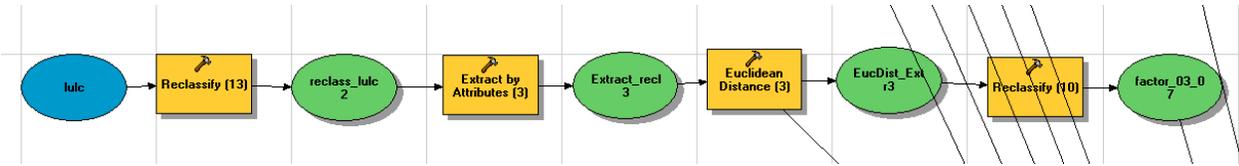
Factor 2.06

Undisturbed Rocky Mountain Conifer Woodlands (includes Pinon-Juniper Woodlands) were identified from the GAP Land Cover data. This dataset was also used in the GWCI model.



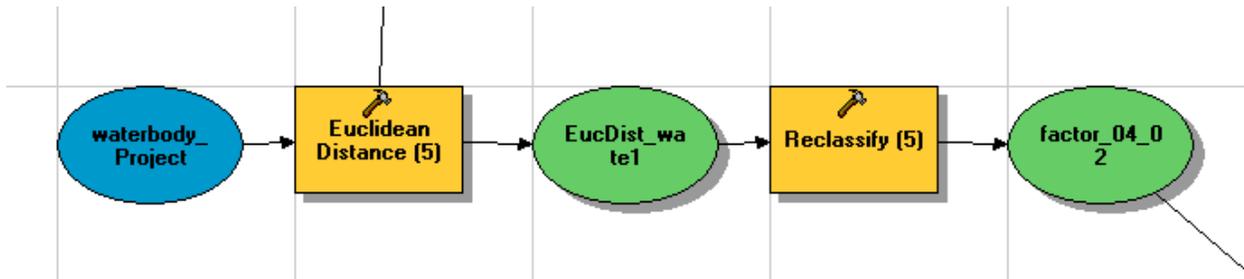
Factor 2.07

Undisturbed forests was used in the GWCI. This dataset is derived from the Land Use Land Cover (LULC) dataset prepared by United States Geological Survey. These areas are considered unique to the area, adding value to the eco-tourism industry and therefore need to be protected.



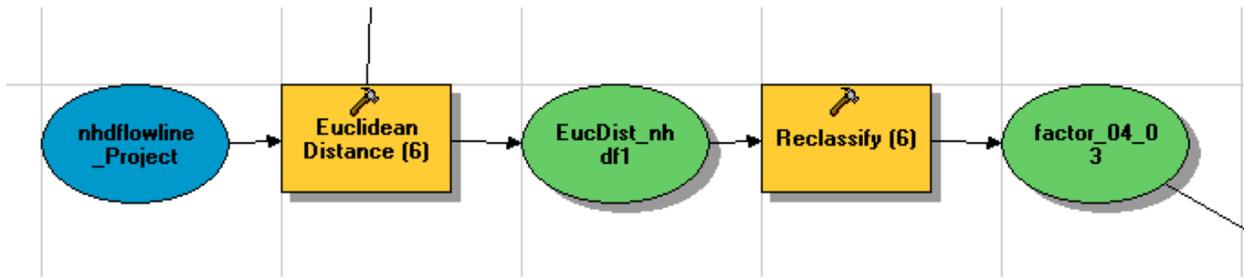
Factor 3.01

Natural springs were selected from a point dataset contained within the USGS’s National Hydrography Plus (NHDPlus) Dataset. These areas are considered constrained as point sources of ground water flow. This data was also used within the GWCI model.



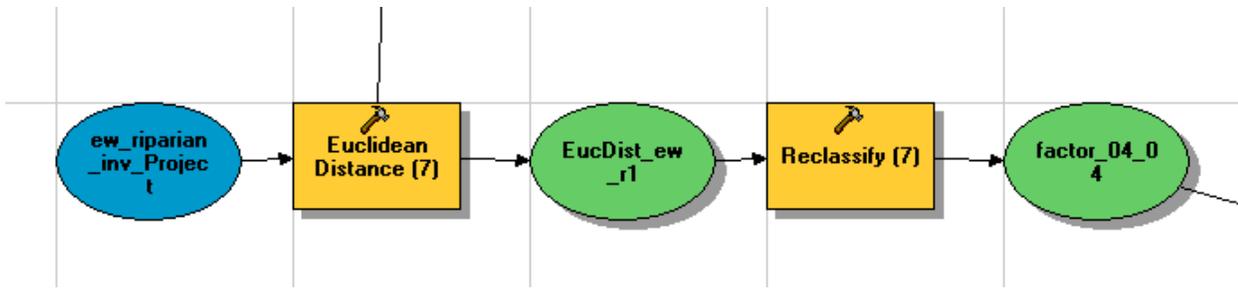
Factor 3.02

Lands near permanent water bodies are considered constrained because above ground water resources are extremely limited in the area. The water bodies were selected from a polygonal data contained with the NHD data. This was also used within the GWCI model.



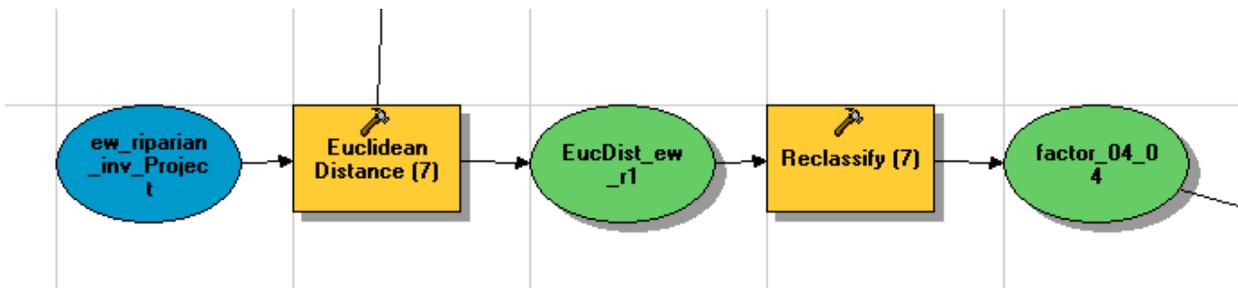
Factor 3.03

Lands proximal to drainage buffers are considered constrained to protect existing aquifer supply routes. Water in these drainage buffers can be permanent, intermittent or ephemeral. This factor was expanded based upon work done by the GWCI.



Factor 3.04

Wetlands and Riparian areas are considered to be sensitive lands due to the relative abundance of vegetation. Many states and local governments require some sort of riparian buffer to help reduce waste and pollution within their water ways. The riparian inventory was created by Earth Analytics and was used within the GWCI.



Factor 3.05

County staff, with the assistance of geologist Alvis Lisenbee, recreated the statewide aquifer vulnerability "D.R.A.S.T.I.C. model" with higher accuracy and precision datasets for the Galisteo GMA. These models are commonly used to represent areas of greatest potential for ground-water contamination on the basis of hydrogeologic and anthropogenic (human) factors.

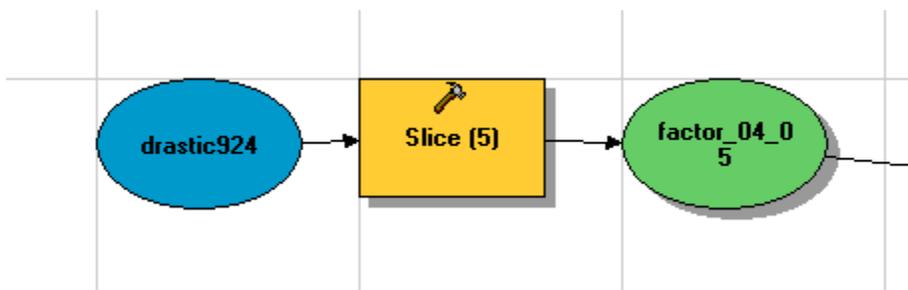
The DRASTIC method considers a generic contaminant introduced at the surface and moving downward at a rate equal to that of water. (Aller et al 1987) DRASTIC is an acronym for each of the seven input characteristics:

- Depth to Water (weight = 5)
- Net Recharge (weight = 4)
- Aquifer Media (weight = 3)
- Soil Media (weight = 2)
- Topography (weight = 1)
- Impact of the Vadose Zone (weight = 5)

Hydraulic Conductivity (weight = 3)

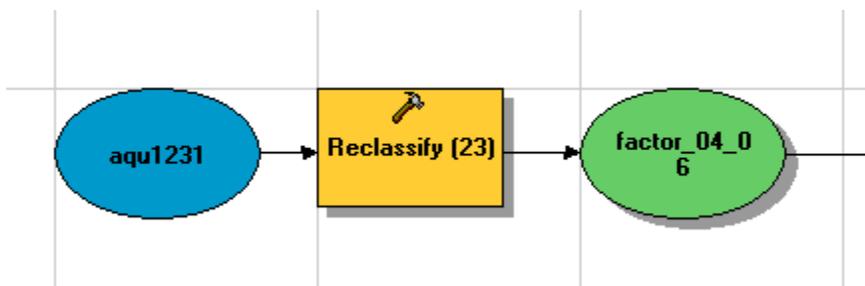
Values within each of the seven input characteristics are grouped into ranges and assigned a rating from one (the lowest vulnerability) to ten (the highest vulnerability). The final vulnerability is calculated by multiplying the characteristic rating by the assigned weight then adding all the weighted scores together for a final score. The result is a relative measure of the pollution potential of that area, ranging from 23 (low vulnerability) to 230 (high vulnerability)

It is generally recommended that in areas having high vulnerability a targeted site specific investigation be conducted prior to development planning. Such a targeted investigation will result in an Aquifer Susceptibility Evaluation.



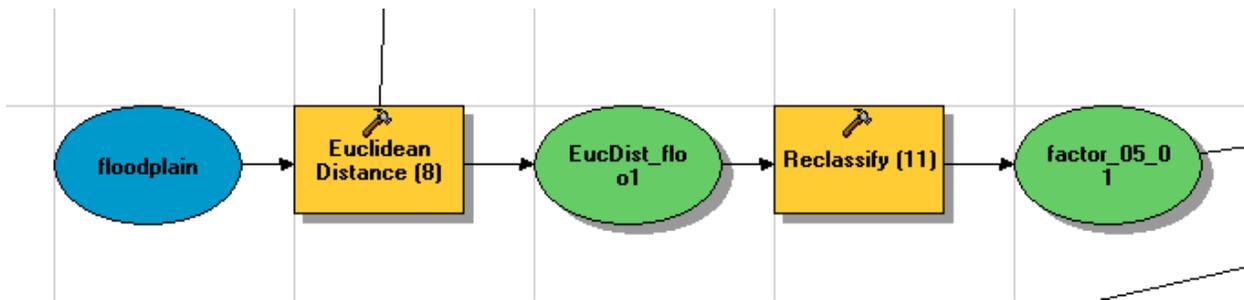
Factor 3.06

Aquifer Susceptibility was derived from the DRASTIC model staff prepared and is a more site-specific study of vulnerable areas based on current or planned conditions in the planning area. Aquifer susceptibility will take into account a risk factor within a vulnerable area where there is an existing or anticipated point source for contamination. For example, where roads cross vulnerable areas of the aquifer this particular area may be categorized as more susceptible or more at risk to a contamination event than a vulnerable area with no public access.



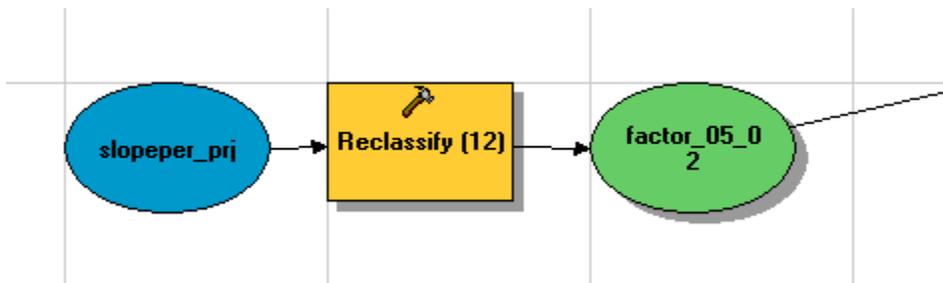
Factor 4.01

Floodplain development of any kind is discouraged throughout the Country. Floodplain analysis is generally included within LESA and LSA models. The floodplain was buffered ¼ mile and then converted to raster for analysis.



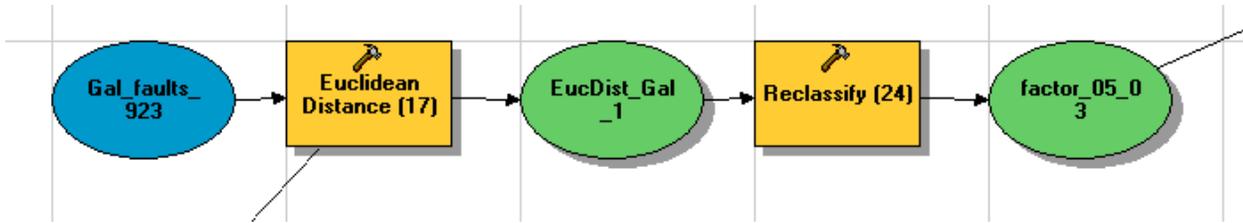
Factor 4.02

Federal oil and gas lease stipulations restrict areas exceeding 25% slope. On the local level, steep slopes are commonly used for buildout analysis, LSA, LESA and nearly all development calculations in areas where steep slopes occur. Issues involved for steep slope development include land stability, drainage and erosion, access, infrastructure cost, aesthetics, natural qualities, fire hazard and recreational value. Standard 10 meter DEMs were obtained from the State GIS clearinghouse, slopes were calculated using standard methodology and reclassified into 3 categories: below 10%, 10% - 25% and over 25%.



Factor 4.03

Development on fault lines should generally be discouraged due to possible seepage and transport of pollutants along the faults to groundwater. For this analysis, fault lines were digitized from maps obtained from the New Mexico Bureau of Geology and Mineral Resources, and confirmed by geologist Alvis Lisenbee.

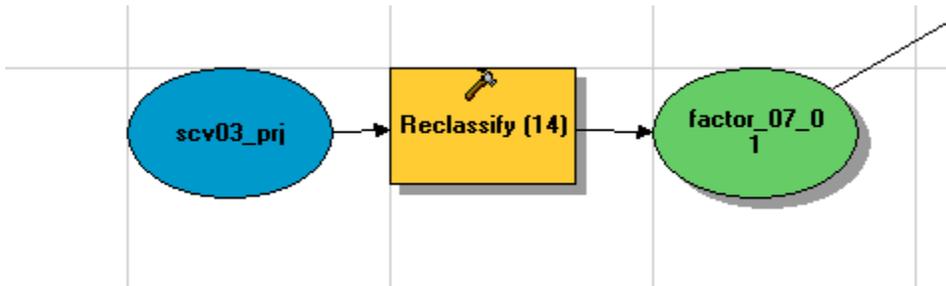


Factor 5.01

Cultural and Historic Places were identified by the GWCI model and include:

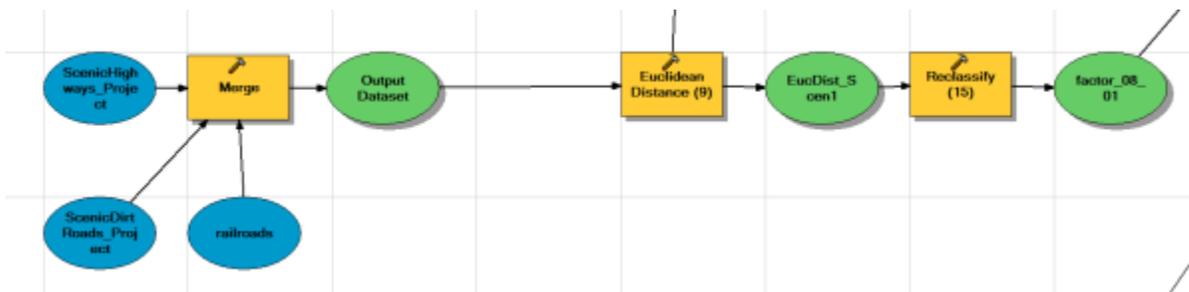
- Proximity to recorded archaeological, historical, and paleontological sites of demonstrated or potential significance (ARMS database)
- Major Pre-Columbian Pueblo Sites and zones of high archaeological or paleontological potential
- Areas of Importance to Native American Groups (Traditional Cultural Properties).

It is widely considered that this database is incomplete and lacking a vast number of archaeological sites. These areas are considered constrained due to cultural and eco-tourism value. For legal reasons, the map is not included within this document. This dataset was used within the GWCI model.



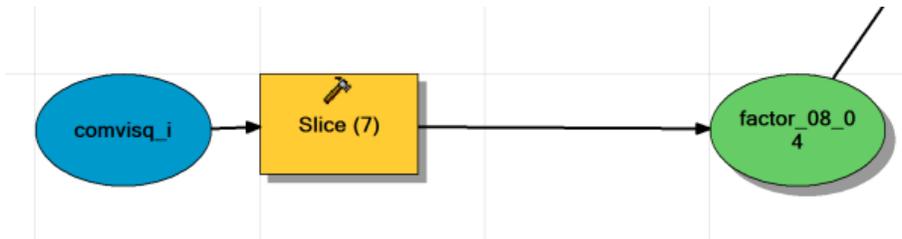
Factor 6.01

Scenic Highways, dirt roads and railways is a factor used in the GWCI model and includes scenic transportation route corridors and areas from which they can be viewed. Scenic lands were selected through a Delphi selection committee of selected experts. These roads were considered to be constrained due to recreational and eco-tourism value.



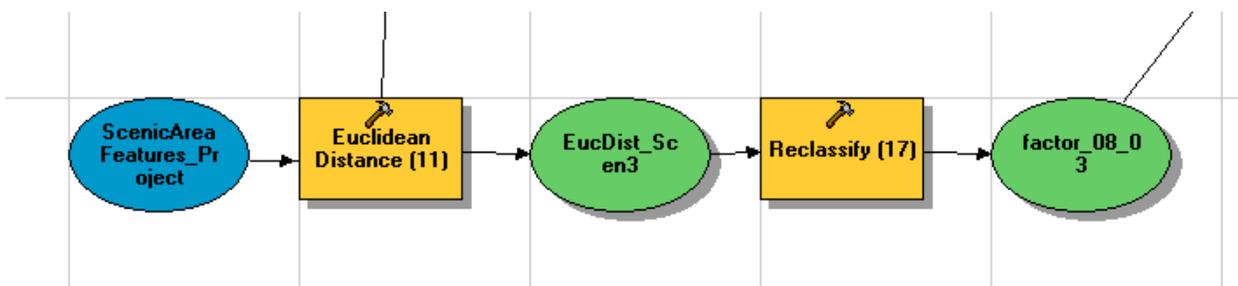
Factor 6.02

In 1995 a Visual Resources Inventory Analysis was done by Design Workshop, Inc. Areas where there is a "combined scenic quality" are included in this Visual Resources Inventory Constraints. "Combined scenic quality" is a combination of both the "intrinsic scenic quality" of different landscape types, as rated by a sample of the public, as well as "relationship scenic quality," which reflects the degree to which adjacent landscapes are seen as enhancing each other.



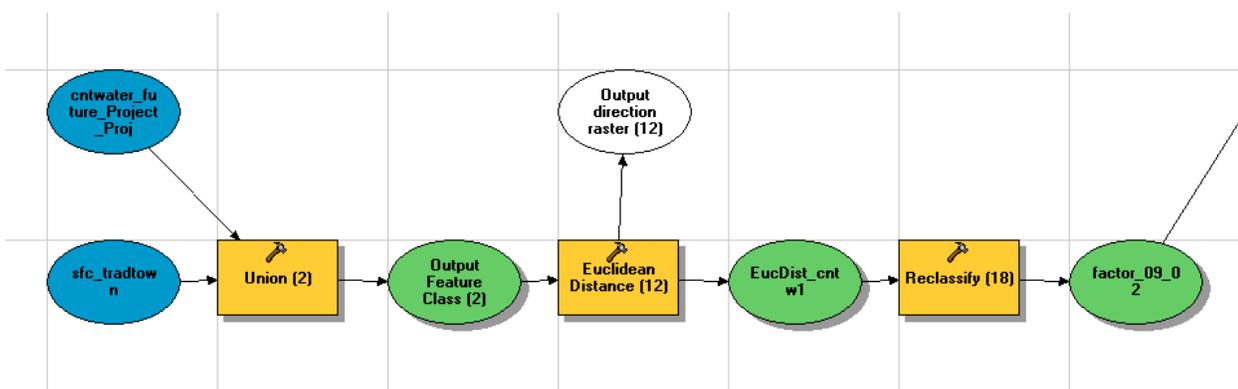
Factor 6.03

Scenic Landmarks is a factor used in the GWCI model and includes scenic roadway corridors and areas from which they can be viewed. Scenic lands were selected through a Delphi selection committee of selected experts.



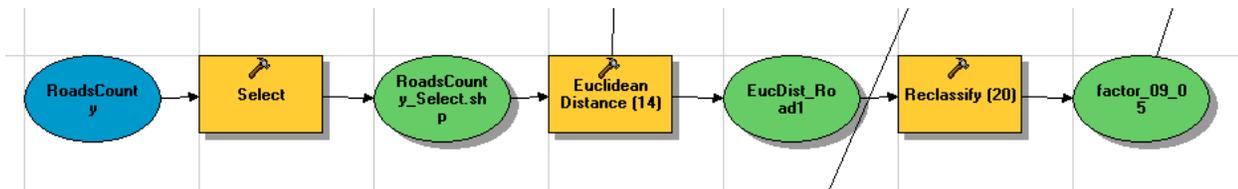
Factor 7.01

Proximity to Community Water Systems was included as a factor to identify areas of an urban or semi-urban level of development. Encroachment by oil and gas facilities upon urban areas should be discouraged for a variety of reasons including: noise pollution, added air pollution and maintenance of property values.



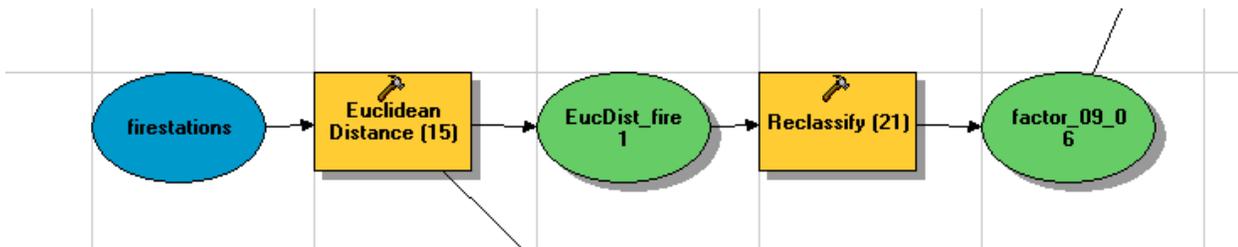
Factor 7.02

Proximity to paved roadways was included with the approach that development should be closer in proximity to paved roadway infrastructure due to cost of additional infrastructure. One and two mile buffers were used as the constraining factor.



Factor 7.03

Proximity to Fire Station is considered due to the increased possibility of fire outbreaks and other emergencies associated with oil and gas development. While it is assumed industry will take all accompanying precautions, it is advised that the County maintain an adequate level of service for all development. Two and four mile buffers from existing fire stations (manned and volunteer) were used to calculate constrained lands.



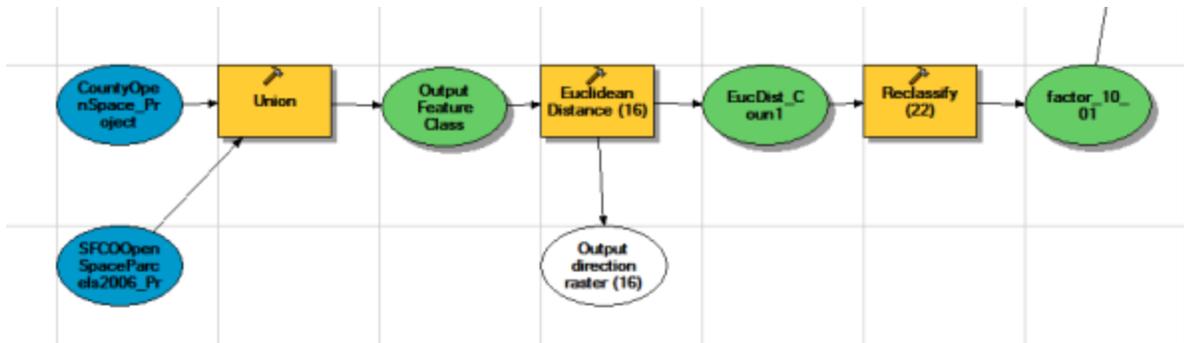
Factor 7.04

Proximity to existing trails was considered in the model. Areas near trails are generally considered more sensitive to encroachment by any type of development and therefore need to be protected.



Factor 8.01

Proximity to county designated open space is used in the GWCI model. This portion of the GWCI model was duplicated for this effort. These lands include county / public open space.



Factor 8.02

Proximity to private conservation easements is considered in the model. These lands have been specifically set aside by ownership as permanent open space areas free from development. These area and the immediate surroundings should be protected from encroaching development.



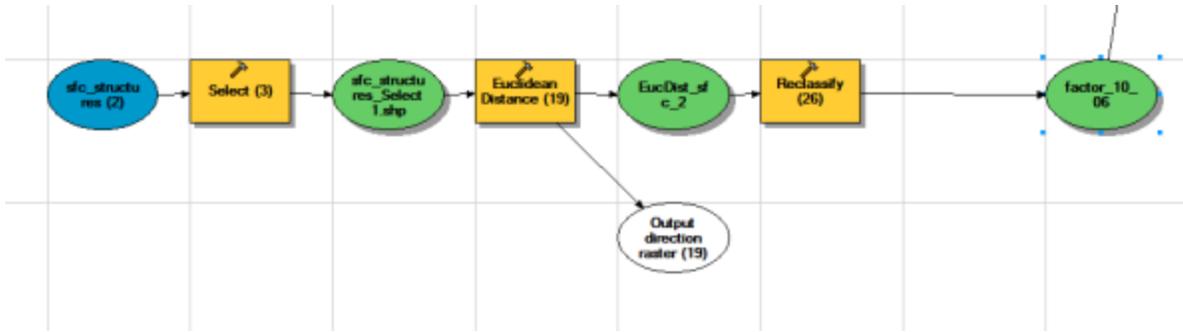
Factor 8.03

Proximity to residential structures was considered in the model. It is widely regarded that oil and gas production facilities pose an elevated danger to surrounding areas, especially residential. Protection of life and property value is the goal of this factor.



Factor 8.04

Proximity to existing non-residential structures, such as commercial and other non-residential building were considered in the model. Oil and gas production facilities are widely regarded as posing an elevated risk to surrounding areas. Non-residential structures are generally structures where people are employed. Protecting these structures protects value and lives.



The Composite Oil and Gas Suitability Map is a weighted summary of the preceding raster layers. Each land use factor had a maximum weighting of 5. Each natural resource factor had a maximum weighting of 10. Natural resource factors identified as having very high sensitivity had a maximum weighting of 20. This output, or model, is a representation of many geographical processes that exist within the Galisteo Basin. The purpose of the Map is to highlight the areas that are most sensitive to Oil and Gas industry development based upon the 29geographical layers compiled by a variety of agencies and should be used as a guide for decision making.

ⁱ Florida Administrative Code Sec. 9J-5.003(45).

ⁱⁱ See, Robert H. Freilich and S. Mark White, *21st Century Land Development Code* (American Planning Association, 2008); S. Mark White, *Using Adequate Public Facilities Ordinances For Traffic Management*, Planning Advisory Service Report No. 465 (American Planning Association, 1996); Board of County Commissioners of Larimer County v. Conder, 927 P.2d 1339 (Colo. 1996).

ⁱⁱⁱ Richard L. Settle and Charles G. Gavigan, *The Growth Management Revolution Washington*, 15 U. Puget Sound L. Rev. 869 (1993); Robert H. Freilich, *From Sprawl to Smart Growth: Effective Legal, Planning, and Environmental Systems* (American Bar Association, 1999).

^{iv} Robert H. Freilich and S. Mark White, *Transportation, and Growth Management*, 4 Loy. L. Rev. 915, 955 (1991). See Maryland Code Ann. Evt. § 9-4`1(b); Wash. Rev. Code § 36.70A.010.

^v Wincamp Partnership v. Anne Arundel County, 458 F. Supp. 1009 (D. Md. 1978); Long Beach Equities v. County of Ventura, 282 Cal. Rptr. 877 (Cal. App. 1991)

^{vi} See R. Freilich, A Five-Tiered Growth Management Program for San Diego 2-7 to 2-11 (1976).

^{vii} J.W. Jones Companies v. City of San Diego, 157 Cal. App. 3d 745 (1984).

^{viii} Nelson, Arthur. "Development Impact Fees: The Next Generation," from Exactions, Impact Fees and Dedications: Shaping Land-Use Development and Funding Infrastructure in the Dolan Era: American Bar Association, 1995.

^{ix} Id. at 2319-20.

^x Nollan v. California Coastal Commission, 483 U.S. 825 (1987).

^{xi} Dolan v. City of Tigard, 512 U.S. 374 (1994).

^{xii} See Nollan, 483 U.S. 825 (finding a taking where a north-south beach easement was required for, but unrelated to, the stated purpose of preserving east-west accessibility to the beach).

^{xiii} See Dolan, 512 U.S. 374 (finding a taking where the city failed to demonstrate that the extent of the required land dedication was "roughly proportional" to the actual impact of the proposed development.)

^{xiv} Road and Bridge Impact Fee Support Study p. 26 – April 2008, Rio Blanco County, Colorado.