CHAPTER 4

CONTAMINANT SOURCE INVENTORY

This chapter presents the Contaminant Source Inventory as specified in Section III of Wyoming's WHP Program Guidance Document (1998) and is Step 3 of the five-step process.

INTRODUCTION

The objective of completing a source inventory is to identify all potential and existing sources of contamination that may threaten public drinking water supply wells. Existing sources are those that are known to have caused groundwater contamination. Potential sources are those that may cause groundwater contamination but, to date, have not.

Groundwater contamination can occur many different ways, but often involves the misuse and improper disposal of liquid and solid wastes; the illegal dumping of household, commercial, or industrial chemicals; the accidental spilling of chemicals from trucks, railways, aircraft, handling facilities, and storage tanks; the improper siting, design, construction, operation, or maintenance of agricultural, residential, municipal, commercial, and industrial land uses; and liquid and solid waste disposal facilities. Contaminants also can be derived from atmospheric pollutants, such as airborne sulfur and nitrogen compounds, which are created by smoke, flue dust, aerosols, and automobile emissions, fall as acid rain, and infiltrate through the soil.

The inventory process includes the following steps.

1. Obtain a base map to locate existing and potential sources.
2. Obtain available information on existing and potential sources:

- Determine and record existing data;
- Identify likely sources for further study;
- Investigate unknown sources; and

- Verify accuracy and reliability of the information gathered.

3. Describe contaminant sources within the wellhead protection area and complete source identification forms for each existing and potential source of contamination identified.
4. Develop the Source Inventory list from completed Source Identification forms.
5. Prioritize sources within the wellhead protection area for management purposes.
6. Transfer source location and information to wellhead protection area delineation maps.
7. Update, refine and expand Source Inventory information.

APPROACH

The Environmental Advisory Committee Contaminant Source Identification Subcommittee (CSIS) began its inventory in 1998. The mission of this subcommittee was to identify existing and potential sources of contamination to the groundwater supply of the City of Laramie. The CSIS was also charged with prioritizing the inventory list to aid in the development of necessary aquifer area management strategies.

The CSIS used the geologic map adapted from Don A. Lundy (1978) for the base map of this inventory. It is a topographic base map with detailed geologic mapping. Zones 2 and 3 of the Casper Aquifer Protection Area (CAPA) were overlaid onto this map.

The original source inventory was completed using several methods of study. In 1998, databases and published information were used by the University of Wyoming Geography and Recreation Department's Planning Program (UW Planning Program) to survey subdivisions in 16 sections due east of the City of Laramie. Two graduate students within the UW Planning Program completed a contaminant inventory of over 50 sections within the protection area for a master thesis (Hallgarth, 2001) and an EAC intern project (Powell, 2000). The graduate students collected and verified their inventories by field searches, windshield surveys, and door-to-door surveys with the use of a global position system (GPS) and geographic information systems (GIS) computer applications. The UW Planning Program submitted two class reports to the EAC in 2000; Build-out Scenarios-Casper Aquifer Recharge Area 1999-2010 and Terrain Analysis of the Casper Aquifer Protection Area, Laramie, WY (August 2000 and September 2000). The Albany County Assessor's office also contributed source inventory information based on land-ownership files, one and five-meter resolution satellite imagery, and GIS applications.

An independent inventory of contaminant sources in the CAPA was performed in June, 2004 as part of a state funded Source Water Assessment for Laramie. The Source Water Assessment is part of Wyoming's Source Water Assessment and Protection Program (SWAP).

In November 2007, Wittman Hydro Planning Associates, Inc. (WHPA) and the City of Laramie Community Development Department updated the list of potential contaminant sources. This update was conducted in conjunction with the revision of the Casper Aquifer Protection Plan (CAPP). WHPA utilized existing databases from Wyoming Department of Environmental Quality (WDEQ) and the City of Laramie Community Development Department conducted a windshield survey of the area.

The CSIS, WHPA, and City of Laramie Community Development Department researched existing data sources and identified potential contaminant sources located within the protection area. Existing sources were verified by a windshield survey. Research included looking at regulatory reporting requirements such as the following:

- Resource Conservation and Recovery Act (RCRA) Subtitle C
- RCRA Subtitle I
- Superfund Amendments and Reauthorization Act (SARA) Title III
- Underground Injection Control (UIC)
- National Pollution Discharge Elimination System (NPDES)
- Spill Prevention Control and Countermeasure (SPCC)

The following regulatory databases were also reviewed:

- Toxic Chemical Release Inventory (TRI)
- CERCLA Information System (CERCLIS)
- Hazardous Waste Data Management System (HWDMS)
- RCRA Information System (RCRIS)
- Waste Management Permit Compliance System
- Hazardous Material Incident Reporting System
- Underground Storage Tanks Case History File
- The Pollution Prevention Information Clearinghouse (PPIC)
- Federal Reporting Data System (FRDS)
- Leaking Underground Storage Tank database (LUST)
- Groundwater Pollution Control Program database

The UW Planning Program class project (University of Wyoming, Department of Geography and Recreation, 1999a) examined land use activities in an area east of the City of Laramie by a windshield survey. The land-uses included residential areas, commercial sites, industrial facilities, transportation networks, forestry activities, mining operations, and agricultural practices. This

information is reported in an unpublished document (University of Wyoming, Department of Geography and Recreation, 1999b). Figure 4-1, updated in 2007, provides County and City land use and zoning designations in the CAPA.

Potential Sources of Contamination

The potential contaminant source inventory was updated in 2007. All of the inventoried contaminant sources are designated potential because the sources have not been documented to have caused, to date, groundwater contamination. Source Identification Forms and Form IV for potential contaminant sources can be found in Appendix G. Due to the complexity of the CAPA and the fact that Zone 2 and Zone 3 are managed as one unit, the potential contaminant sources for all CAPA Zones have been listed together on the Source ID and Inventory List.

Zone 1 Potential Sources of Contamination

The only potential contaminant sources within Zone 1 are the naturally occurring springs at Pope, Soldier, and Turner wellfields.

Zones 2 and 3 Potential Sources of Contamination

Potential sources of contamination are listed in the contaminant source inventory (Table 4-1) and shown in Figure 4-2a. Figures 4-2b, 4-2c, and 4-2d provide a closer look at the potential contaminant sources around Spur, Turner, and Pope and Soldier wellfields, respectively. Figure 4-3 shows the County subdivisions that use septic systems.

General categories of contaminant sources are described below. Management strategies for each of the potential sources of contamination are discussed in Chapter 5.

- **Transportation corridors.** Hazardous materials are transported along these routes and if spills were to occur it could contaminate the Casper Aquifer in a single event. Automobile wastes and petroleum products associated with transportation routes can accumulate over time and be introduced into the aquifer through storm runoff.
- **Residential land use.** Septic systems in the Casper Aquifer are of particular concern because vulnerable features may provide a direct route for sewage effluent to enter the aquifer. Nitrates, bacteria, and other household wastes are all potential contaminants associated with septic systems. Additionally, every house over the Casper Aquifer generates household hazardous wastes and if improperly disposed these hazardous wastes may also enter the aquifer. Fertilizers and pesticides

may enter the aquifer either through runoff into drainages or through leaching into groundwater if improperly applied. Residential areas that are attached to a centralized wastewater system will have much less of an impact on the aquifer than those using septic systems.

- **Abandoned wells.** Improperly abandoned wells completed in the Casper Aquifer, provide a direct pathway for contaminants to enter the Casper Aquifer.
- **Underground and aboveground storage tanks (UST and AST).** USTs and ASTs often store petroleum products or other hazardous materials and leaks may go undetected for some time. Due the materials stored in these tanks, they are considered a potential contaminant source.
- **Stormwater and urban runoff.** Heavy metals, automobile fluids, pesticides, and fertilizers are all contaminants found in stormwater and urban runoff. Stormwater and urban runoff are typically associated with parking lots, building, and roadways. As the stormwater and urban runoff reach drainages and infiltrate the aquifer, associated contaminants are introduced into groundwater.
- **Commercial land use.** Some commercial land uses store, use, and/or generate hazardous materials that if improperly handled may contaminate the aquifer. Storm runoff is generated from impervious areas, and pesticides and fertilizers used by these businesses may be introduced to the Casper Aquifer.
- **Limestone quarries.** Limestone quarries use fuel and blasting materials that if improperly handled may contaminate the aquifer. The blasting materials are consumed during the detonation but could contaminate the aquifer if improperly handled or stored.
- **Agricultural land use.** Waste from commercial concentrated livestock facilities and applications of fertilizers and pesticides pose a risk from agricultural land use to the Casper Aquifer. General livestock grazing poses much less of a threat to groundwater than commercial concentrated feeding operations.
- **Miscellaneous uses.** There are other uses within the CAPA which have the potential to contaminate the Casper Aquifer. These uses produce the following contaminants: stormwater, animal wastes, medical wastes, pesticides, fertilizers, lead, and hazardous materials.

Updating the Contaminant Source Inventory

To ensure that the contaminant source inventory continues to be updated on a regular basis, the assigned City/County staff will incorporate new developments into the inventory as the developments occur. The Albany County Planning Department and the Laramie Community Development Department will provide the development information to the assigned City/County staff. Federal and state databases regarding potential contaminant sources will be accessed once each year to include the latest information in the inventory. Every two years, when the CAPP is updated, a windshield survey will also be conducted to verify contaminant sources

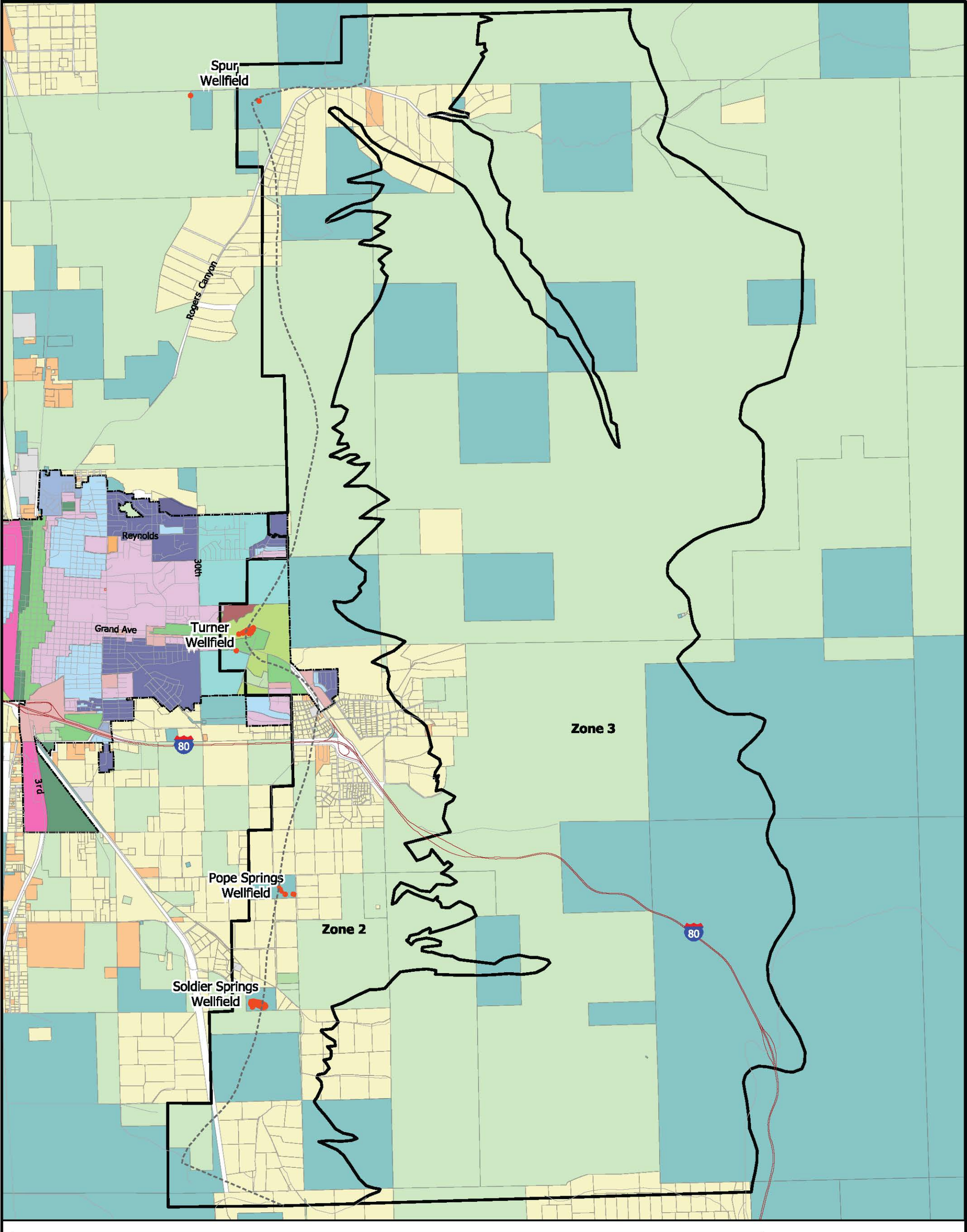

Figure 4-1. Albany County land use and City of Laramie zoning.

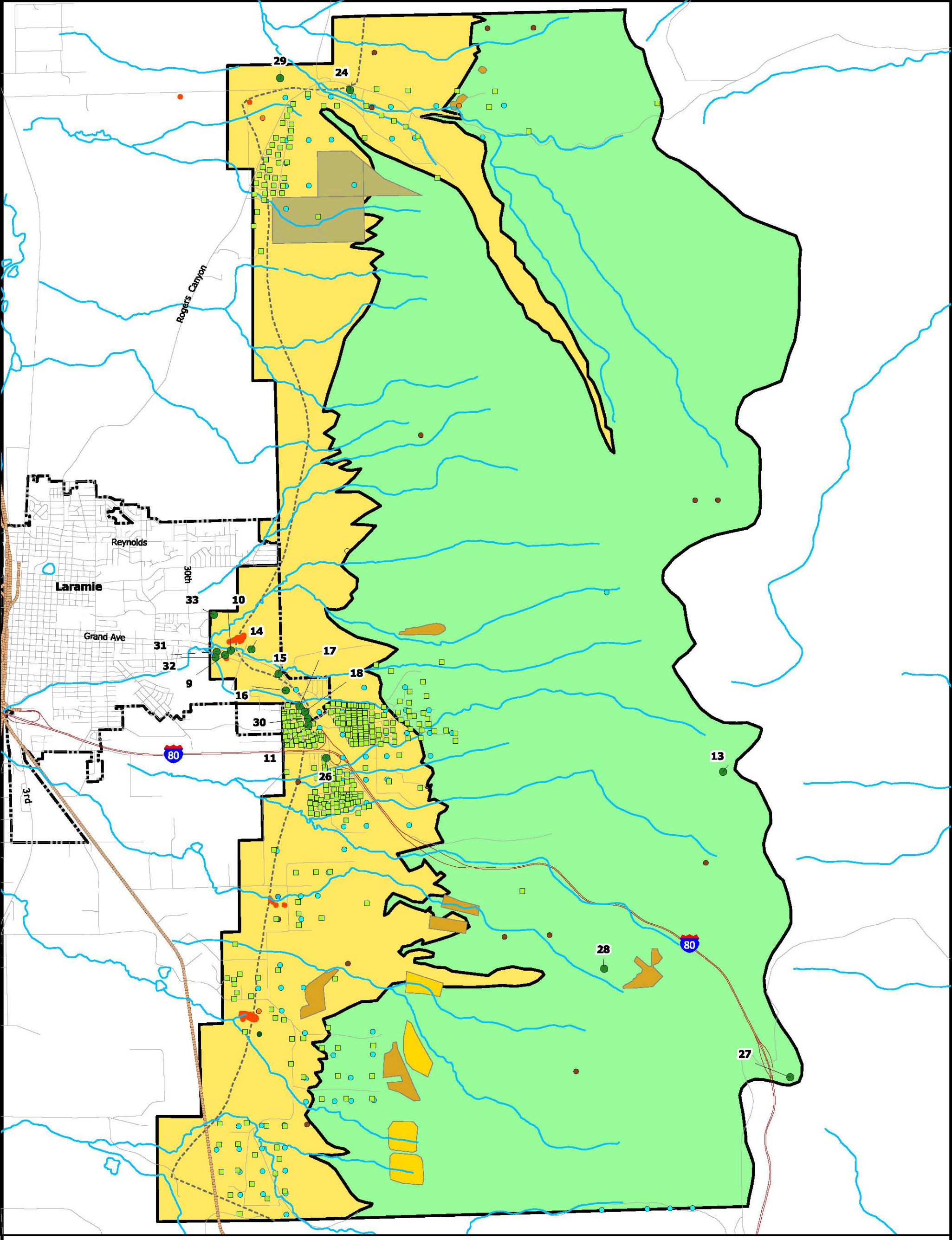

Figure 4-2a. Potential contaminant sources, septic systems, and wells in the CAPA.

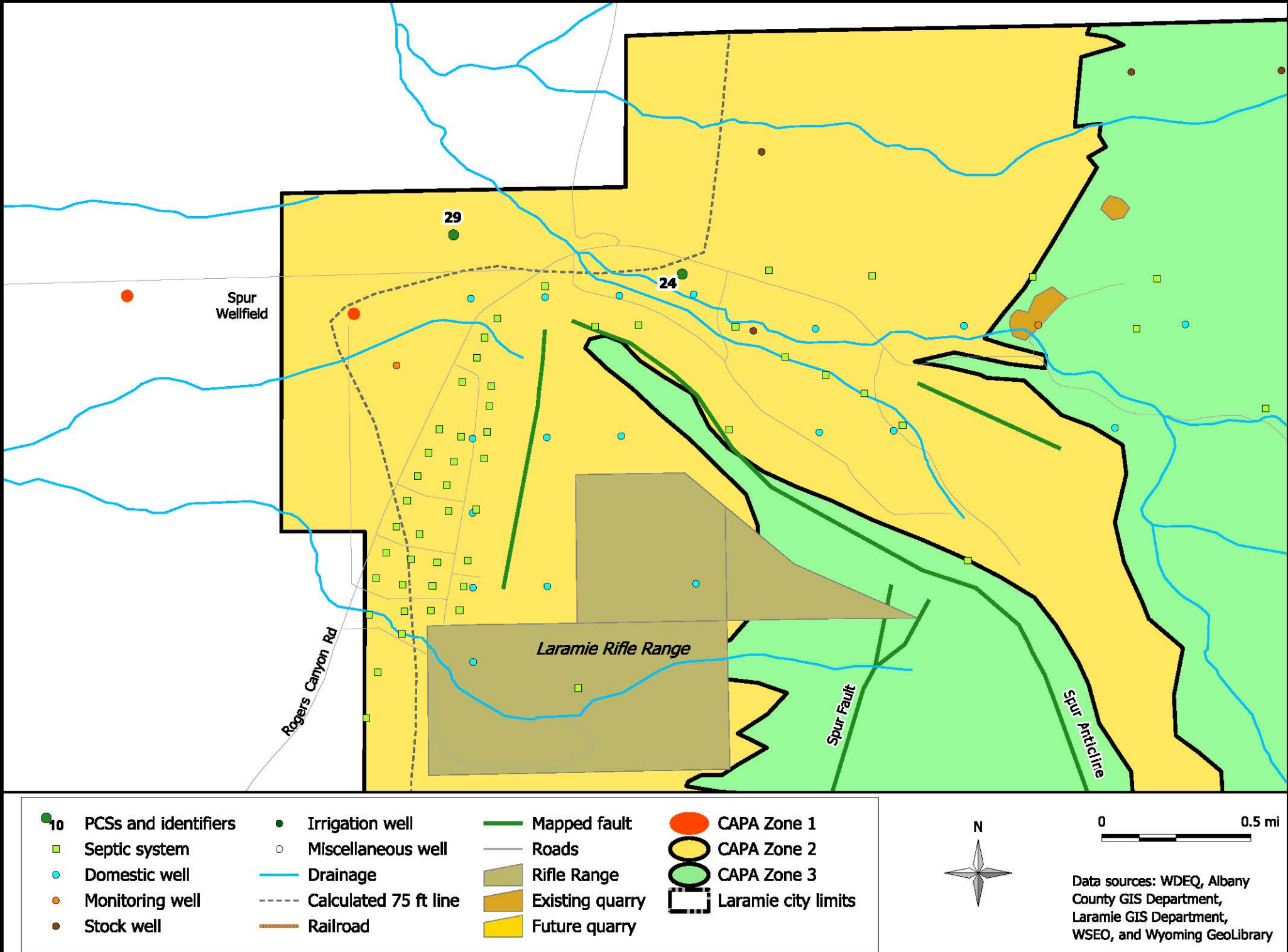

Figure 4-2b. Potential contaminant sources, wells, ans septic systems near Spur Wellfield.

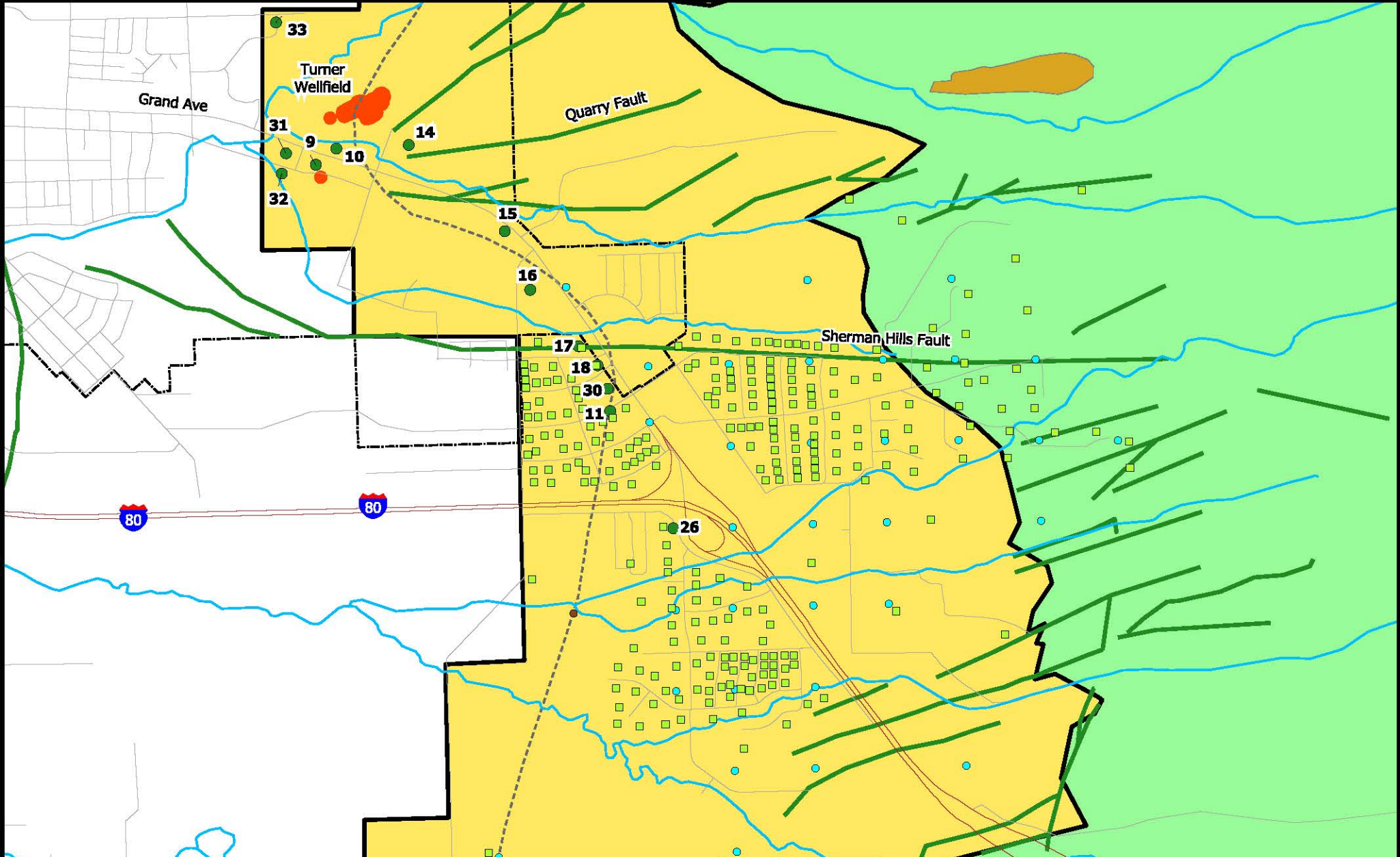

Figure 4-2c. Potential contaminant sources, wells, ans septic systems near Turner Wellfield.

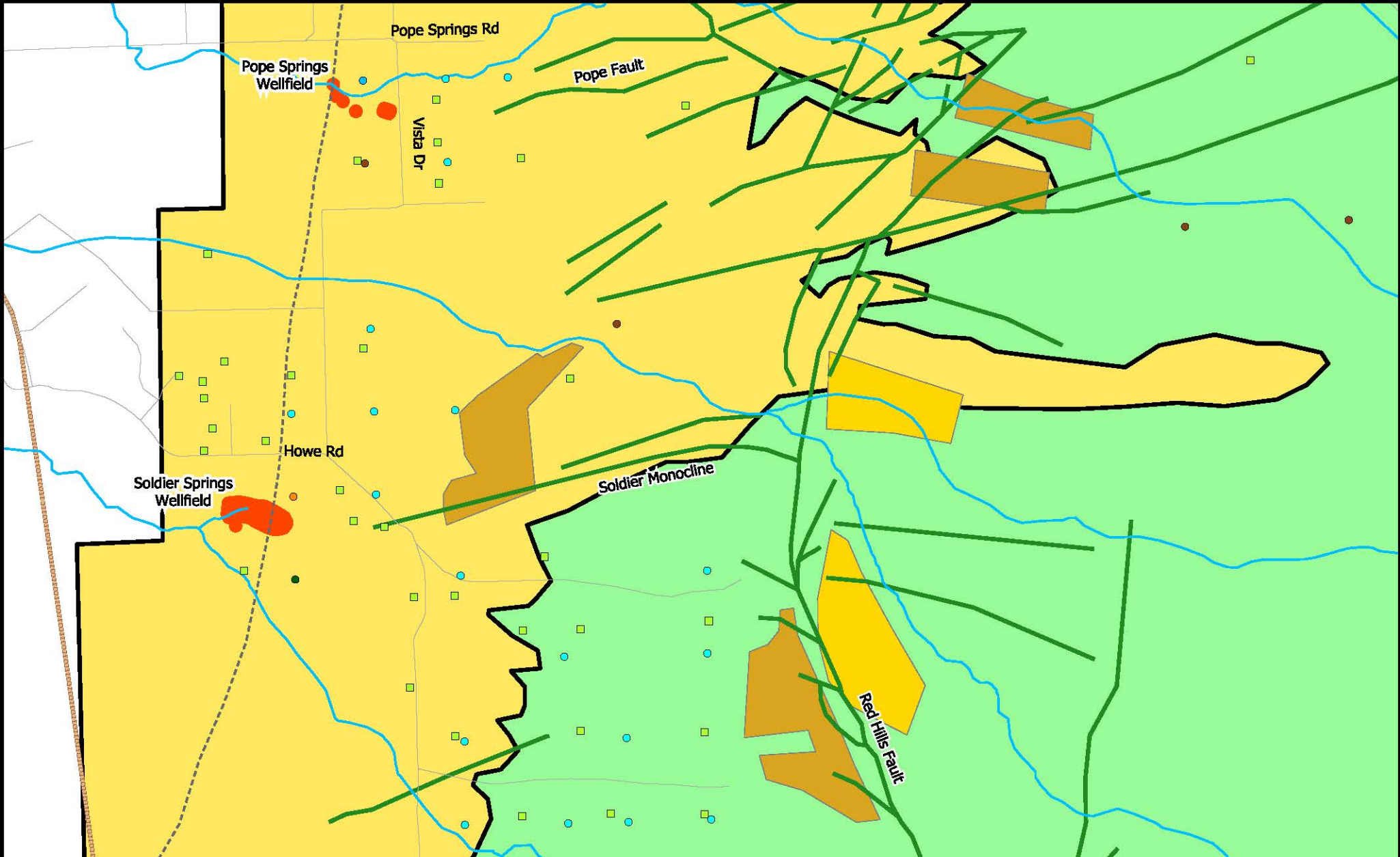

Figure 4-2d. Potential contaminant sources, wells, and septic systems near Pope Springs and Soldier Springs wellfields.

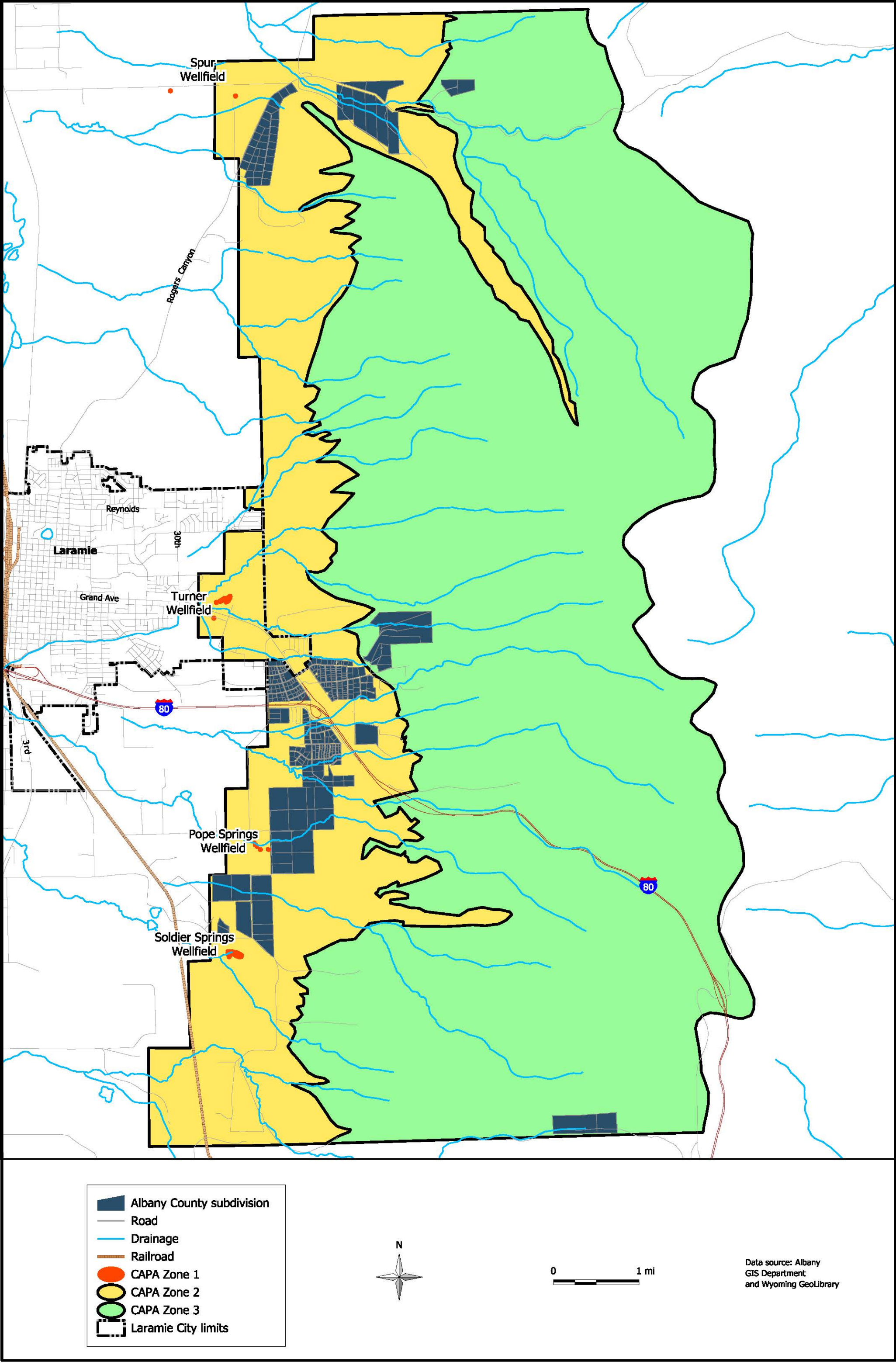

Figure 4-3. Albany County subdivisions within the Casper Aquifer Protection Area.

TABLE 4-1. POTENTIAL CONTAMINANT SOURCE INVENTORY – UPDATED NOVEMBER 2007.

Map Number*	Nature of Site and Site Name	Site Address/Location	Potential Source	Delineation Zone	Priority**
	Residential Areas	T15N, R73W: Sec 1, S2 &Sec 1 S2 NW4 (Sherman Hills, Imperial Heights, Laramie Plains); Sec 12 (Country Meadows, Sundial Acres, Valley View). T15N, R73W: Sec 14 SE4; Sec 13; Sec 23 E; Sec 24. T15N, R73W: Sec 23 E2; Sec 26 E2; Sec 25; Sec 24, Sec 35; Sec 36.	Septic systems (except for Imperial Heights), household hazardous wastes, pesticides, and fertilizers	Zones 2, 3	High
	Interstate 80	T15N, R73W: Sec 1 W2; Sec 12 NE4; T15N, R72W: Sec 7 NW4; Sec 18 N2; Sec 17 N2; Sec 16 S2; Sec 21 NE4; Sec 22; Sec 27 E2; Sec 26 NW4	Hazardous waste spill, road salts	Zones 2, 3	High
	Springs	T16N, R73W: Sec 35 S2. T15N, R73W: Sec 14 E2; maybe Sec 13. T15N, R73W: Sec 23 S2; Sec 26 N2; Sec 24 W2.	Conduit for contaminants	Zone 1	High
	Wells (municipal, monitoring, abandoned, test, domestic)	Refer to Figure 4-2a, 4-2b, 4-2c, 4-2d	Conduit to groundwater	Zones 1, 2, 3	High
9	Automobile Dealership Laramie GM Auto Center	T16N, R73W: Sec 35 S2 3600 E. Grand Ave.	UST (removed), Automotive waste, hazardous waste generator	Zone 2	High
10	Automobile Dealership Laramie Ford	T16N, R73W: Sec 35 S2 3609 E. Grand Ave.	Detail Shop, Automotive wastes, UST (removed 1991)	Zone 2	High
11	Gas Station Tumbleweed Express	T15N, R73W: Sec 1 SW4, NE4 4700 Bluebird Lane	UST-potentially less than 30 ft of Satanka Shale overlying the Casper Formation at this location	Zone 2	High
	Union Pacific Railroad	T15N, R73W: Sec 26 SW4, SW4; Sec 35 W2; T14N, R73W: Sec 2 W2; Sec 11 W2	Derailment and hazardous waste spill	Zones 2, 3	Medium
13	UST Pilot Hill Radio Repeater	T15N, R 72W, Sec 10	Two 560 gallon diesel tanks (1 removed)	Zone 3	Medium
14	Urban run-off Dollar Tree, Staples, Snowy Range Academy, and Express Pharmacy	4005 and 4027 E. Grand St.	Urban run-off	Zone 2	Medium
15	Urban run-off & auto services Super Wal-mart	T16N, R73W: Sec 35 SW4, SE4 4308 Grand Ave.	Oils, antifreeze, fertilizers, urban run-off	Zone 2	Medium
16	Medical Facility Gem City Bone & Joint	1909 Vista Drive	Medical wastes	Zone 2	Medium
17	Animal Hospital	4619 Bobolink Ln	Medical wastes	Zone 2	Medium
18	Green house	4633 Mockingbird Ln	Fertilizers	Zone 2	Medium
	Quarries (ABA and Active)	Throughout CAPA	Quarry activities (refueling spills, residue from blasting compounds-diesel fuel and ammonium nitrate)	Zones 2, 3	Low

Map Number*	Nature of Site and Site Name	Site Address/Location	Potential Source	Delineation Zone	Priority**
	Rifle Range Laramie Rifle Range Corporation	T16N, R73W: Sec 12 N2	Lead bullets	Zone 2, 3	Low
	Municipal Sewer Lines	T15N, R73W: Sec 1	Nitrates, fecal coliform	Zone 2	Low
	Mosquito Spraying	Throughout CAPA	Bti and Malathion @ 3 ounces/acre	Zone 2, 3	Low
24	Equine Riding Facility	25 Domino	Animal wastes	Zone 2	Low
	Transportation routes	Grand Avenue, I-80, and all other roads located in the CAPA.	Increase salinity	Zone 2, 3	Low
26	UST (Underground Storage Tank) J. T. Peele	2038 Skyline Drive	3,000 gallon diesel tank (removed 1989)	Zone 2	Low
27	UST Sherman Hill Microwave Site	13 Miles W on Happy Jack Road and Exit 323 on I-80	350 gallon gasoline tank (removed 1994)	Zone 3	Low
28	Wastewater Discharge Etchepare Quarry	T15N, R72W, Sec 21	NPDES Mineral Mining Discharge, Construction Sand and Gravel	Zone 3	Low
29	Wastewater Discharge Ninth Street Pit #2	T17N, R73W, Sec 36	NPDES Mineral Mining Discharge, Construction sand and gravel	Zone 2	Low
30	Wood/logging site	Grand Avenue	Fuel from operating equipment	Zone 2	Low
31	Dental office	3421 E. Garfield St.	Dental wastes	Zone 2	Low
32	Detailing shop	3424 E. Garfield St.	Auto wastes, solvents	Zone 2	Medium
33	Golf course Jacoby Golf Course	3501 Willet Drive	Pesticides, fertilizers	Zone 2	Medium
	Agricultural land use	Throughout the CAPA	Animal wastes, pesticides, fertilizers	Zones 2, 3	Low

* Sources without a map number are depicted on the maps (Figure 4-2a, 4-2b, 4-2c, and 4-2d) in other manners. For example, septic systems are represented by green squares.
** Priority qualitatively determined based on distance from wellheads, groundwater flow direction considerations, and types of contaminants present.