

SANTA FE COUNTY

**INFRASTRUCTURE
BUILDOUT ANALYSIS**

MARCH 2017

Bohannon  Huston

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EXECUTIVE SUMMARY

PURPOSE

The Santa Fe County (County) Infrastructure Buildout Analysis (IBA) builds upon existing planning efforts – the Sustainable Growth Management Plan (SGMP) and the Sustainable Land Development Code (SLDC). The IBA lays the groundwork for the conceptual expectation of infrastructure needs for County-identified Sustainable Development Areas for the next 20 years, based on projected development patterns. The analysis includes consideration of roadways, water, and wastewater systems, as well as emergency services, parks, open space, and trails. In addition, the Plan offers a capacity scenario to understand the total amount of development that could be accommodated in SDA-1 areas in Santa Fe County, potentially beyond the 20 years. The capacity scenario assumes that all developable land is utilized. Although the scenario is not linked to a date in time, it is a useful reference for future decisions. The County can then take the information presented under the 2040 projections scenario and the capacity scenario and determine if, when, and how this infrastructure is funded: publicly, privately, or a combination, as appropriate. In particular, the information contained in the IBA can be used to inform the County Infrastructure Capital Improvement Plan (ICIP).

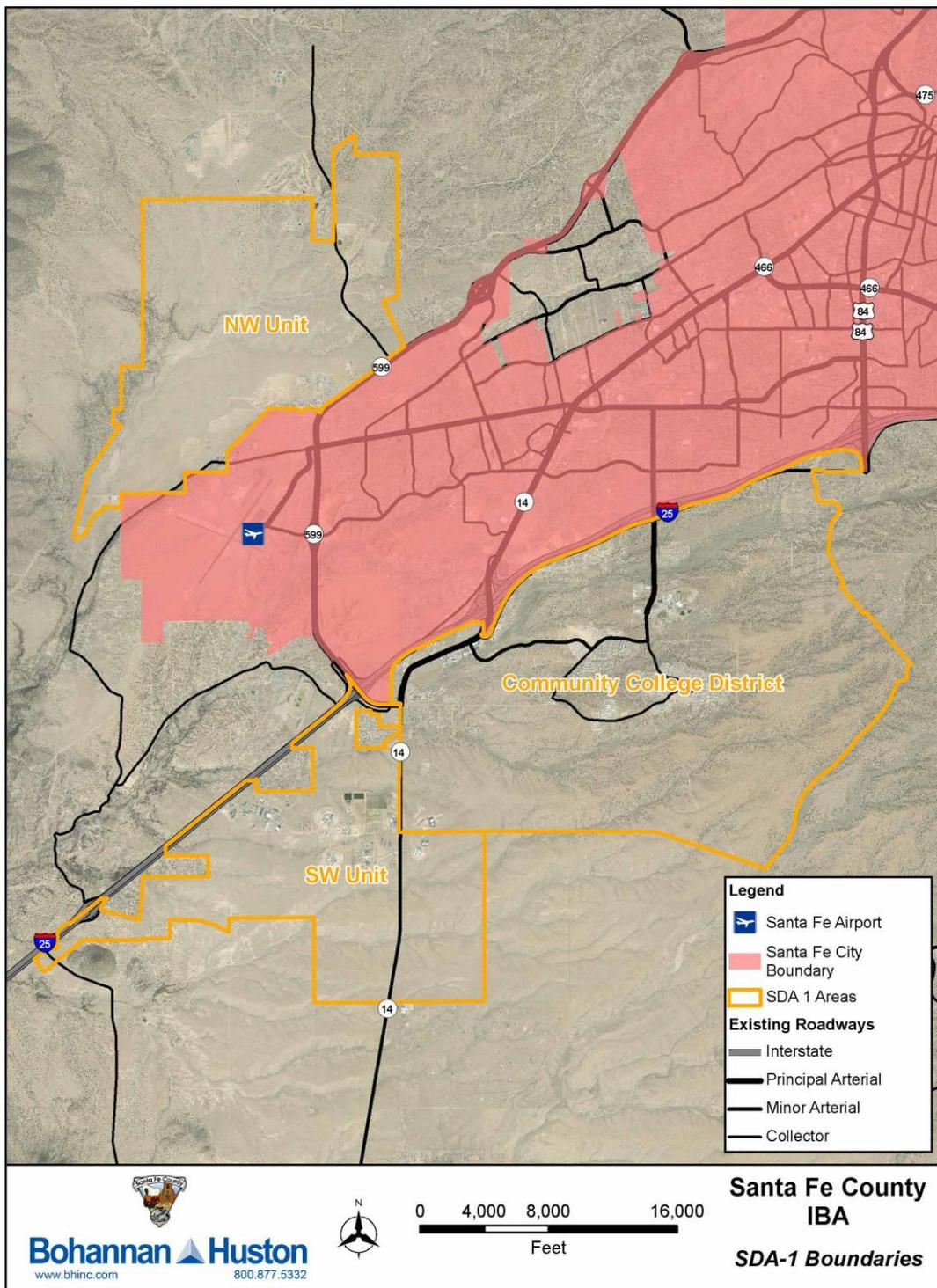
POPULATION AND EMPLOYMENT GROWTH

Santa Fe County, with the support of BBER, developed population and employment estimates by County subarea, including each of the SDA subareas, for 2030. To meet the 20-year horizon for the IBA, County-level projections are extended from 2030 to 2040 using a variety of extrapolation methods. An initial analysis of population, housing, and employment was completed prior to the consideration of future infrastructure needs. The analysis completed for roadways, water, and wastewater was all completed based on the same set of growth assumptions. For Roadways, water and wastewater, all recommendations remain within the SDA-1 areas. The recommendations for emergency services, parks, open space, and trails are based on County-wide data (exclusive of incorporated areas) with recommendations for future services primarily focused on the needs/benefits within the SDA-1 area.

There are projected to be over 14,000 additional residents in unincorporated portions of Santa Fe County between 2015 and 2040, of which more than 9,000 additional residents are expected to be located in SDA-1 areas. This level of population growth will require almost 3,800 additional housing units. The projections reflect the fact that there will be an increasing share of residents of unincorporated Santa Fe County located in SDA-1 areas over time. By 2040, approximately one quarter of Santa Fe County's unincorporated population will reside in SDA-1 areas, compared to around 14 percent (%) in 2015.

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EX Figure 1 - SDA Areas



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Employment in SDA-1 areas is also expected to grow at rates higher than Santa Fe County overall, indicating a disproportionate level of economic activity will take place in these areas over time. Between 2015 and 2040, the SDA-1 areas of Santa Fe County will add approximately 1,650 jobs.

The IBA divides the SDA-1 areas into three separate subareas (also referred to in the IBA as “units”) for a more accurate analysis. These areas are analyzed for population, housing and employment. They are also used to create separated, area-wide population projections. These numbers are summarized below.

The three subareas are identified as follows (See EX Figure 1):

- Northwest (NW) Unit
- Southwest (SW) Unit
- Community College District (CCD) Unit

The vast majority of housing growth will occur in known or planned subdivisions in the CCD Unit. The IBA assumes that the subdivisions will buildout at differing rates, depending on factors such as accessibility. The remaining housing growth will most likely occur in the privately-held developable lands located in mixed-use zones in the NW and SW Units, or in areas classified as village zones or community or employment centers in the CCD Unit. The CCD Unit is expected to experience the highest levels of population and employment growth (see EX Table 2).

EX Table 1 - SDA-1 Projections by Subarea¹

Summary Statistics	NW Unit	SW Unit	CCD Unit	SDA-1 Total
2015 Population	12	967	6,276	7,255
2040 Population	1,422	2,088	13,042	16,552
2015 Household Population	12	128	5,704	5,844
2040 Household Population	1,122	1,249	12,470	14,841
2015 Group Quarters Population	0	839	572	1,411
2040 Group Quarters Population	300	839	572	1,711
2015 Housing Units	5	56	2,586	2,647
2040 Housing Units	484	539	5,380	6,403
2015 Employment	124	557	1,959	2,640
2040 Employment	690	905	2,711	4,306

¹ The sources for all population and employment tables are Bohannon Huston, BBER, and the US Census Bureau. See Appendix A for more details on the development of the projections.

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EX Table 2 - Share of Total Growth by SDA-1 Subarea, 2015-2040

Share of Growth	NW Unit	SW Unit	CCD Unit	SDA-1 Total
Population	15%	12%	73%	100%
Housing Units	13%	13%	74%	100%
Employment	34%	21%	45%	100%

PROJECTED INFRASTRUCTURE NEEDS

The IBA's recommended infrastructure network is based on the need to provide access to developable land and to support future development at base density levels (i.e. the minimum lot sizes and density levels by zoning district in the SLDC). However, County planning efforts encourage new development to occur in sustainable patterns that take advantage of existing services and infrastructure. The recommendations for roadways, water, and wastewater are built on the foundation of maximizing allowable density, thus minimizing the amount of new infrastructure required to support new development. If new development occurs at levels above the base density, less land must be utilized (and accessed) to support development needs depending on the intensity of development in those areas. Higher density growth patterns would therefore reduce the need for all of the roadway and utilities infrastructure identified in the IBA.

For these three infrastructure needs (roadways, water, and wastewater), all recommendations remain within the SDA-1 area. However, the recommendations for emergency services, parks, open space, and trails are based on County-wide population data with recommendations for future services primarily focused on the needs/benefits within the SDA-1 area. The County-wide service levels remain constant regardless of density levels or the distribution of housing and employment.

The recommended improvements are split into three phases that span a period of twenty years.

EX Table 3 - Phases and Timeframe

Phase	Timeframe
Phase 1	2017-2023 (Years 1-7)
Phase 2	2024-2030 (Years 8-14)
Phase 3	2031-2040 (Years 15-20)

The following are the recommended improvements for roadways, water, and wastewater, with some discussion on County-wide services.

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Summary of Roadways

The recommended roadways identified in the IBA represent a base network that supports long-term development and land access needs consistent with the SLDC and SGMP. These roadways will need to be coordinated with roads that are constructed as part of site development projects or subdivisions. The identification of roadway phases is informed by the 2040 Metropolitan Transportation Plan (MTP), as some facilities are already programmed in the short-term Transportation Improvement Program (TIP) or identified in a particular timeframe in the MTP.

Preliminary roadway cost estimates are also provided for general planning purposes only and are intended to offer a reference for the costs associated with an expanded roadway network. Estimates are provided in 2015 dollars and are not indexed for future inflation, nor do they include right of way acquisition, environmental, and design costs. Some roadway improvements may be constructed using federal funds or by private developers. The total cost of all roadway improvements in SDA-1 areas across all phases is approximately \$49 million.

The proposed base network for the **NW unit** consists of a series of roads that provide land access to support anticipated development needs through 2040 (see Section 4 and Appendix A for more information on the 2040 projections). This network includes two sets of parallel facilities that form a large-scale grid to support access and network connectivity over time. The **SW unit** has limited existing roadway network and minimal connectivity between existing roadways. Although no new roads are proposed in the SW unit in the 2040 MTP, to support the anticipated levels of development over the next 20 years and to promote sustainable development patterns, a more complete roadway network must be provided. Unlike the NW and SW units, where land access is a major determining factor in the location and phasing of new roadway facilities, the recommended network for the **CCD unit** emphasizes connectivity and access to known or planned subdivisions.

EX Table 4 - Summary Roadway Infrastructure Costs by Phase and Subarea²

Subarea	Phase 1	Phase 2	Phase 3	Total
NW Unit	\$0	\$7,783,396	\$3,499,648	\$11,283,044
SW Unit	\$2,246,021	\$3,134,092	\$9,673,371	\$15,053,485
CCD Unit	\$10,833,150	\$3,000,000	\$8,864,222	\$22,697,372
Total	\$13,079,171	\$13,917,488	\$22,037,241	\$49,033,900

² All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

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EX Table 5 - All Roadway Projects³

Unit	Phase	Road	Name / Description	Length (mi)	Classification	Cost Estimates
NW	2	A	Caja del Rio / Paseo Real Connector	0.9615	Minor Collector	\$1,549,371
NW	2	B	Caja del Rio / Paseo Real Connector	1.1694	Minor Collector	\$1,884,276
NW	2	C	Old Cochiti Rd	0.6890	Local	\$756,960
NW	2	D	Caja del Oro Grant Rd	1.9261	Major Collector	\$3,000,000
NW	2	E	N/A	0.5396	Local	\$592,789
NW	3	F	N/A	0.7736	Local	\$849,958
NW	3	G	N/A	1.7618	Local	\$1,935,577
NW	3	H	N/A	0.6500	Local	\$714,113
SW	1	A	Metro Blvd extension	0.2642	Local	\$290,260
SW	1	B	Valle Vista Blvd extension	0.6649	Minor Collector	\$1,071,301
SW	1	C	Valle Vista Blvd connector	0.2279	Minor Collector	\$367,223
SW	1	D	Louis Rd	0.4708	Local	\$517,238
SW	2	E	Comanche Dr	1.9450	Major Collector	\$3,134,092
SW	3	H	Penitentiary Rd	1.9419	Local	\$2,133,478
SW	3	G	Frontage - La Cienega Connector	2.2723	Local	\$2,496,431
SW	3	F	La Cienega - NM 14 Connector	3.6352	Rural Minor Arterial	\$5,043,463
CCD	1	A	SE Connector	1.8564	Minor Arterial	\$4,104,803
CCD	1	B	NE Connector	1.9829	Minor Arterial	\$4,384,515
CCD	1	C	Avenida del Sur / SE Connector	1.06	Minor Arterial	\$2,343,833
CCD	2	D	Richards Ave Bike Lanes	1.1251	Principal Arterial	\$1,000,000
CCD	2	E	Avenida del Sur Bike Lanes	3.2975	Minor Arterial	\$1,000,000
CCD	2	F	Rancho Viejo Blvd Bike Lanes	1.6667	Major Collector	\$1,000,000
CCD	3	G	Sunshine Mesa	0.4088	Minor Arterial	\$903,923
CCD	3	H	Old Galisteo Way / Meador Ln	1.5549	Minor Collector	\$2,505,461
CCD	3	I	Campus Rd extension	0.9638	Minor Collector	\$1,553,003
CCD	3	J	Dinosaur Trail Bike Lanes	1.6382	Major Collector	\$1,000,000
CCD	3	K	Old Galisteo Rd connection	0.3402	Local	\$373,756
CCD	3	L	Chili Line Rd extension	0.0625	Local	\$68,665
CCD	3	M	N/A	0.6153	Local	\$675,991
CCD	3	N	San Antonio Peak extension	0.3969	Minor Collector	\$639,538
CCD	3	O	College Dr extension	0.7099	Minor Collector	\$1,143,885

³ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

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Summary of Water and Wastewater Recommendations

The IBA includes a summary of the demand calculations, design criteria, and recommendations for water and wastewater infrastructure. The water and wastewater recommendations have been developed to meet 2040 demand projections, but also analyzed the infrastructure needs under the capacity scenario (i.e. full buildout). This information will help the County determine if the 2040 recommendations will be sufficient at buildout, or if it will be more prudent to upsize or downsize the 2040 recommendations, and whether the County should anticipate parallel water and wastewater lines in the future.

Water and wastewater recommendations are provided for each SDA-1 subarea, and summarized below. In all three units, wastewater trunk pipelines are located along proposed roadways. Lift stations are located at low elevations where gravity drainage is not possible. For the water system in all three units, 16-inch transmission lines are sufficient to provide domestic and fire flow to customers under all demand conditions. Details on the recommended pipe velocities for the 16-inch transmission lines at the calculated demands for each of the three units are included in the IBA. Cost estimates by subarea and phase can be found in EX Table 6.

All wastewater flows in the **NW Unit** are assumed to be conveyed to the City of Santa Fe Wastewater Treatment Facility. Wastewater infrastructure recommendations include four lift stations, approximately 32,800 feet of gravity wastewater mains, and 5,100 feet of wastewater force main. An optional 36,900 feet of force main is recommended to lift wastewater from the NW Unit to the Quill Wastewater Treatment Plant (WWTP).

All wastewater flows in the **SW Unit** are assumed to be conveyed to the County's Quill WWTP. Wastewater infrastructure recommendations include trunk lines along conceptual roadways and NM 14 that split the flow between the area north of the Quill WWTP and the area south of the Quill WWTP. Wastewater infrastructure north of Quill WWTP includes approximately 9,700 feet of gravity wastewater lines that drain to an existing lift station. Infrastructure along NM 14 includes two lift stations, approximately 7,400 feet of gravity wastewater line, and 5,300 feet of force main line that connects to existing infrastructure. Wastewater infrastructure west of NM 14 includes two lift stations, approximately 48,700 feet of gravity wastewater line, and approximately 16,900 feet of force main that connects to the Quill WWTP.

All wastewater flows in the **CCD Unit** are assumed to be conveyed to the County's Quill WWTP. Wastewater infrastructure recommendations include trunk lines along existing and conceptual roadways. Wastewater infrastructure includes two lift stations, approximately 100,500 feet of gravity wastewater line, and 9,400 feet of wastewater force main.

Based on when development occurs, specific design analysis and project funds will need to be evaluated. Further details on phasing recommendations and preliminary cost estimates for each SDA-1 Subarea are provided in the IBA.

EXECUTIVE SUMMARY

EX Table 6 - Water Infrastructure Costs by Phase and Subarea⁴

Subarea	Phase	Description	Units	Unit Cost	Quantity	Total
NW Unit	1	16" Waterline Pipe and Appurtenances	Linear Feet	\$100	11,300'	\$1,130,000
	2		Linear Feet	\$100	10,100'	\$1,010,000
	3		Linear Feet	\$100	20,000'	\$2,000,000
SW Unit	1	16" Waterline Pipe and Appurtenances	Linear Feet	\$100	5,000'	\$500,000
	2		Linear Feet	\$100	5,600'	\$560,000
	3		Linear Feet	\$100	31,200'	\$3,120,000
CCD Unit	1	16" Waterline Pipe and Appurtenances	Linear Feet	\$100	15,800'	\$1,580,000
	2		Linear Feet	\$100	11,700'	\$1,170,000
	3		Linear Feet	\$100	0	\$0
All Units	1	Pressure Reducing Valve in Vault	Per Unit	\$60,000	3	\$180,000
	2		Per Unit	\$60,000	1	\$60,000
	3		Per Unit	\$60,000	2	\$120,000
Total						\$11,430,000

EX Table 7 - Wastewater Infrastructure Costs by Phase and Subarea⁵

Phase	Subarea	Lift Station	Force Main	8-inch	10-inch	12-inch	16-inch	Manholes	Total Cost
			(cost per ft)						
Phase 1	NW	1	3,496	8,482	0	0	0	30	\$584,880
	SW	0	0	6,702	0	0	0	20	\$237,665
	CCD	2	9,415	17,443	9,100	9,749	3,704	100	\$2,130,272
Phase 2	NW	2	2,866	12,925	0	0	0	40	\$862,218
	SW	2	5,281	10,439	0	0	0	30	\$852,121
	CCD	0	0	14,533	0	1,620	0	50	\$588,622
Phase 3	NW	2	31,017	7,962	6,895	0	0	40	\$1,915,381
	SW	2	16,896	36,285	4,410	0	0	110	\$2,314,633
	CCD	0	0	35,605	0	0	0	90	\$1,221,944
	Total								\$10,707,736

EX Table 8 - Wastewater Infrastructure Unit Costs

⁴ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

⁵ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

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Description	Unit Type	Unit Cost
Lift Station	Per Unit	\$150,000
8-inch Force Main	Linear Feet	\$35
8-inch Sewer Main	Linear Feet	\$28
10-inch Sewer Main	Linear Feet	\$30
12-inch Sewer Main	Linear Feet	\$35
16-inch Sewer Main	Linear Feet	\$40
Manholes	Per Unit	\$2,500

Summary of Recommendations on County-wide Services

County-wide services have also been analyzed, including emergency services, parks, trails, and open space. The analysis reviewed current, adopted LOS thresholds from Table 12-1 of the SLDC and SGMP. After utilizing these threshold levels and reporting the findings to County staff, a consensus by these agency representatives was that the current LOS thresholds were not representative of actual County needs, historic provisions of each type, and/or proposed short and long term improvements currently planned for or anticipated. EX Table 9 accordingly lists proposed, yet un-adopted quantities and costs of each infrastructure or service type based on these more realistic LOS thresholds. Section 8 of this IBA provides additional detail on this subject.

EX Table 9 - Proposed County-Wide Infrastructure Recommendations

Infrastructure/Facility	Quantity/Size	Cost per quantity/size	Total
Sheriff Vehicles ⁶	NA	NA	NA
Sheriff Facilities ⁷	15,000 sq ft	\$250 per sq ft	\$3,750,000
Fire Vehicles ⁸	Various*	See below	\$8,770,000
Fire Facilities	43,219 sq ft	\$250 per sq ft	\$10,804,750
Park Land ⁹	33.93 acres	\$15,000 per acre	\$508,950
Trails (concrete – 10 ¹⁰ ft wide)	12.71 miles	\$32.5 per linear ft	\$2,181,036
Open Space ¹¹	1978.28 acres	\$5000 acres	\$9,891,400
Total			\$35,906,136

Relationship to County Planning Process

⁶ Cost estimates have been omitted pending revised LOS thresholds. This number includes specialty vehicles.

⁷ This does not include animal control facilities.

⁸ Fire Vehicle costs are in 2017 dollars.

⁹ Costs are from 2015 and are for land acquisition only. Amenities are separate.

¹⁰ Table 8-32 of the SLDC specifies Trail Standards with minimum trail widths defined based on the trail category. These widths range from 5 feet for Equestrian and Local trails up to 8 feet for District Trails. Chapter 8.10.3.7 6g provides definitions of each category. While the SLDC provides these specific width requirements, it is noted that they are listed as “minimum” dimensions. A review of AASHTO standards for paved multi-use paths specified a minimum width of 10’ for this type of amenity. This document utilizes 10’ as it conforms to the AASHTO standards while also meeting the minimum widths defined in the SLDC.

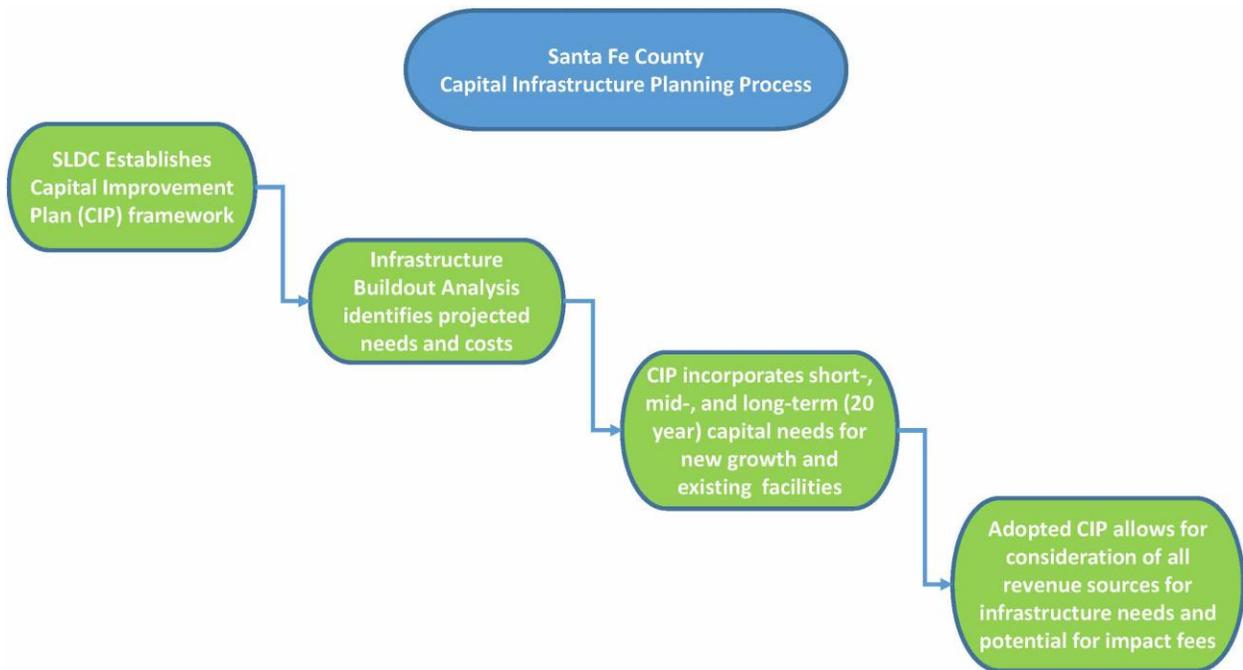
¹¹ Costs are from 2015 and are for land acquisition only. Amenities are separate.

EXECUTIVE SUMMARY

The results and recommendations from the Santa Fe County IBA can and should be used to create the framework for the County Capital Improvement Plan (CIP). The recommendations were developed to inform the County on a comprehensive list of infrastructure needs expected over the next 20 years. This includes a coordinated evaluation of roads, water, wastewater, parks, open space, trails, and emergency services. The set of recommendations includes preliminary cost estimates which provide a magnitude of costs to be used for funding acquisition and prioritization of projects. In order to allow for flexibility in development patterns, timing of growth, and funding availability, the infrastructure recommendations are presented in phases.

This phase format reiterates that these recommendations are created to be a framework for decision-making, with further refinement required on prioritization and design. The IBA is the first step for the County in establishing funding sources for future infrastructure needs, to include public and private funds, as well as the potential for impacts fees.

Ex Figure 2 - ICIP Process



DEFINITION OF TERMS

1 DEFINITION OF TERMS

- *Booster stations:* Booster Pumps or compressors located at intervals along a pipeline to boost the pressure of the fluid flowing towards its destination.
- *Distribution lines:* These are the pipes used to distribute water to consumers. Pipes come in several types and sizes. They can be divided into three main categories: metallic pipes, cement pipes and plastic pipes.
- *Group quarters* refers to the residents of group living facilities, such as penitentiaries, group homes, dormitories, and nursing facilities. Residents of group quarters are generally not related to each other. Primary group quarters facilities in Santa Fe County SDA-1 areas include the New Mexico State Penitentiary and the Santa Fe County Adult Correctional Facility. The proposed Senior Campus @ Caja del Rio is considered a group quarters facility housing 300 residents (on average 1.5 persons per unit).
- *Household population* refers to the inhabitants of all residential housing units. The household population plus the group quarters population equals the total population.
- *Household population / housing unit ratio:* refers to the number of inhabitants on average for each residential housing unit. The ratios are based on the total number of housing units and do not adjust for the fact that not all housing units are occupied. Therefore, actual average household sizes are likely to be somewhat larger than the values provided.
- *Housing units:* Housing unit numbers are developed based on a ratio of the total household population and the rate of persons per housing unit. The housing unit control total is used as the basis for disturbing growth across the SDA-1 areas (see below).
- *Level of Service:* Level of service (LOS) is a qualitative measure used to relate the quality of traffic service. LOS is used to analyze highways by categorizing traffic flow and assigning quality levels of traffic based on performance measure like speed, density, etc. It is also used to evaluate the need for additional transportation, water, and wastewater infrastructure on a County-wide basis for emergency response, parks, trails, and open space.
- *Open Space:* An area that is intended to provide light and air, and is designed, depending upon the particular situation, for environmental, scenic, or recreational purposes. May include, but need not be limited to, lawns, decorative plantings, bikeways, walkways, outdoor recreation areas, wooded areas, greenways, and water courses. The computation of open space shall not include driveways, parking lots. Also, includes any land, water, or submerged land that is provided for, preserved for, or used for park or recreational purposes; conservation of land or other natural resources; cultural, historic, or scenic purposes; assisting in the shaping of the character, direction, and timing of community development; or wetlands.
- *Park:* Typically developed areas that can include recreational components like playground equipment, ball fields, water features, seating areas, exercise amenities and areas for play and/or rest. These areas are intended for enjoyment and relaxation.
- *Park Land:* Land acquired by the County for the eventual development of parks with amenities.
- *Pressure reducing valves:* Installed at the water mains to protect the whole installation from problems due to excess pressure. Pressure reducing valves are usually completely automatic.
- *Pressure zone:* A pressure zone is an area of service supplied by a source or a number of sources that provides a constant hydraulic gradient.

DEFINITION OF TERMS

Typically, the hydraulic gradient is provided by the high water level of the reservoir serving the pressure zone. Pressure decreases due to friction as water travels through pipes.

- *Right-of-way (ROW)*: the legal right, established by usage or grant, to pass along a specific route through grounds or property belonging to another.
- *SDA-1*: Sustainable Development Area 1. The portion of Santa Fe County designated as the priority growth area for the County. Growth is anticipated and encouraged to occur in this area. For the purpose of this study, the three SDA-1 areas are evaluated for projected growth and potential infrastructure needs to serve that growth.
- *SLDC*: The 2016 Sustainable Land Development Code (SLDC) governs land use and development throughout the unincorporated areas of the County. The 2015 SLDC contains the regulations that a property owner must follow when building or remodeling a structure. It also explains the process by which land use and development can occur.
- *SGMP*: The 2010 Sustainable Growth Management Plan (SGMP) is the duly adopted, statutorily authorized General Plan for the unincorporated portion of the County. The SGMP comprises the future direction over planning, environmental protection, public facilities and services, fiscal planning, land use, housing, resource conservation, renewable energy and green development policies, administrative regulation, and development application processes.
- *Trail*: A paved or natural-surface track or path that provides connectivity between developed areas and non-developed areas for the use of pedestrians, bicycles, and sometimes equestrian. Trails can feature very different physical design attributes based on their context and location (urban or suburban areas vs. rural or wilderness areas).
- *Transmission lines*: Any pipeline conveying raw or treated water from a well field or remote storage facility to a treatment plant and/or distribution storage tank.
- *Water to Wastewater Ratio*: A number designed to help municipalities to anticipate the impact of water conservation on servicing requirements. The ratio of wastewater flow to water demand should roughly be 0.8, given the volume of water consumed is approximately equal to the sewage generated.

2 LIST OF ACRONYMS

ADD - Average Daily Demand

BBER - University of New Mexico Bureau of Business and Economic Research

CCD - Community College District

CIP – Capital Improvement Plan

DU - Dwelling Unit

GPM - Gallons per Minute

gpd/DU - Gallons per day per dwelling unit

ICIP - Infrastructure Capital Improvement Plan

IFC - International Fire Code

LOS - Level of Service

MDD - Max Daily Demand

MPO - Metropolitan Planning Organization

MTP - Metropolitan Transportation Plan

NW - Northwest

NE - Northeast

NMED - New Mexico Environment Department

NMDOT - New Mexico Department of Transportation

NW - Northwest

PDD - Peak Daily Demand

PRV - Pressure Reducing Valve

PSI - Pounds per square inch

SDA - Sustainable Development Area

SE - Southeast

IBA - Santa Fe County Infrastructure Buildout Analysis

SGMP - Sustainable Growth Management Plan

SLDC - Sustainable Land Development Code

SW - Southwest

LIST OF ACRONYMS

SWPPP - Storm water pollution prevention plan

TIP - Transportation Improvement Program

UFC - Uniform Fire Code

WMP - Water Transmission and Storage System Master Plan

WWTP - Wastewater Treatment Plant

3 INTRODUCTION

3.1 PURPOSE

The Santa Fe County Infrastructure Buildout Analysis (IBA) is part of the ongoing planning process that includes the Sustainable Growth Management Plan (SGMP) and the Sustainable Land Development Code (SLDC).

The first step in this planning process, the SGMP was created to ensure that future development protects the environment, preserves the integrity of existing public facilities and services and plans for future land use, housing, resource conservation, renewable energy, fiscal budgets, development application processes, administrative regulation and green development policies. The SGMP defines the vision for how and where development should happen in Santa Fe County. It also identifies the Sustainable Development Areas (SDA) used in the IBA. According to the SGMP, “[The SGMP] is a police power, public nuisance, environmental and land use regulation designed to establish... standards.” In other words, it is designed to govern the type and intensity of development that can occur in each SDA area. The SLDC supports the policies and strategies of the SGMP by defining the land uses and development standards for each of the SDAs.

The IBA is designed to support and facilitate development through recommendations on infrastructure needs as the County experiences employment and population growth. The IBA will provide reasons and justification for more compact infrastructure development over sprawl development by recommending infrastructure improvements which promote higher density in areas already established under the SGMP and SLDC for this type of land use. Currently, development patterns can be defined by the location of services and infrastructure. Most development is limited by access to existing infrastructure; where access to existing infrastructure is limited, the addition of new infrastructure and services is included in the cost of development and can be prohibitive. With the guidance of the IBA, a framework for determining the best and most effective locations for future infrastructure can be established.

With this information, the IBA lays the groundwork for the conceptual expectation of infrastructure needs for the SDA-1 areas for the next 20 years, based on estimated growth patterns, and can then inform the County’s CIP. The analysis includes consideration of roadways, water and wastewater systems, as well as emergency services, parks, open space, and trails. In addition, the analysis developed a capacity scenario to understand the total amount of development that could be accommodated in SDA-1 areas in Santa Fe County, potentially beyond the 20 years.

Figure 1 - SGMP

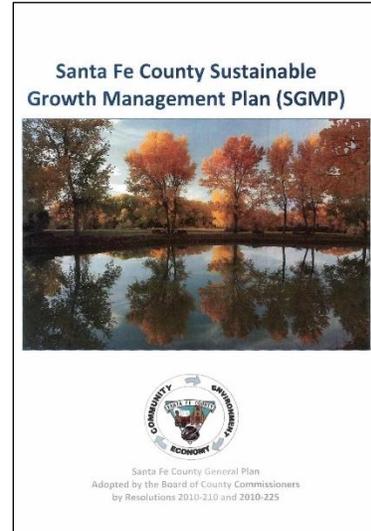
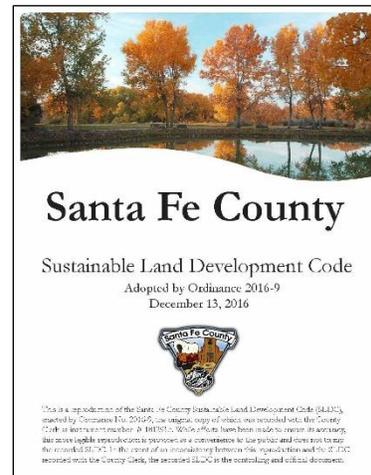


Figure 2 - SLDC



INTRODUCTION

The capacity scenario assumes that all developable land is utilized. Although the scenario is not linked to a date in time, it is a useful reference for future decisions. The County can then take the information presented under the 2040 projections scenario and the capacity scenario and determine if, when, and how this infrastructure is funded: publicly, privately, or a combination, as appropriate.

3.2 PLANNING PROCESS

The SGMP Plan has three SDA subgroups. SDA-1 is the focus of the IBA, as SDA-2 and 3 are rural in nature and unlikely to receive an intense amount of development. Supporting the planning process and in an attempt to provide an appropriate level of analysis within SDA-1, the overall SDA-1 area is defined by three (3) distinct subareas: Northwest (NW) Unit, the Southwest (SW) Unit, and Community College District (CCD) Unit (Figure 4). As the focus of the IBA, the SDA-1 areas examination focuses on the following components:

- Population
- Housing
- Employment
- Roadways
- Water and Wastewater Demands
- Facilities for Emergency Services, Parks, Open Space, and Trails

Santa Fe County, with the support of BBER, developed population and employment estimates by County subarea, including each of the SDA subareas, for 2030. To meet the 20-year horizon for the IBA, county-level projections are extended from 2030 to 2040 using a variety of extrapolation methods. An initial analysis of population, housing, and employment was completed prior to the consideration of future infrastructure needs. The analysis completed for roadways, water, and wastewater was all completed based on the same set of growth assumptions. For roadways, water and wastewater, all recommendations remain within the SDA-1 areas. The recommendations for emergency services, parks, open space, and trails are based on County-wide data (exclusive of incorporated areas) with recommendations for future services primarily focused on the needs/benefits within the SDA-1 area.

The recommendations are split into three phases that span a period of twenty years. The phases are based primarily on the roadway network and the timeframe for recommended construction; however, the water and wastewater recommendations are tiered off of this since the implementation of development is often driven by the access provided by new roads.

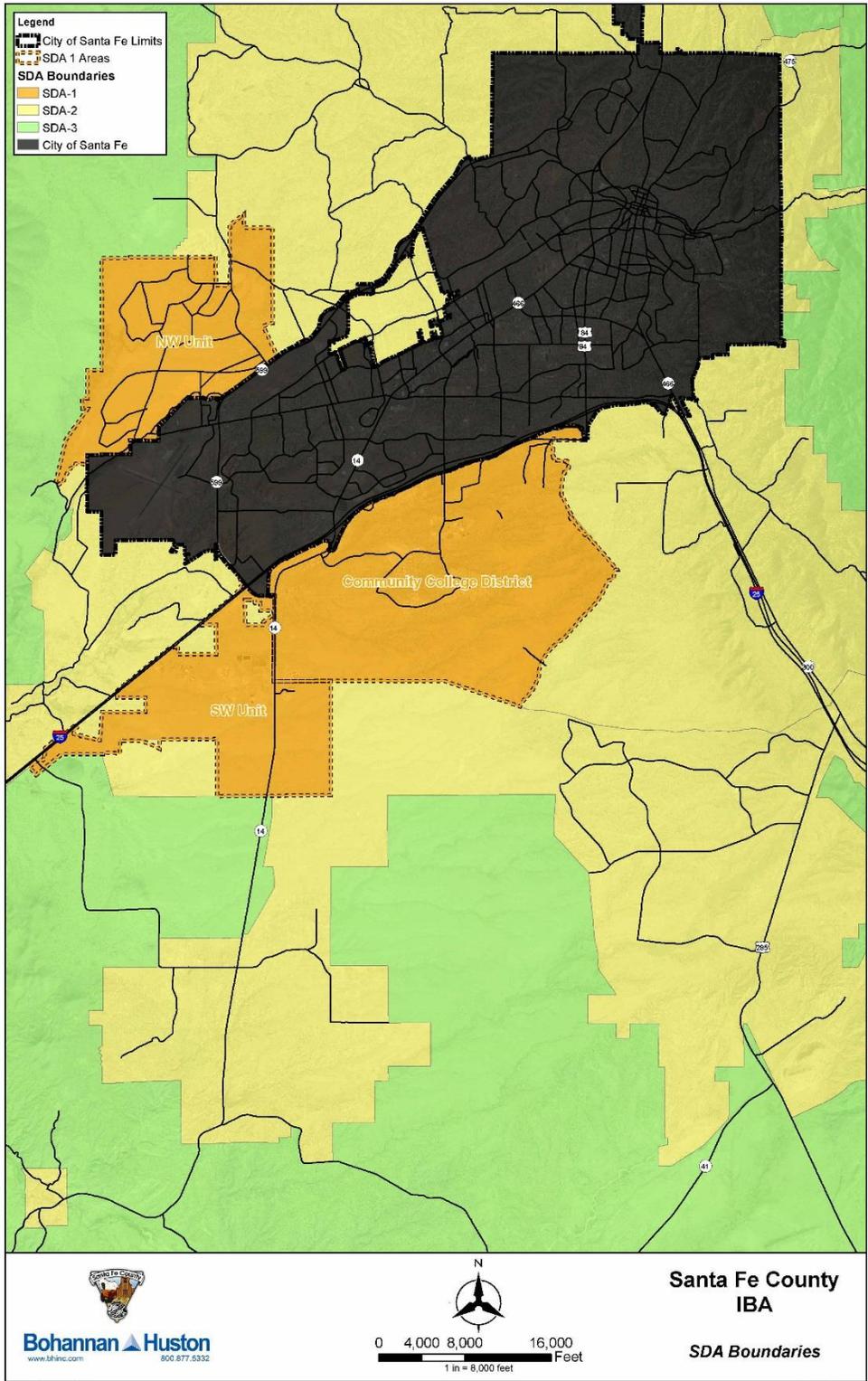
Table 1 - Phases and Timeframe

Phase	Timeframe
Phase 1	2017-2023
Phase 2	2024-2030
Phase 3	2031-2040

The following two sections on population projections and land use needs summarize the data used consistently throughout the planning process to analyze all infrastructure types.

INTRODUCTION

Figure 3 - SDA Boundaries



4 POPULATION AND EMPLOYMENT PROJECTION OVERVIEW

4.1 INTRODUCTION

Population and employment projections form the foundation for the IBA, which considers the services and infrastructure required to support future population and employment growth over a 20-year period. The IBA focuses on SDA-1 areas because it is where new development is expected to be concentrated as part of the County's growth management policy. Initial forecasts have been developed for the aggregate of SDA-1 areas; however, infrastructure planning requires an understanding of the extent of new development projected by location. To ensure the data supports Santa Fe County planning efforts, the following additional analyses have been performed:

- County and subarea level projections are extended from 2030 to 2040 to meet the 20-year buildout horizon from the present time.
- The distribution of population and employment within the SDA-1 subareas has been determined.
- A "capacity" scenario has been developed that calculates the maximum number of housing units and jobs that could be accommodated in the County, based on the total amount of developable land and SDA-1 area future land use types.

4.2 2040 POPULATION AND EMPLOYMENT PROJECTIONS

In 2014, Santa Fe County contracted with BBER to develop population and employment estimates by County subarea. As part of its estimates, BBER produced population and employment forecasts for the year 2030 for each of the SDA types within the County. To meet the 20-year horizon for the IBA, County-level projections have been extended from 2030 to 2040 using a variety of extrapolation methods. See Appendix A for more details on the County-level population and employment projections.

This amendment to the BBER reports considers the population and employment projections already produced for Santa Fe County to be a baseline. Projections utilize the existing estimates and forecasts to ensure as much consistency as possible with BBER forecasts. The BBER forecasts, as well as the projections contained here, rely on County-level estimates as a control total. Population and employment projections for unincorporated areas of Santa Fe County have been developed in order to create estimates by SDA unit type (e.g. SDA-1). Finally, estimates for each SDA-1 subarea have been developed by first determining the growth expected to occur in known subdivisions, then by allocating the remaining projected housing and employment based on the amount of developable land and existing and proposed roadway infrastructure in each subarea. A full description of the projections methodology can be found in Appendix A.

4.2.1 Population Summary

4.2.1.1 *Population and Housing Units*

There are projected to be over 14,000 additional residents in unincorporated portions of Santa Fe County between 2015 and 2040. More than 9,000 of those additional residents will be located in SDA-1 areas, requiring almost 3,800 additional housing units.

POPULATION AND EMPLOYMENT PROJECTION OVERVIEW

The extended projections reflect the fact that there will be an increasing share of residents of unincorporated Santa Fe County located in SDA-1 areas. By 2040, approximately one quarter of Santa Fe County’s unincorporated population will reside in SDA-1 areas, compared to around 14 percent in 2015. Table 2 provides the population growth by geographic area across Santa Fe County, while Table 3 projects housing units and household population for SDA-1 areas.

Table 2 - Population Estimates and Projections, 1990-2040

Year	Santa Fe County	Unincorporated Areas	SDA-1 Areas
1990	101,373	30,937	3,326
1995	115,266	36,752	3,197
2000	129,160	41,457	2,972
2005	136,853	46,937	4,500
2010	144,546	52,813	6,018
2015	148,402	53,062	7,255
2020	151,910	53,815	8,524
2025	159,257	58,670	10,565
2030	165,289	62,217	12,553
2035	168,764	64,997	14,540
2040	171,665	67,502	16,552

Note: Custom projections shown in blue.

Table 3 - Household Population and Housing Unit Projections for SDA-1 Areas, 2010-2040

Year	Total Population	Household Population	Group Quarters Population	Housing Units	Household Population / Housing Unit Ratio
2010	6,018	4,607	1,411	2,108	2.19
2015	7,255	5,844	1,411	2,647	2.21
2020	8,524	7,113	1,411	3,190	2.23
2025	10,565	8,854	1,711	3,932	2.25
2030	12,553	10,842	1,711	4,768	2.27
2035	14,540	12,829	1,711	5,588	2.30
2040	16,552	14,841	1,711	6,403	2.32

Note: Custom projections shown in blue.

4.2.1.2 Employment

Santa Fe County employment totals are projected to increase by 16,500 from 2015 to 2040, including about 4,400 additional jobs in unincorporated Santa Fe County and nearly 1,700 jobs in SDA-1 areas.

Employment in SDA-1 areas is expected to grow at rates higher than Santa Fe County overall, as well as other unincorporated portions of Santa Fe County.

POPULATION AND EMPLOYMENT PROJECTION OVERVIEW

The average annual employment growth rate in SDA-1 areas, 1.7%, is approximately twice the overall County growth rate, indicating a disproportionate level of economic activity will take place in these areas over time. Table 4 projects total employment growth by area through 2040.¹²

Table 4 - Employment Estimates and Projections by Location, 2002-2040

Year	Santa Fe County	Unincorporated Areas	SDA-1 Areas
2002	58,731	4,678	1,364
2005	62,587	5,964	1,890
2010	61,538	8,104	2,968
2015	62,048	8,145	2,640
2020	65,984	9,166	3,017
2025	69,063	9,997	3,325
2030	73,464	10,982	3,682
2035	75,442	11,668	3,981
2040	78,570	12,504	4,306

Note: Custom projections shown in blue.

4.3 SUBAREA POPULATION AND EMPLOYMENT PROJECTIONS

Summary projections by subarea are developed for total population, household population, group quarters, housing units, and employment as part of the IBA. The project team considered a series of factors to develop these projections, including existing land uses and current activity levels, near-term master plan development acres of developable land by type, and existing and anticipated roadway infrastructure. The subarea numbers are consistent with the County-level control totals produced by the project team through the year 2040. The projections by subarea consider three distinct units:

1. Southwest (SW) Unit, located to the west of NM 14
2. Santa Fe Community College District (CCD) Unit, located to the east of NM 14
3. Northwest (NW) Unit, located to the north of NM 599

The CCD unit features the most highly developed infrastructure of the three subareas, and permits residential densities that are much greater than the NW and SW units. The CCD unit includes the Santa Fe Community College and the Rancho Viejo master planned community. The SW and NW units feature large tracts of undeveloped land and relatively limited roadway infrastructure.

¹² The employment projections produced by BBER use 2002 as a base year while the population projections provide historical data to 1990.

POPULATION AND EMPLOYMENT PROJECTION OVERVIEW

Table 5 - SDA-1 Projections by Subarea

Summary Statistics	NW Unit	SW Unit	CCD Unit	SDA-1 Total
2015 Population	12	1,777	5,466	7,255
2040 Population	1,422	3,460	11,670	16,552
2015 Household Population	12	938	4,894	5,844
2040 Household Population	1,122	2,621	11,098	14,841
2015 Group Quarters Population	0	839	572	1,411
2040 Group Quarters Population	300	839	572	1,711
2015 Housing Units	5	648	1,994	2,647
2040 Housing Units	484	1,131	4,788	6,403
2015 Employment	124	557	1,959	2,640
2040 Employment	690	948	2,668	4,306

Table 6 - Growth by SDA-1 Subarea, 2015-2040

Difference 2015-2040	NW Unit	SW Unit	CCD Unit	SDA-1 Total
Total Population	1,410	1,121	6,766	9,297
Housing Units	479	483	2,794	3,756
Employment	566	348	752	1,666

Table 7 - Share of Total Growth by SDA-1 Subarea, 2015-2040

Share of Growth	NW Unit	SW Unit	CCD Unit	SDA-1 Total
Total Population	15%	18%	67%	100%
Housing Units	13%	13%	74%	100%
Employment	34%	23%	43%	100%

The fastest growing subarea is the CCD unit, which absorbs almost 2,800 new housing units and more than 5,600 additional residents between 2015 and 2040. These numbers represent about ¾ or 75% of new residential growth in the SDA-1 areas. About one out of two new jobs are also located in the CCD unit. The remaining housing unit, population, and job growth between 2015 and 2040 are split relatively evenly between the NW and SW units.

4.4 CAPACITY SCENARIO

The “capacity” scenario reflects the potential level of activity in SDA-1 areas if development occurs on *all* available land at assumed levels of intensity for both residential and commercial uses. The capacity scenario should *not* be interpreted as a plausible scenario for development in Santa Fe County and is not associated with a particular point in time.

POPULATION AND EMPLOYMENT PROJECTION OVERVIEW

Rather, the capacity scenario values are based on an evaluation of developable acres by land use type within each subarea and the allowable future land uses within each of those subareas. In other words, the capacity scenario is a reflection of the maximum level of development associated with current policy and serves as a reference for growth beyond the 2040 time horizon. More information on the assumptions behind the capacity scenario can be found in Appendix A.

The capacity scenario is particularly useful for planning of water and wastewater infrastructure. Unlike roadways, where sufficient right-of-way is generally set-aside to allow for widening projects if they become necessary, it is much more expensive and logistically challenging to add larger water and wastewater infrastructure in the future if demand increases beyond expected levels. Therefore, the capacity scenario is used as a reference point to ensure that recommended utilities infrastructure is properly sized. This information can help the County in making solid decisions on how to fund improvements if/when they become necessary, and provide information for the County ICIP. It also creates a framework for the consideration of private funds associated with future developments.

The tables below contrast the 2015 base year and 2040 projections against the capacity scenario values. Table 8 contains base year (2015) housing unit, population, and employment totals in each SDA-1 subarea. Table 9 contains the total new development allowable in each SDA-1 subarea based on the developable land, allowable uses, and assumed intensity levels.

Table 10 provides the sum of existing development (i.e. Table 8) and the total new development in the capacity scenario (Table 9). As expected, these values are substantially higher than the totals contained in the 2040 projections by SDA-1 subarea, which are found in Table 5.

Table 10 indicates the difference between the capacity scenario and the 2040 projections. Table 9 calculates the 2040 projections as a share of the overall SDA-1 subarea development capacity.

Table 8 - Maximum Amount of New Growth in Capacity Scenario

Max. New Growth	NW Unit	SW Unit	CCD Unit	Total
Housing Units	5,451	5,953	5,906	17,309
Household Population	12,633	13,797	13,688	40,118
Employment	11,092	10,148	11,441	32,681

Table 9 - Total Development in Capacity Scenario – Existing Plus Potential Growth

Capacity Scenario	NW Unit	SW Unit	CCD Unit	Total
Housing Units	5,456	6,009	8,492	19,957
Household Population	12,645	13,925	19,392	45,962
Employment	11,216	10,705	13,400	35,321

Table 10 - Difference Between Capacity Scenario and 2040 Projections

Difference	NW Unit	SW Unit	CCD Unit	Total
Housing Units	4,972	5,470	3,112	13,553
Household Population	11,523	12,676	6,922	31,121
Employment	10,526	9,800	10,689	31,015

5 LAND-USE ASSUMPTIONS

In any socioeconomic forecast, it is difficult to determine the exact locations where new development will occur. The IBA therefore utilizes a land-needs approach to determine the most likely locations and scale of new infrastructure to support the levels of anticipated development by 2040.

The land needs approach can be understood as the minimum amount of land required to meet projected growth levels and should be viewed as a reference for the scale of potential land needs. The IBA specifically considers the average amount of currently undeveloped land that would be required to meet 2040 projected housing and employment levels, assuming the base densities allowable with current zoning. The residential land needs assessments are based on base density levels of one (1) unit per acre in the mixed use zones in the Northwest and Southwest units, and 3.5 units per acre in the Community College District. Land needs are therefore a function of density levels. The acreage required to support employment is based on a ratio of the average number of employees per acre by industry type.

Table 11 - Land-Need Employment Assumptions

Sector	Employees per Acre
Industrial Light	10
Industrial General	5
Public / Institutional	10
Commercial General	15
Mixed Use	15

For the NW and SW units, all residential activity is assumed to take place in mixed use zoning districts. Employment may take place in any of the zoning districts, though the locations for potential employment sites are informed by the type of employment by industry. In the CCD, the majority of new development is likely to take place in known subdivisions – master planned areas that are partially constructed, are already approved but not yet developed, or proposed and identified by Santa Fe County as likely to develop in the future.

5.1.1 Land Needs and the Recommended Roadway Network

The Roadway section contrasts the total amount of land needed for projected housing and employment against the locations where development may occur, as dictated by current zoning and the acreage of developable land. If sufficient land can be accessed via existing roads to support the development levels projected by 2040, then minimal new roadways will be required. The roadways identified in later phases of the 20-year study horizon are based on creating land access required to support long-term development needs. See the Roadways section for more details.

5.1.2 Capacity Scenario and Water/Wastewater Infrastructure Needs

Land needs are also utilized for water and wastewater infrastructure by determining the amount of water demand associated with each SDA-1 subarea by 2040.

LAND-USE ASSUMPTIONS

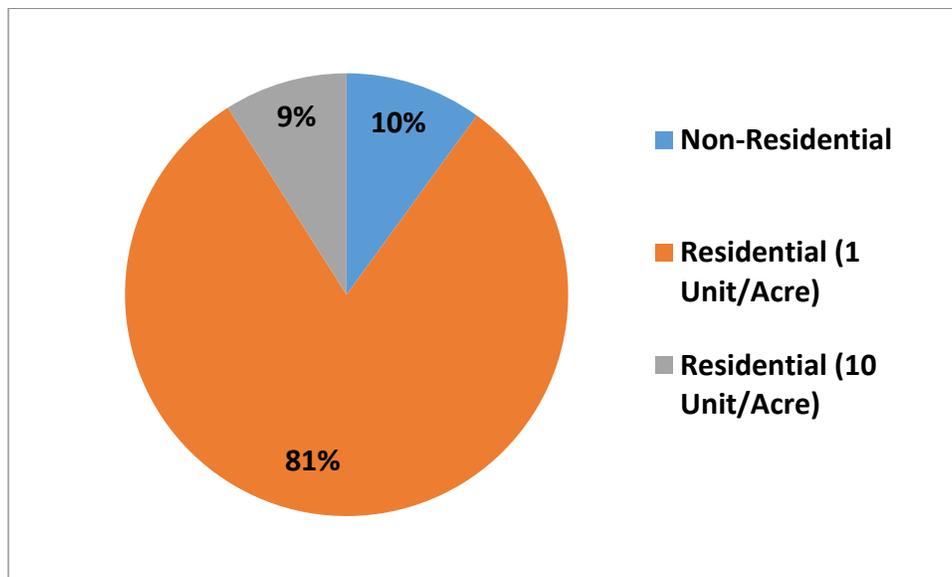
Since it can be challenging to add larger water and wastewater infrastructure in the future if demand increases beyond expected levels, the capacity scenario is also referenced.

The capacity scenario exists to create an understanding of the total amount of development that could be accommodated in SDA-1 areas in Santa Fe County. The capacity scenario assumes that all developable land is utilized. Although the scenario is not linked to a date in time, it is a useful reference for the sizing and location of utility pipes.

An important difference between the capacity scenario and the 2040 projections is the consideration of higher density development through the use of transfer of development rights (TDR). In the capacity scenario, 10% of residential land in areas zoned for mixed use is assumed to develop at a rate of 10 units per acre (instead of 1 unit per acre). Figure 4 below indicates the share of mixed-use land devoted to residential and non-residential activities in the capacity scenario.

If the TDR process is pursued, a far greater amount of new housing could be accommodated in SDA-1 areas. Alternatively, the projected amount of new housing could be accommodated in far less land than if the base density of 1 unit per acre is realized.

Figure 4 - Assumed Activity in Multi-Use Zones in the Capacity Scenario



LAND-USE ASSUMPTIONS

5.2 NORTHWEST UNIT – LAND-USE ASSUMPTIONS

5.2.1 Land Requirements – NW Unit

Based on the 2040 projections, only a small portion of the developable land contained in the NW unit will be required to support estimated growth demands. The NW unit is expected to grow by 479 residential units and 566 jobs between 2015 and 2040. In addition, the Senior Campus @ Caja del Rio will provide living facilities for approximately 300 senior citizens. However, the types of projected development and the locations where that development will occur would likely require additional roadway infrastructure beyond the current system or the roads proposed in the 2040 MTP.

Table 12 - Developable Acres by Land Use Type - NW Unit

Land Use	Total Acres	Developable Acres
Mixed Use	3,061.9	2,967.1
Public / Institutional	829.8	257.0
Industrial General	1,397.7	858.1
Industrial Light	190.3	190.3
Residential Estate	425.5	200.3
Total	5,905.1	4,500.9

From a land needs perspective, the following amounts of additional acreage are required to support 2040 population and employment levels:

- 479 acres for residential units, based on a rate of one unit per acre
- 28-acre Senior Campus @Caja del Rio located along Caja del Rio Road
- Approximately 54 acres of new land to support employment growth

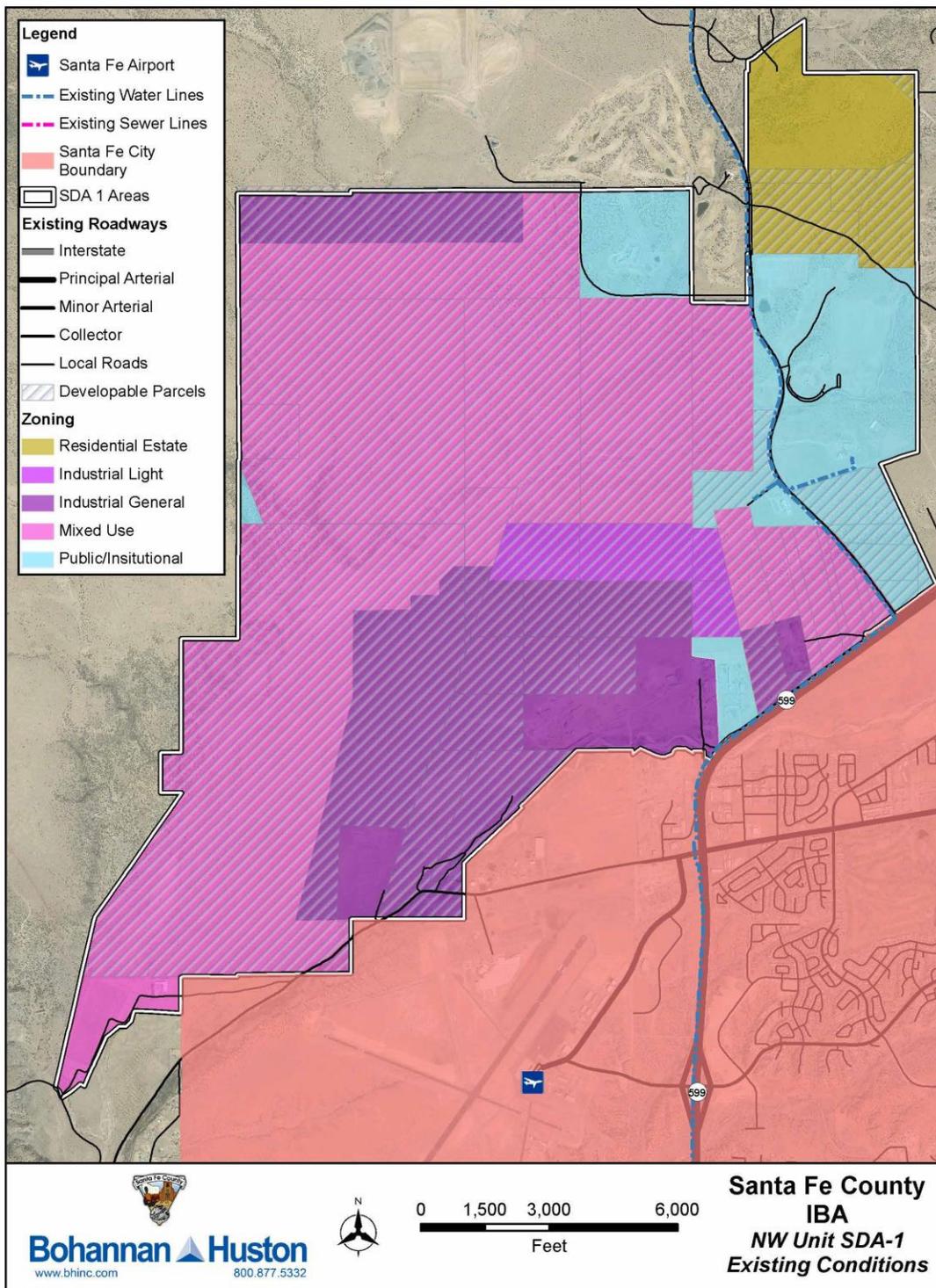
5.2.2 Residential Development - NW Unit

There are three main locations that are zoned as mixed use and could support residential development in the NW unit: 1) the area to the west of Caja del Rio Road; 2) the north-central portion of the NW unit (land that is currently undeveloped but with no formal access); and 3) the southwestern portion of the NW unit, which could be accessed from Paseo Real and South Polo Drive. The northeast portion of the NW unit is zoned as “residential estate” and may also be developed for residential purposes. However, with a base density of 1 unit every 2.5 acres, it is unlikely that a high number of housing units will be developed. Access could be provided from unpaved North Caja del Oro Grant Road, which connects to Caja del Rio Road.

Due to its proximity to NM 599 and existing access, the Caja del Rio Road mixed-use area is a likely location for future residential activity. However, at a base density of one unit per acre, the Caja del Rio Road mixed use area, which comprises approximately 207 acres, does not provide enough acreage to support all future residential units. Unless higher densities are pursued through a transfer of development rights or other means, new residential activity must occur in other portions of the NW unit to support 2040 growth levels, including the tracts of land that are privately held in large parcels in the north-central and western portions of the NW unit.

LAND-USE ASSUMPTIONS

Figure 5- Existing Conditions – NW Unit



LAND-USE ASSUMPTIONS

5.2.3 Employment Activity – NW Unit

Job growth in the NW unit is projected to occur in fields such as healthcare, administration and waste, construction, and professional and technical services. It is reasonable to assume that most employment activity will take place along Caja del Rio Road, where land to the east of the road is zoned for public/institutional uses. Land uses to the immediate west of Caja del Rio Road and south of Old Cochiti Road are zoned as mixed use lands and could be utilized for commercial or residential purposes. Areas to the west of NM 599 and to the north of Paseo Real are identified for general industrial uses and are also likely to support new employment sites over time.

Table 13 provides the current and projected employment by industry in the NW unit. Based on the average number of acres required to support employment for each industry, 56 acres of new land are required to support projected employment growth.

Table 13 - Employment Land Needs for Growth in NW Unit

Industry	NW Unit Jobs - 2015	NW Unit Jobs - 2040	Employees per Acre	Numeric Change in Jobs	Acres Required
Mining & Agriculture	2	8	5	6	1.2
Construction	45	120	10	75	7.5
Manufacturing	7	7	10	0	0.0
Wholesale Trade	69	92	10	23	2.3
Retail Trade	1	6	15	5	0.3
Transportation	0	0	0	0	0.0
Information	0	0	0	0	0.0
Finance & Insurance	0	0	15	0	0.0
Real Estate	0	1	15	1	0.1
Professional & Technical Services	0	69	15	69	4.6
Management	0	0	0	0	0.0
Administration & Waste	0	102	10	102	10.2
Education	0	0	10	0	0.0
Healthcare	0	100	10	100	10.0
Arts & Entertainment	0	14	15	14	0.9
Accommodation & Food	0	6	15	6	0.4
Other	0	0	10	0	0.0
Government	0	165	10	165	16.5
Total	124	690		566	54.0

LAND-USE ASSUMPTIONS

5.3 SOUTHWEST UNIT – LAND-USE ASSUMPTIONS

5.3.1 Land Requirements – SW Unit

The SW unit is expected to experience modest levels of residential growth and new employment activity relative to the amount of developable land. According to the 2040 projections, the SW unit is projected to absorb 483 additional housing units, requiring an equal number of housing units (residential density is assumed to be one unit per acre). The projections call for 380 additional jobs, requiring approximately 35 acres of new land to support employment growth.

Table 14 - Developable Acres by Land Use Type – SW Unit

Land Use	Total Acres	Developable Acres
Mixed Use	3,417.8	3,288.7
Public / Institutional	1,037.3	133.0
Industrial Light	720.4	398.8
Commercial General	200.7	115.4
Federal and State Public Lands	45.0	45.0
Total	5,421.2	3,980.9

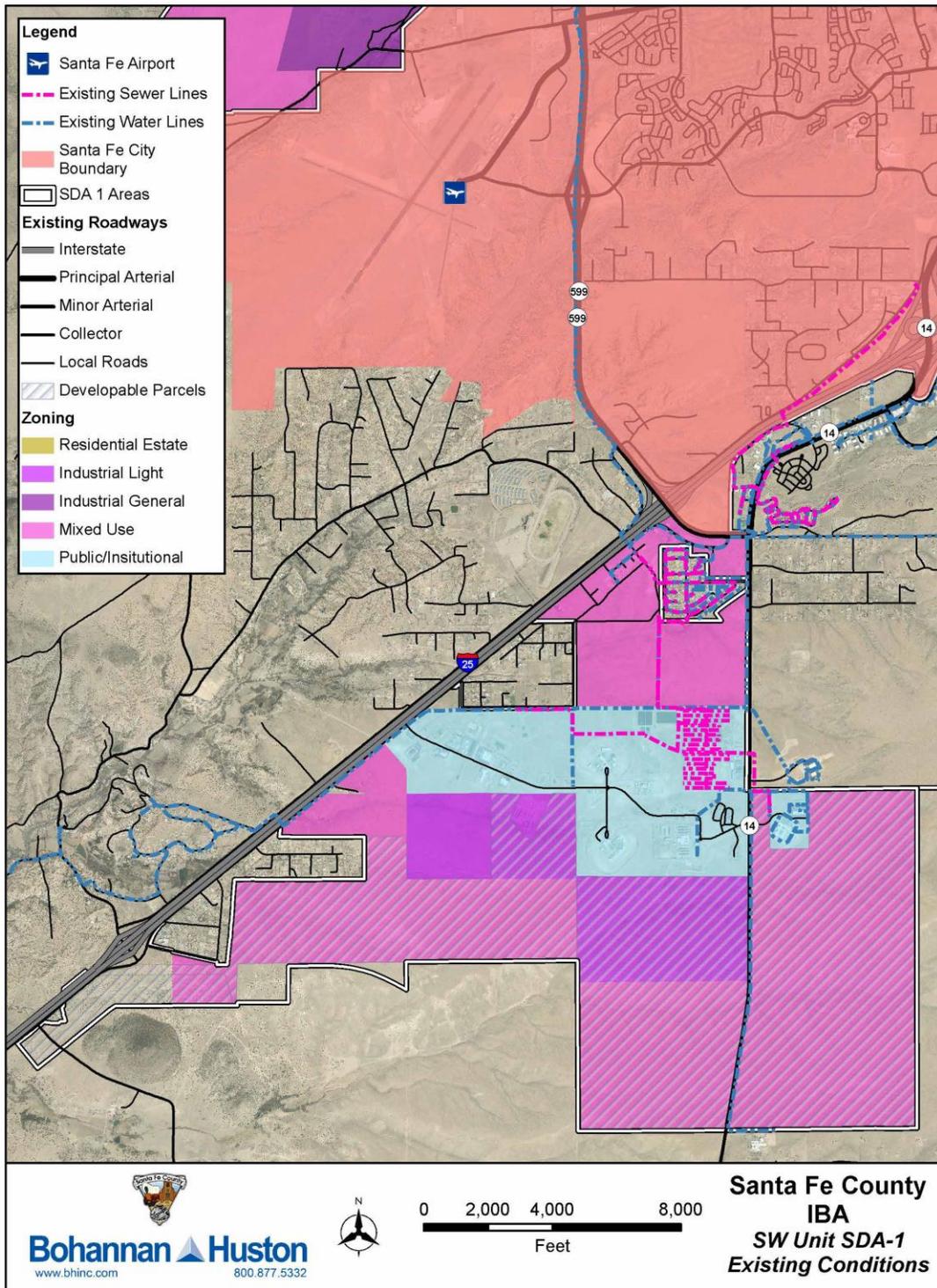
5.3.2 Residential Growth – SW Unit

Future residential growth will occur on land zoned as mixed use; there are two general areas where this growth may occur. First, the mixed use area north of Comanche Drive in the northern portion of the SW unit provides access to I-25 and NM 14 and constitutes a logical location for additional residential activity to occur. Second, there is also a considerable amount of land that could be opened up for development in the southern portion of the SW unit if that area is served by transportation infrastructure.

While the mixed-use area to the north of Comanche Drive is a likely location for future development, there will not be sufficient land to support 2040 growth levels, assuming all available land in this area develops at the base density rate of one unit per acre. Residential development is therefore likely in both areas zones for mixed use in the SW unit. The existing roadway network in both mixed use areas would require new roadways, improvements to existing roadways, and extensions of existing facilities to access developable land.

LAND-USE ASSUMPTIONS

Figure 6 - Existing Conditions - SW Unit



LAND-USE ASSUMPTIONS

5.3.3 Employment Activity – SW Unit

The central portion of the SW unit comprises land zoned for public/institutional uses. These parcels are mostly developed and include the state penitentiary campus, although some additional activity could occur in this area, especially given the types of employment growth projected.

The SW unit is most likely to experience employment growth in the construction, professional and technical services, government, and administration and waste sectors. Given the growth industries, it is likely that much of the employment growth will occur in the land zoned for public/institutional uses. Other commercial activity may occur along the I-25 Frontage Rd near the interchange with NM 599 and along the northern end of NM 14. Only a small portion of the developable land is required to meet projected growth in employment through 2040.

Table 15 provides the current and projected employment by industry in the SW unit. Based on the average number of acres required to support employment for each industry, 32.7 acres of new land are required to support projected employment growth.

Table 15 - Employment Growth and Land Needs – SW Unit

Industry	SW Unit Jobs - 2015	SW Unit Jobs - 2040	Employees per Acre	Numeric Change in Jobs	Acres Required
Mining & Agriculture	0	0	5	0	0.0
Construction	30	83	10	53	5.3
Manufacturing	13	13	10	0	0.0
Wholesale Trade	2	19	10	17	1.7
Retail Trade	6	12	15	6	0.4
Transportation	0	0	0	0	0.0
Information	0	0	0	0	0.0
Finance & Insurance	0	0	15	0	0.0
Real Estate	0	0	15	0	0.0
Prof. & Tech. Services	199	248	15	49	3.3
Management	0	0	0	0	0.0
Admin & Waste	0	73	10	73	7.3
Education	89	89	10	0	0.0
Healthcare	57	83	10	26	2.6
Arts & Entertainment	0	0	15	0	0.0
Accommodation & Food	11	18	15	7	0.5
Other	0	0	10	0	0.0
Government	150	267	10	117	11.7
Total	557	905	Total	348	32.7

LAND-USE ASSUMPTIONS

5.4 COMMUNITY COLLEGE DISTRICT – LAND-USE ASSUMPTIONS

5.4.1 Land Requirements – CCD Unit

Land use and development opportunities in the CCD unit fall into four categories: 1) known or planned subdivisions; 2) previously developed parcels outside of the known subdivisions; 3) undeveloped parcels outside of the known subdivisions; and 4) land that must be set-aside for open space purposes.

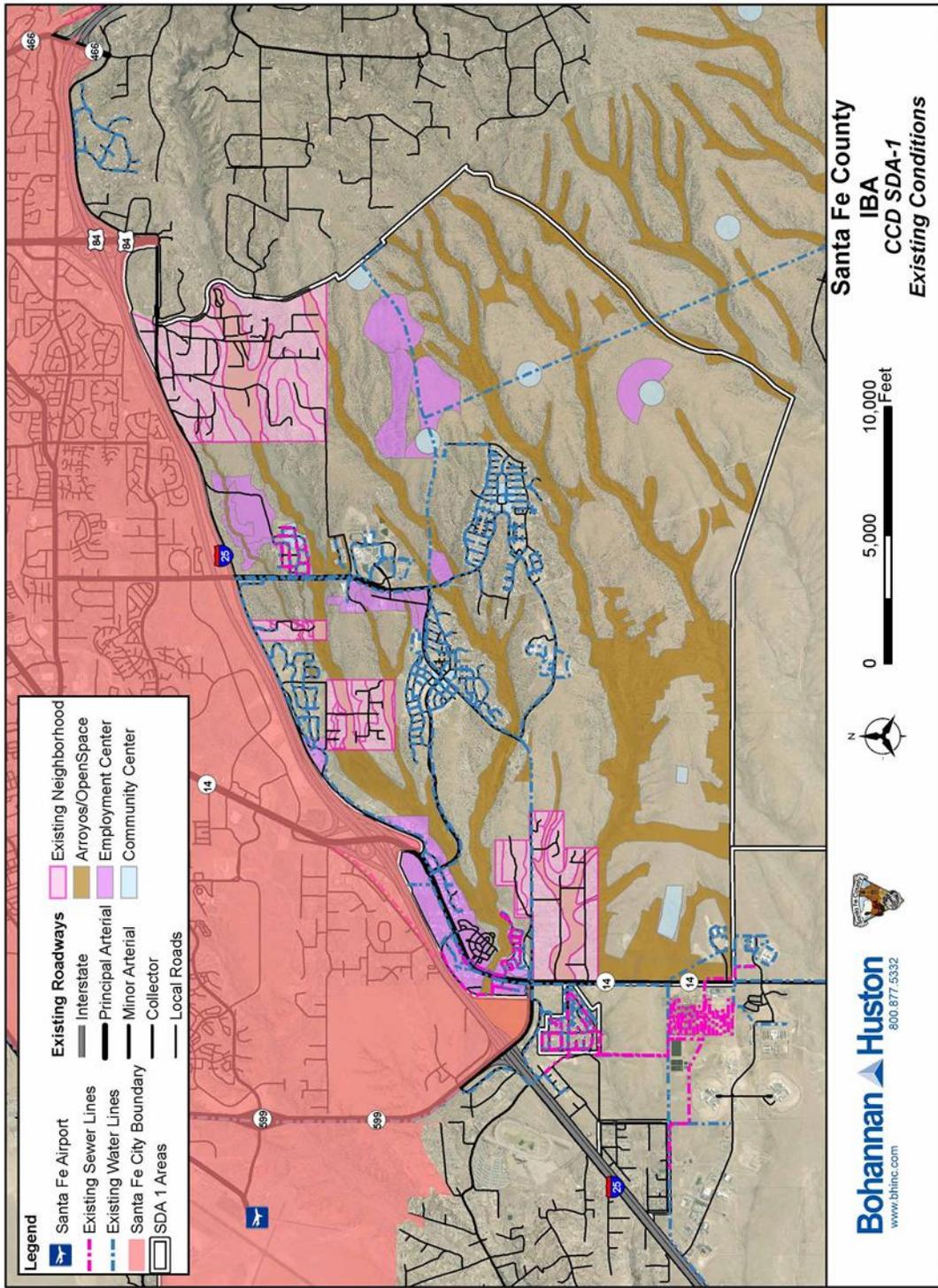
There are 14 subdivisions in the CCD unit that have been evaluated as part of the IBA. The majority of these subdivisions, which comprise 1,591 acres, are part of the Rancho Viejo master planned community. Only a fraction of the available land in the subdivisions has been developed, although greater buildout of these subdivisions is expected over time. Outside of the planned subdivisions, there are an additional 1,598 acres of developable land, excluding land set aside for open space in the CCD unit.

A total of 2,794 additional housing units are projected by 2040 in the CCD unit. From a land-needs perspective, the following amounts of new development are projected to occur in the CCD unit by 2040.

- 2,051 housing units located in existing subdivisions
- 743 housing units located outside of subdivisions, requiring approximately 215 acres of new land
- 752 additional employees, requiring approximately 70 acres of land

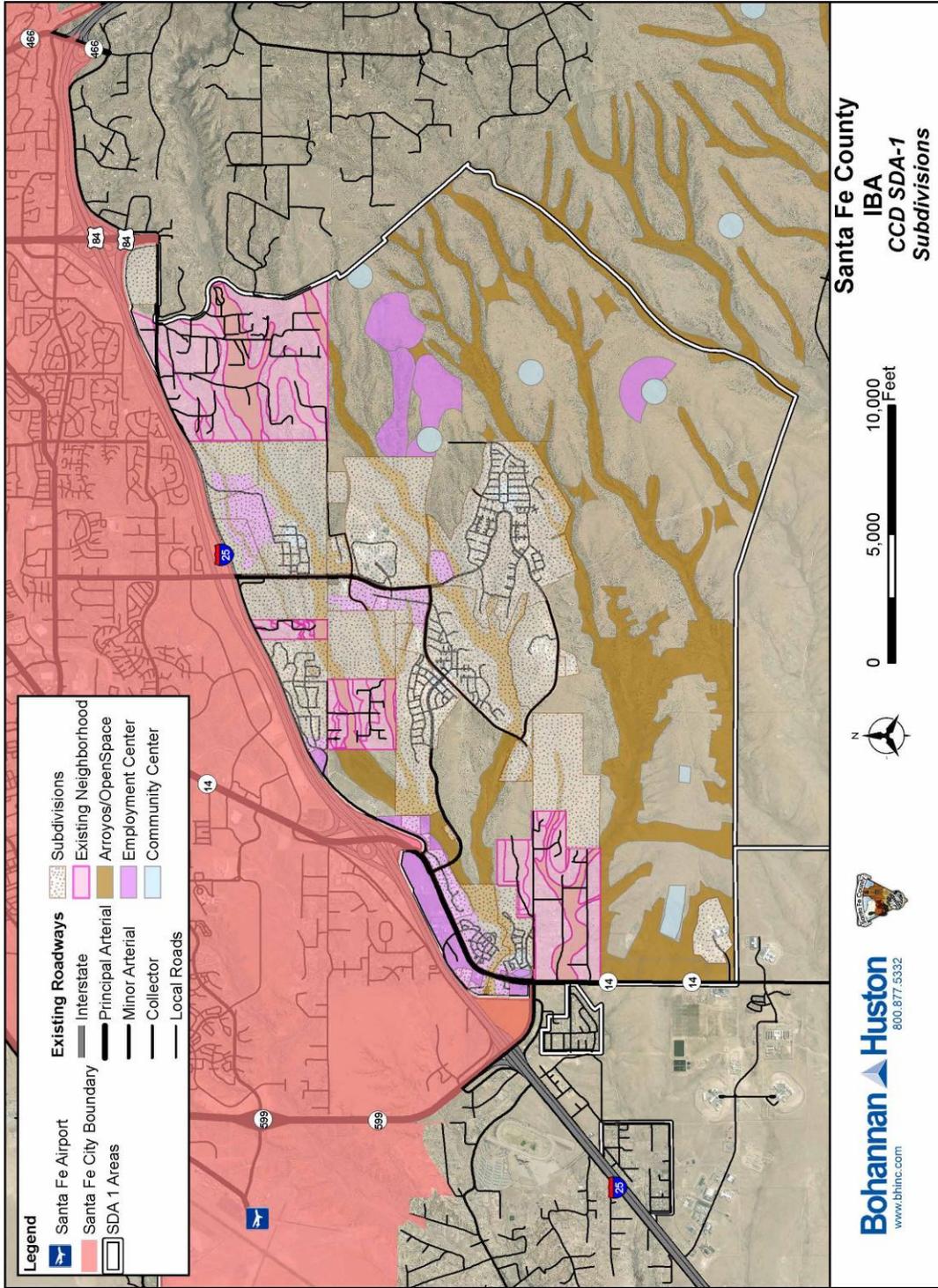
LAND-USE ASSUMPTIONS

Figure 7 - Existing Conditions - CCD Unit



LAND-USE ASSUMPTIONS

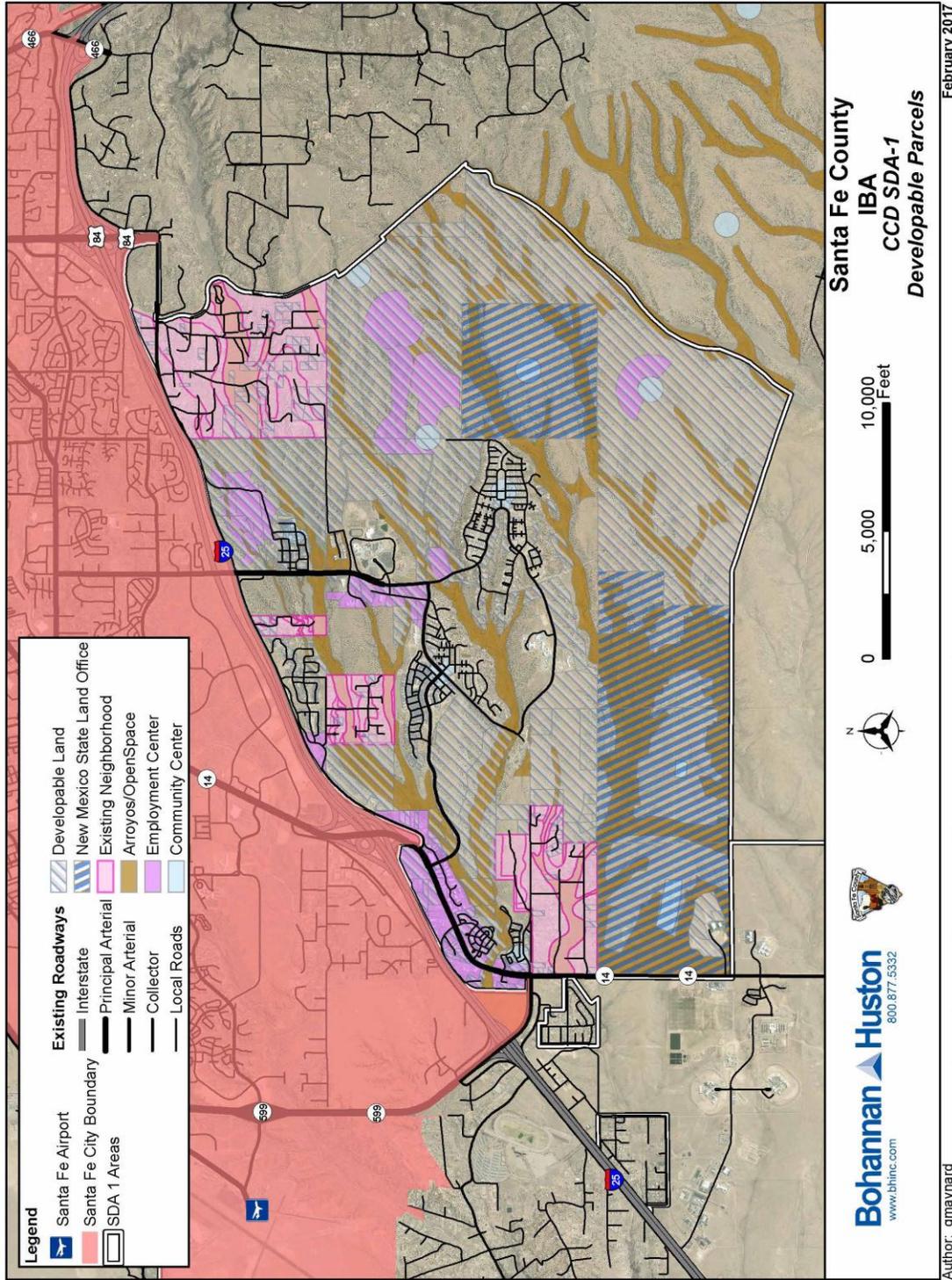
Figure 8 - CCD Subdivisions



Author: gmaynard
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LAND-USE ASSUMPTIONS

Figure 9 - Developable Land in CCD Unit



LAND-USE ASSUMPTIONS

Table 16 - Developable Acres by Land Use Type in CCD Unit (before open space set-aside)

Vacant Land by LU Type	Total Acres	Developable Acres	SDA-1 Zoning Equivalent
Existing Neighborhood Zones	270.3	270.3	Residential Estate
Community Center	29.9	29.9	Mixed Use
Employment Center	319.1	319.1	Mixed Use
Institutional Campus	69.9	69.9	Public / Institutional
Media District	50.9	50.9	Commercial General
Fringe	3,679.4	1,690.4	Mixed Use
Rural	1,140.7	1,140.7	Mixed Use
State Land Office	2,390.5	0.0	Mixed Use
Vacant land - SF housing in Fringe Zones	8.9	8.9	Mixed Use
Total	7,964.4	3,580.1	

5.4.2 Residential Activity – CCD Unit

The vast majority of housing growth – 2,051 additional housing units – will occur in known or planned subdivisions. The current and projected housing levels in known subdivisions in the CCD unit are depicted in the table below. This study assumes that the subdivisions will buildout at differing rates, depending on factors such as accessibility. See Table 17 for more details.

Table 17 - Residential Activity

Subdivision	Land Use	Existing Units	Proposed Units	Development Ratio	Total New Units	2040 Units	Acres	Status
Arroyo Hondo	Mixed, mostly SF	0	256	75%	192	192	110.8	Proposed
Elevations	MF residential	0	214	100%	214	214	22.7	Vacant
Fireplace Apartments	MF residential	0	200	100%	200	200	8.1	Proposed
La Entrada	SF Residential	131	456	50%	163	294	244.5	Partial
La Entrada Mixed Use	Mixed Use	0	26	50%	13	13	7.4	Proposed
La Pradera	Mixed Use	101	238	100%	137	238	165.4	Partial
Oshara Village	Mixed Use	60	735	50%	338	398	361.7	Partial
Rancho Viejo Windmill Ridge	SF Residential	0	66	50%	33	33	123.8	Vacant only
Saleh	Mixed Use	0	229	75%	172	172	65.5	No data
San Cristobal	Mixed Use	0	2,781	0%	0	0	0.0	Vacant - SLO land
Sonterra	Mixed Use	0	520	50%	260	260	236.8	Vacant
St Francis South Business Park	Mixed Use	0	250	50%	125	125	63.4	Vacant
Turquoise Trail Estates	SF Residential	0	20	100%	20	20	5.8	Vacant
Turquoise Trail North Residential	SF Residential	0	354	25%	89	89	101.2	Vacant w/ arroyos
Turquoise Trail South Residential	SF Residential +23 MF	184	313	75%	97	281	74.4	Vacant
Total		476	6,402		2,051	2,527	1,591.4	

The remaining housing growth in the CCD unit will most likely occur in the privately-held developable lands located in areas classified as village zones or community or employment centers. Assuming an average rate of 3.5 housing units per acre, the 743 units will require 212 acres, or about 13% of the remaining developable land in the CCD Unit. Additional housing and population growth is most likely to occur in village zones and identified centers.

LAND-USE ASSUMPTIONS

The most logical locations for additional residential development outside of the known subdivisions include lands to the south of Rancho Viejo Boulevard and along Road B.

It is important to note that most but not all community and employment centers identified in the CCD unit are served by roads in the recommended network. The 2040 MTP and the Official Network Map identify a series of privately funded roads in the southern and eastern portion of the CCD unit, although the timeframe for construction of these roads is not provided. The recommended roadway network does not include these facilities.

The locations of future residential development are also informed by the SLDC requirement that 50% of the CCD unit be set-aside as open space. Currently, only 11.5% of the CCD Unit can be considered formal open space. Small amounts of open space may be allocated as part of planned subdivisions as those subdivisions develop. However, in order to reach the 50% open space target, large plots of land must be set aside. Logical locations that may be utilized for open space purposes include land that is owned by the New Mexico State Land Office (and which is traversed by large arroyo systems, making development challenging under normal circumstances), as well as land classified as fringe in the eastern and southern portions of the CCD unit.

5.4.3 Employment Activity – CCD Unit

Much of the proposed employment growth is likely to occur in existing locations or in the known subdivisions. Other likely locations include identified centers, where improved access and the confluence of roads (both existing and proposed) may provide attractive locations for small commercial and retail. The projections indicate 709 additional employees in the CCD unit. Since there are already about 2,000 employees, the new growth will consume a small share of the developable land.

The largest numeric increases in employment in the CCD unit can be found in the fields of healthcare and government. Other sectors expected to experience growth include retail, accommodation and food services, and healthcare, which will most likely be located in identified employment and community centers.

Table 18 provides the current and projected employment by industry in the CCD unit. Based on the average number of acres required to support employment for each industry, 68.6 acres of new land are required to support projected employment growth.

LAND-USE ASSUMPTIONS

Table 18 - Employment Growth and Land Needs in CCD Unit

Industry	CCD Unit Jobs - 2015	CCD Unit Jobs - 2040	Employees per Acre	Numeric Change Jobs	Acres Required
Mining & Agriculture	2	2	5	0	0.0
Construction	257	304	10	47	4.7
Manufacturing	131	131	10	0	0.0
Wholesale Trade	57	72	10	15	1.5
Retail Trade	31	87	15	56	3.7
Transportation	0	0	0	0	0.0
Information	0	0	0	0	0.0
Finance & Insurance	6	6	15	0	0.0
Real Estate	0	17	15	17	1.1
Prof. & Tech. Services	469	512	15	43	2.9
Management	0	0	0	0	0.0
Admin & Waste	0	65	10	65	6.5
Education	766	816	10	50	5.0
Healthcare	11	275	10	264	26.4
Arts & Entertainment	0	8	15	8	0.5
Accommodation & Food	54	129	15	75	5.0
Other	0	8	10	8	0.8
Government	175	279	10	104	10.4
Total	557	2,711		752	68.6

6 ROADWAYS

6.1 ASSUMPTIONS AND METHODOLOGY

Based on projections, the IBA recommends a transportation network that support the levels of development projected in SDA-1 areas by 2040. These recommendations position the County to be better able to accommodate long-term development needs. The recommended roadways are grouped into three phases that could be pursued over the 20-year study period. It is expected that the phasing and estimated costs of the roadways will be revised and updated over time as new forecasts become available and as new development occurs. The roadways and phasing have been identified in coordination with recommendations regarding water and wastewater infrastructure.

The recommended road network is based on existing planning efforts. The two principal references are the Official Network Map, the long-range roadway network identified in the SLDC, and the 2040 MTP for the Santa Fe metropolitan area, which identifies the new or improved facilities that are expected to be funded through 2040. The Official Network can be thought of as a full-build scenario, including all roads that could be constructed over the period of time including and beyond 2040. The 2040 MTP contains a subset of the roads identified in the long-range network. It is recommended that new roadways proposed in the Santa Fe County IBA and their associated functional classifications be incorporated into future updates to the region's MTP.

All roads that have been identified for funding through the Santa Fe MPO's Transportation Improvement Program (TIP) for the years 2016-2021, or as part of the later years of the 2040 MTP (years 2022-2040), are included in the recommended network for the IBA. However, in some cases the timeframe and the cost estimates for those projects have been revised. Additional roadways are included in the recommended network if they support Santa Fe County growth management objectives or serve to improve connectivity within the SDA-1 subareas. Where possible, the recommended roads follow existing unpaved roads or previously identified alignments.

The recommended roadways are split into three phases that span a period of twenty years. The identification of roadway phases is informed by the 2040 MTP, as some facilities are already programmed in the short-term Transportation Improvement Program or identified in a particular timeframe in the MTP. The phasing for other roadways in the recommended network are based on providing adequate land access over time. The most logical locations for development served by roads identified for construction are in Phase 1 or Phase 2.

The recommended roadway networks identified in the IBA do not represent all potential roadways. Rather, the roadways represent a base network that will need to be coordinated with roads that are constructed as part of site development projects or subdivisions.

6.1.1 Land Needs and Recommended Roadways

The identification of the recommended roadway network relied upon comparing previously planned and identified roadways against the land use and projected growth rates for the SDA-1 subareas. An underlying assumption of the IBA is that future roadway improvements must support access to land in each subarea where growth could occur and is most desirable.

ROADWAYS

Where potential access to land required for 2040 housing and employment levels is not supported by the roads identified in the Santa Fe County official network map, additional roads have been proposed.

The recommended roadway network takes into account the uncertainties related to long-term development. While land requirements to support the projects levels of growth are modest, particularly in the Northwest and Southwest units, it is difficult to determine the exact locations for new development, or to ensure that new development is concentrated. A summary of the projected development levels in each subarea are provided in the Land Use Assumptions section of this document.

6.1.2 Transfers of Development Rights (TDR) and Future Infrastructure Needs

The SLDC establishes that development in SDA-1 areas may occur at up to 20 housing units per acre – as opposed to the base density rate of one unit per acre – through the application of TDR. TDR is a zoning mechanism used to promote preservation of agricultural areas, open space, or other important resources by allowing the owner of such lands to sell development rights to a landowner whose property is located in a place that is more appropriate because of roadway and utilities infrastructure. TDR is therefore a means of incentivizing higher-intensity development in locations where it is desirable and can be better accommodated.¹³

The IBA's recommended roadway network is based on the need to support future development at base density levels. However, Santa Fe County planning efforts encourage new development to occur in ways that concentrate development into sustainable patterns and that take advantage of existing services and infrastructure. If new growth occurs at levels above the base density, less land must be utilized (and accessed) to support development needs depending on the intensity of development in those areas. Higher density growth patterns would therefore reduce the need for all of the roadway and utilities infrastructure identified in the IBA. If transfers of development rights are pursued, then later phases of the roadway network will likely not be necessary in the 2040 timeframe.

6.1.3 Recommended Roadway Network Components

Each roadway facility on the recommended network is assigned a functional classification that reflects the scale and elements appropriate for the particular roadway. Functional classifications for recommended roadways are based on the Official Network Map, if such designations were previously available, and have been assigned for additional roads in the recommended network. The recommended network generally contains roads that would be classified as collectors or arterials, although a number fit the profile of roads often classified as "major local." Santa Fe County should continue coordination with the Santa Fe MPO to integrate these roadways into the long-range planning documents contained in the metropolitan transportation plan. All roads are currently assumed to be two-lane facilities.

¹³ According to the SLDC, a transfer of development rights receiving site must be: located in mixed use, planned development, industrial general, industrial light, commercial general, or other designated district; served by public water and wastewater systems; and accessible by public roads.

ROADWAYS

Roadway Types

- Urban Local
- Urban Collector
- Urban Minor Arterial (2 lanes)
- Urban Minor Arterial (4 lanes)
- Rural Collector
- Rural Minor Arterial (2 lanes)

The functional classification informs the types of elements that may be included in the roadway design. In particular, the materials utilized for the roadway also depends on factors such as design speeds and the traffic volumes and heavy vehicle truck travel associated with different facilities. The width of the roadway footprint varies based on the number of travel lanes and the presence of turn lanes, sidewalks, and on-street bicycle facilities. Roadway elements also vary based on whether the facility is considered urban or rural. Table 19 indicates the roadway elements and dimensions associated with each roadway type, based primarily on Tables 7-12 and 7-13 of the SLDC. It is important to note that these dimensions are utilized for cost purposes and do not constitute exact design specifications. Planners and road designers should consult the 2016 SLDC and national reference manual for technical standards during the design process.¹⁴ The roadway elements prescribed for each roadway type are consistent with the trend toward multi-modal street design and increased accommodation for pedestrians and bicyclists. Definitions and explanations are provided below.

Table 19 - Assumed Dimensions by Functional Classification

	Urban				Rural	
	Major Local	Collector	2-Lane Arterial	4-Lane Arterial	Collector	Arterial
Sidewalks	5'	5'	5'	5'	no	no
Landscaping Buffer	4'	4'	4'	4'	no	no
Curb & Gutter	2'	2'	2'	2'	no	no
Bike Lanes	no	5'	5'	5'	no	no
Travel Lanes	2	2	2	4	2	2
Bike Buffer	0'	0'	1.5'	1.5'	0	0
Lane Widths	11'	11'	12'	12'	11'	12'
Center Turn Lanes	0'	12'	14'	14'	Intersections Only	Intersections Only
Paved Shoulder	4'	no	no	No	4'	5'
Unpaved Shoulder	no	no	no	No	6'	6'
Design Speed	25	35	35-40	40-45	40	40-50
Minimum ROW	60	80	120	120	80	120
Typical Section	52	66	73	97	42	46
Typical w/o median	N/A	54	59	N/A	N/A	N/A

¹⁴ For cost estimate purposes, the "Sub-collector" roadway type was used as the basis for roadway elements and dimensions contained in the Urban Major Local roadway type.

ROADWAYS

Since all SDA-1 areas are considered urban, the rural roadway designation reflects the characteristics of the roadway rather than the actual location. Urban roadways contain elements that are not practical or necessary in more rural contexts, including curb and gutter, bicycle lanes, and sidewalks. Paved and unpaved shoulders are designed to accommodate non-motorized travel in rural areas.

These designations are consistent with the 2040 MTP, which calls for paved shoulders as a suitable form of bicycle infrastructure on roadways such as Caja del Rio Road and Caja del Oro Grant Road.

6.1.4 Roadway Component Definitions

- **Center turn lanes** – Continuous two-way left-turn lanes are included in all urban roadway types other than local roads. In reality, this may take the form of turn bays at intersections, making the costs estimates for this component somewhat conservative.
- **On-street parking** – The roadway designs do not call for on-street parking as part of the cross-sections or cost estimates on any roads classified as collectors or arterials. On-street parking may occur in neighborhood residential areas on local roads.
- **Sidewalks** – All urban roadways contain a standard 5' raised concrete sidewalk on both sides of the roadway.
- **Bicycle facilities** – All urban collectors and arterials contain on-street bicycle facilities. Bicycle buffers with a minimum width of 1.5' are included on urban arterials. For rural areas, shoulders are intended to be of sufficient width to support safe bicycle travel. Shoulders could be converted to formal bicycle lanes if the surrounding area takes on a more urban form over time. Restriping could take place if unpaved shoulders and unused right-of-way are converted into sidewalks and additional roadway space.
- **Curb and gutter** – Curb and gutter are provided for both sides of the street on urban roadways only.
- **Shoulders** – Paved and unpaved shoulders are provided in rural areas. Local roads contain a paved shoulder on both sides of the roadway, which could be used for on-street parking in residential areas.
- **Landscaping buffers** – The space between the sidewalk edge and the curb may be utilized for landscaping, utilities, signage, and public amenities such as benches and bicycle racks. Landscape buffers are included on all urban roadways.
- **Right-of-way** – Guidance on right-of-way is provided in the SLDC. Exact right-of-way set-asides are not identified at this time. A sufficient amount of space should be set aside to allow for flexibility in the uses along the roadway in the future. Sufficient right-of-way also allows for the possibility that roadways would need to be widened, depending on the function of the roadway, the types of nearby land uses, and the intensity of nearby development.

6.1.5 Cost Assumptions

The roadway cost estimates provided in the IBA are provided for general planning purposes only and are intended to offer a reference for the magnitude of costs associated with an expanded roadway network. It is expected that these estimates will need to be revised as future development occurs. Estimates are provided in 2015 dollars and are not indexed for future inflation. Right-of-way acquisition, environmental, and design are not included in the estimates.

ROADWAYS

Estimates have been developed using average unit bid prices produced by the New Mexico Department of Transportation for the year 2015. This study also utilizes the NM 599 Interchange Corridor Study, conducted in 2009, given the evaluation of potential roadway infrastructure near the SDA-1 areas with similar topographical characteristics. Although the cost estimates from the NM 599 Interchange Corridor Study are no longer valid, the study can be used as a reference for determining the incidental and ancillary cost rates – calculated as a percentage of the base unit cost – associated with the recommended roads in the SDA-1 areas.¹⁵

The estimated roadway costs per mile are the sum of the base unit costs by roadway type and the lump sum additional costs, which includes incidental and ancillary costs associated with construction. The total, or loaded cost per mile, can be multiplied by the length of each road to estimate individual roadway costs. The cost estimates for new roadways developed for the IBA are utilized for all proposed roads, even if cost estimates are provided in the MTP. This approach ensures consistency for future planning efforts.

The cost estimates are summarized by each subarea and by phase in subsequent sections. For the purposes of this analysis, the same features and cost estimates are assumed for all roads classified as collectors (i.e. major and minor collectors are not distinguished).

Table 20 - Summary Costs per Mile by Roadway Type¹⁶

	Functional Class	Base-Unit Cost Per Mile	Lump Sum Additional Costs	Total Cost per Mile
Urban	Major Local	\$765,600	\$333,036	\$1,098,636
	Collector	\$1,122,880	\$488,453	\$1,611,333
	2-lane arterial	\$1,540,880	\$670,283	\$2,211,163
	4-lane arterial	\$2,618,000	\$1,138,830	\$3,756,830
Rural	Collector	\$765,600	\$333,036	\$1,098,636
	Arterial	\$966,827	\$420,570	\$1,387,396

It should be noted that the estimates represent general values based on unit costs and lengths, and do not take into account the specific topography, drainage infrastructure, or other challenges associated with each individual alignment. While general alignments for the roadways are identified, surveys have not been conducted and more engineering and environmental analysis would be required before detailed cost estimates could be developed.

All costs presented in the Santa Fe County IBA include construction only (2015 dollars). An additional 20-30% increase is expected for environmental, design, and contingency. Right-of-way acquisition costs must also be added, with needs to be determined on a project-specific basis. Minor and major collectors have the same basic elements in these cost assumptions. The functional classification is important for right-of-way dedication and design features.

¹⁵ The NM 599 Interchange Corridor Study was completed by Bohannon Huston, Inc. in 2009.

¹⁶ Minor and major collectors have the same basic elements in these cost assumptions. The functional classification is important for right-of-way dedication and design features.

ROADWAYS

6.1.5.1 Roadway Type Assumptions

Base-unit costs by roadway type are a function of the thickness of the asphalt concrete, the gravel base, and the width of the road. As indicated in the table below, higher classification roadways require thicker asphalt treatments and greater pavement widths.

Table 21 - Roadway Type Assumptions

	Roadway Type	Asphalt Concrete Thickness	Gravel Base Thickness	Pavement Width
Urban	Major Local	4"	6"	30'
	Collector	4"	6"	44'
	2-lane arterial	5"	6"	51'
	4-lane arterial	6"	6"	75'
Rural	Collector	4"	6"	30'
	Arterial	5"	6"	32'

6.1.5.2 Ancillary and Incidental Costs

Based on the costs identified in the NM 599 Interchange Corridor Study, a series of ancillary and incidental costs have been added to the base unit costs. Ancillary costs include drainage, earthwork, signage and striping, miscellaneous roadway elements, clearing and grubbing, and removals. Incidental costs include the storm water pollution prevention plan (SWPPP), traffic control, mobilization, staking, and materials testing. Since the County-level gross receipts tax rate fluctuates over time, the estimates applied an assumed 7.0% to the total unit cost.

Table 22 shows the percent of the total unit cost associated with each ancillary or incidental activity associated with roadway construction. Based on the estimates from the NM 599 Interchange Corridor Study, these costs collectively add a total of 43.5% to the base unit cost for each roadway type.

Table 22 - Standard Lump Sum Additional Cost Assumptions

Category	Item	Percent of Total Unit Cost
Ancillary Costs	Drainage	3.5%
	Earthwork	4.0%
	Signage and Striping	1.0%
	Miscellaneous roadway	5.0%
	Clearing and grubbing	1.5%
	Removals	2.0%
Incidental Costs	Traffic Control	5.0%
	Mobilization	10.0%
	Staking	2.0%
	Materials Testing	1.5%
	SWPPP	1.0%
Tax	NMGRT	7.0%
	Total	43.5%

ROADWAYS

6.2 NORTHWEST UNIT - ROADWAYS

6.2.1 Recommended Roadway Network – NW Unit

The proposed base network for the NW Unit consists of a series of roads that provide land access to support anticipated development needs through 2040 (see Figure 10 and Figure 11). This network includes two pairs of parallel roadway facilities that form a large-scale grid to support access and network connectivity over time. These recommended roads represent a subset or first phase of the Official Network Map developed for the SLDC. Although these roadways are appropriate for the 2040 timeframe given the current projections, the phasing of roadways is contingent upon the pace of development. There are no roads in the NW Unit in Phase I.

- Road A: The north-south portion of the Caja del Rio/Paseo Real Connector, this facility is included in the 2040 MTP as a Public Agency Lead/Future Road Extension, and in the SLDC Future Roads Map as a minor collector. This project spans City and County lands, and costs may be shared among the agencies.
- Road B: The east-west portion of the Caja del Rio/Paseo Real Connector, this facility is included in the 2040 MTP as a Public Agency Lead/Future Road Extension, and in the SLDC Future Roads Map as a minor collector.
- Road C: East-west facility with eastern terminus at Caja del Rio Road that follows the alignment of Old Cochiti Road. Road C is a new facility and is proposed as a minor collector.
- Road D: Southeast-northwest facility that connects the NM 599-Meadows Road interchange with Caja del Rio Road along the existing Caja del Oro Grant Road corridor. A portion of the Caja del Oro Grant Road corridor is an existing dirt road. The road is classified as a minor arterial.
- Road E: North-south facility that extends north from the Caja del Rio/Paseo Real Connector. Road E is a new facility and is proposed as a minor collector.
- Road F: East-west facility that extends west from the Caja del Rio/Paseo Real Connector. Road F is a new facility and is proposed as a local road.
- Road G: North-south facility with southern terminus at Paseo Real that follows an alignment identified by Santa Fe MPO.
- Road H: East-west facility that provides a connection between proposed Roads C and G. Road H is a new facility and is proposed as a local road.

Two of the four recommended roads are contained in the 2040 MTP. The proposed Caja del Rio/Paseo Real Connector is classified as a minor collector and corresponds to Roads A and B in the IBA. The second roadway in the NW unit identified in the 2040 MTP, Caja del Oro Grant Road, is an existing unpaved road and classified as a future minor arterial.

Note: NMDOT will complete a study in 2017 to reprioritize interchange and frontage road improvements for the NM 599 corridor. If interchange or frontage road improvements are constructed in the near term in the airport area this may mitigate or delay the need for the Paseo Real Connector, which is identified as Roads A and B in the IBA and is included in the 2040 MTP. An assessment of the regional roadway network and consideration of potential projects will be conducted as part of the next update to the MTP for the Santa Fe metropolitan planning area. This project is identified as the “NMDOT Study Road” in Figure 10 and Figure 11.

ROADWAYS

The estimated total cost for all recommended roads in the NW Unit is \$11,283,044, with the majority of costs associated with projects identified in the MTP and anticipated to be constructed in Phase 2.

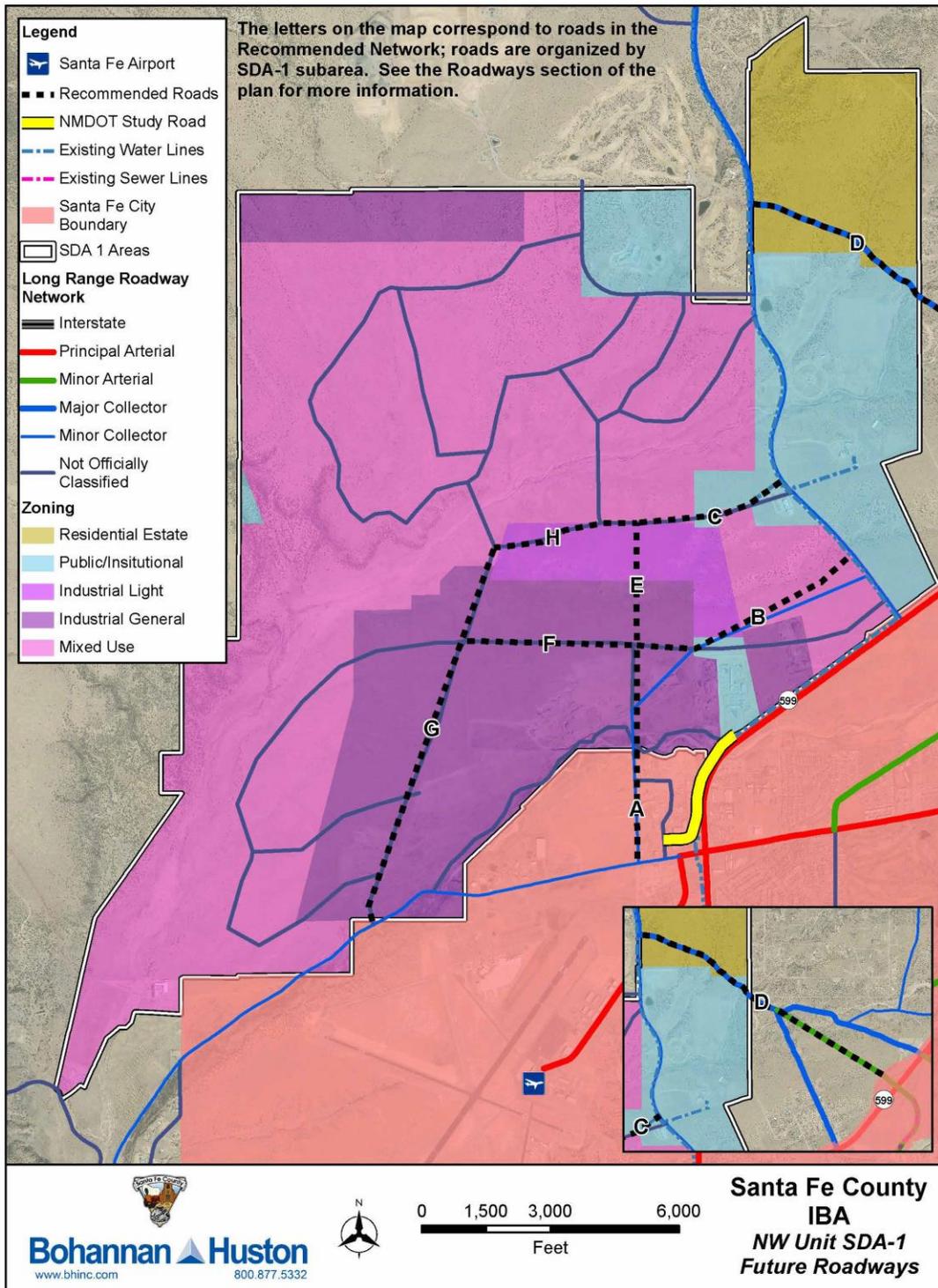
Table 23 - Recommended Roads in the NW Unit¹⁷

Phase	Road	Name / Description	Length (mi)	Classification	MTP Status	Cost Estimate
2	A	Caja del Rio / Paseo Real Connector	0.96	Minor Collector	Identified in MTP	\$1,549,371
2	B	Caja del Rio / Paseo Real Connector	1.17	Minor Collector	Identified in MTP	\$1,884,276
2	C	Old Cochiti Rd	0.69	Local	Not included	\$756,960
2	D	Caja del Oro Grant Rd	1.93	Major Collector	Identified in MTP	\$3,000,000
2	E	N/A	0.54	Local	Not included	\$592,789
3	F	N/A	0.77	Local	Not included	\$849,958
3	G	N/A	1.76	Local	Not included	\$1,935,577
3	H	N/A	0.65	Local	Not included	\$714,113

¹⁷ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

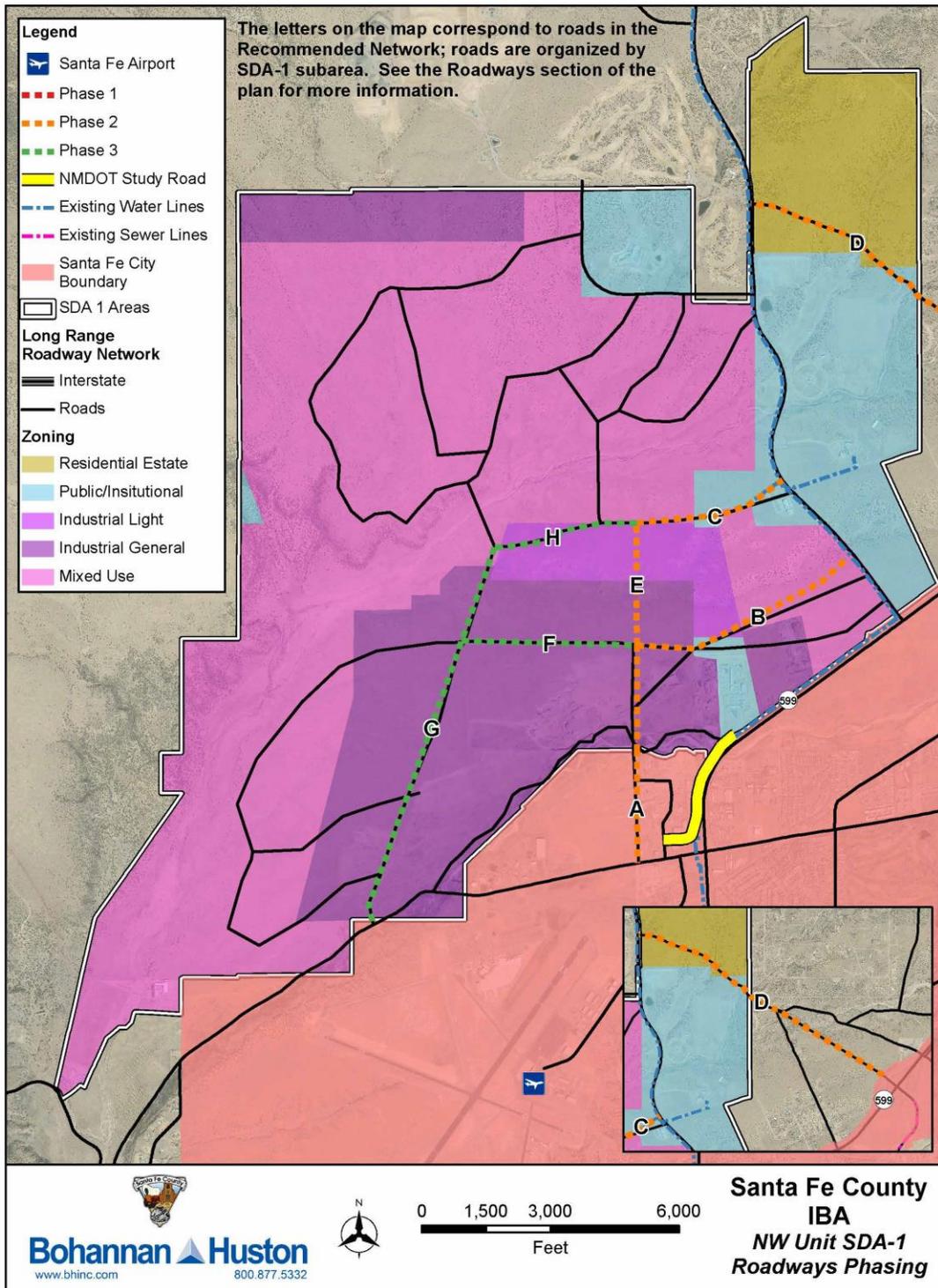
ROADWAYS

Figure 10 - Future Roadways - NW Unit



ROADWAYS

Figure 11 - Recommended Roadways Phasing Plan - NW Unit



Author: gmaynard
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ROADWAYS

6.3 SOUTHWEST UNIT - ROADWAYS

6.3.1 Recommended Roadway Network – SW Unit

The SW Unit has a limited existing roadway network and minimal connectivity between existing roadways. As a result of the limited network, there is poor access to potential development sites. The only existing roadway that traverses the subarea is Bataan Boulevard, which connects the I-25 Frontage Road to NM 14 from east-to-west. Bataan Boulevard provides access primarily to penitentiary sites and a National Guard facility, though it does not provide any connections to north-south roadways along the corridor (see Figure 6).

Although no new roads are proposed in the SW unit in the 2040 MTP, to support the anticipated levels of development over the next 20 years and to promote sustainable development patterns, a more complete roadway network must be provided. The following roads are recommended for the SW Unit:

- Road A: North-south facility that extends Metro Boulevard to the east and south. The road partially follows an existing dirt road and terminates to the south at Road D (Louis Road extension). The facility is proposed as a local road.
- Road B: North-south facility that connects from Valle Vista Boulevard (Road C) to Comanche Drive (Road E). The corridor follows the general path of an existing dirt road. The facility is proposed as a minor collector.
- Road C: East-west corridor that extends the existing Valle Vista Boulevard from the I-25. The new portions of the route follow an existing dirt road. The facility is proposed as a minor collector.
- Road D: East-west facility that extends east from Louis Road (which begins at the I-25 Frontage Road) to proposed Road B. The corridor follows an existing dirt road and is proposed as a local road.
- Road E: East-west facility that improves and expands upon the existing Comanche Drive gravel road. The corridor connects the I-25 Frontage Road to NM 14 and is identified in the 2040 MTP as a Study Road. The improved road is proposed as a major collector.
- Road F: East-west facility that connects I-25 from the La Cienega interchange to NM 14. The roadway is identified as a Study Road in the 2040 MTP and is proposed as a rural minor arterial.
- Road G: North-south facility that connects Road E, Comanche Drive (north terminus) with Road H (west terminus) and intersects with existing Bataan Boulevard to improve access across the central portion of the SW Unit. Road G follows an east-west path at the southern end of the corridor in order to avoid a large arroyo. The alignment of Road G could be revised if a connection to La Cienega is deemed critical and the expense of crossing the arroyo is determined to be justified.
- Road H: North-south facility with southern terminus at La Cienega Connector and northern terminus at I-25 Frontage Road. The northern portion of the alignment follows an existing dirt road. The facility is proposed as a local road.

Comanche Drive and the La Cienega-NM 14 Connector (Roads E and F respectively), when completed, will provide critical east-west connections between I-25 and NM 14 and offer access across the SW Unit. Both of these facilities are identified in the 2040 MTP as Study Roads, although funding and exact alignments remain to be determined.

ROADWAYS

It is anticipated that the construction of these roads would support development opportunities in the areas zoned as mixed-use. Additional roadways have been identified that support the principles of network connectivity and land access (see Figure 13 and Figure 14).

The estimated total cost for all recommended roads in the SW Unit is \$15,053,485.

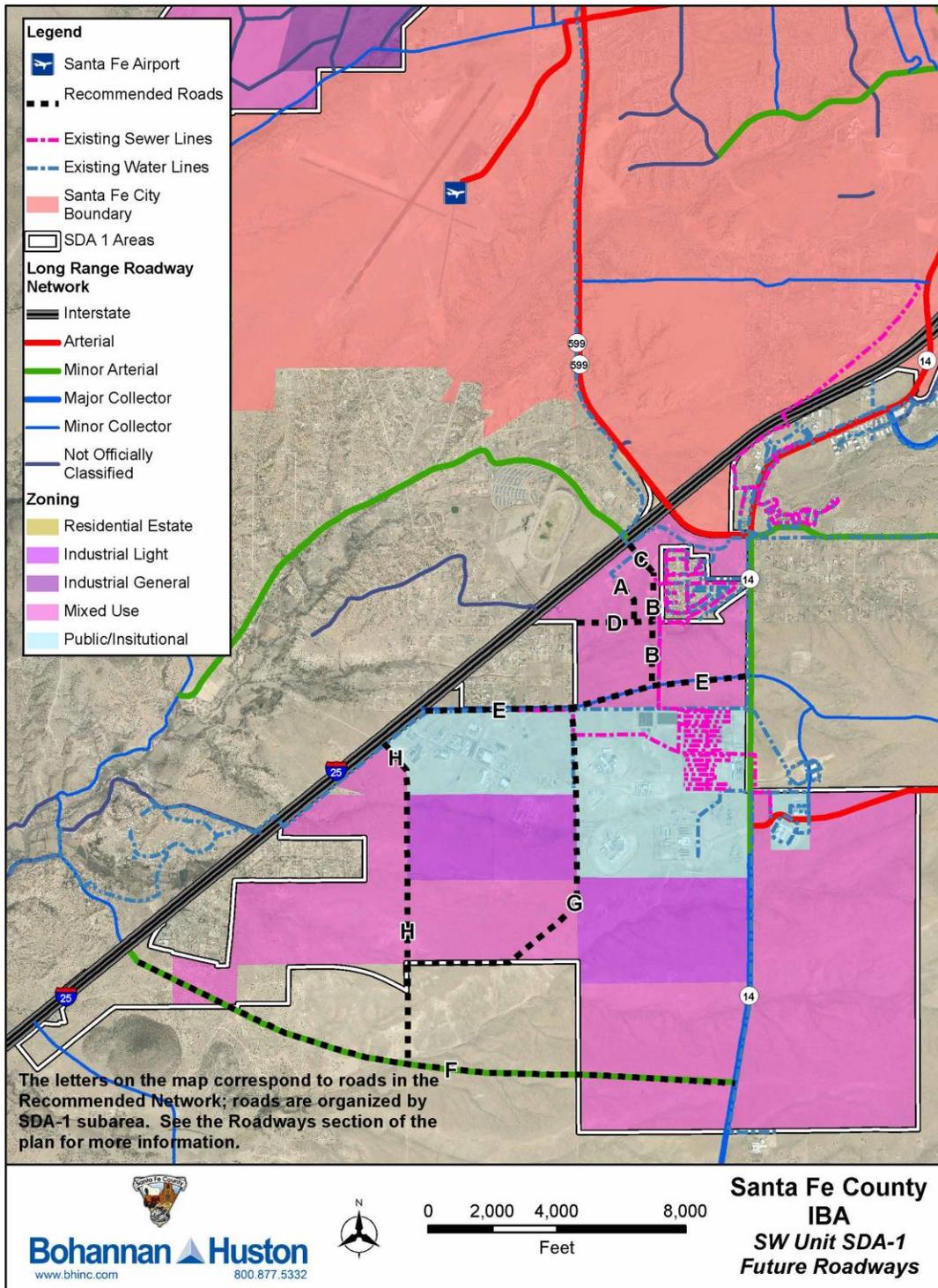
Table 24 - Recommended Roads in the SW Unit¹⁸

Phase	Road	Name / Description	Length (miles)	Classification	MTP Status	Cost Estimates
1	A	Metro Blvd extension	0.26	Local	Not included	\$290,260
1	B	Valle Vista Blvd extension	0.66	Minor Collector	Not included	\$1,071,301
1	C	Valle Vista Blvd connector	0.23	Minor Collector	Not included	\$367,223
1	D	Louis Rd	0.47	Local	Not included	\$517,238
2	E	Comanche Dr	1.95	Major Collector	MTP Study Road	\$3,134,092
3	H	Penitentiary Rd	1.94	Local	Not included	\$2,133,478
3	G	Frontage - La Cienega Connector	2.27	Local	Not included	\$2,496,431
3	F	La Cienega - NM 14 Connector	3.64	Rural Minor Arterial	MTP Study Road	\$5,043,463

¹⁸ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

ROADWAYS

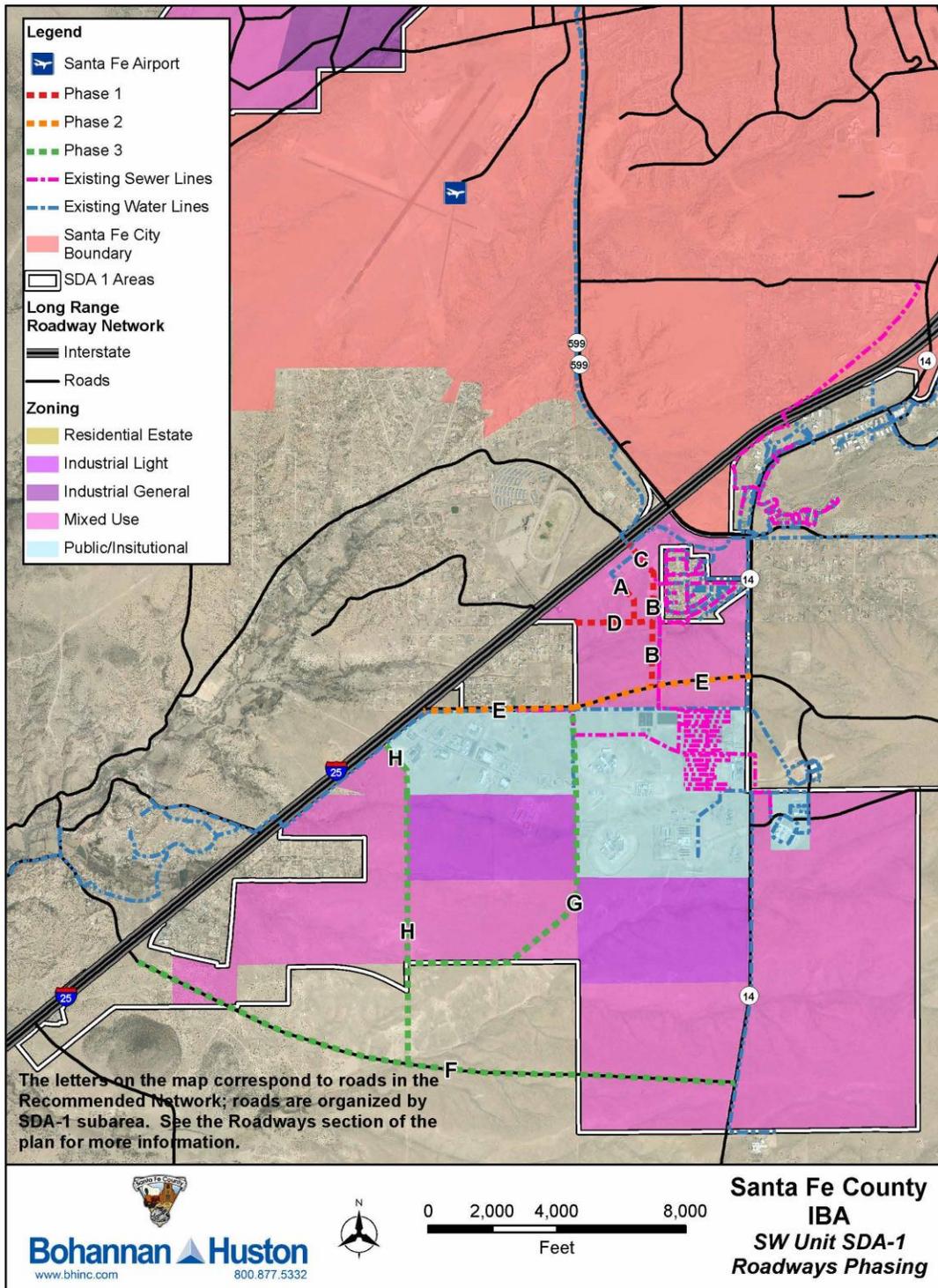
Figure 12 - Future Roadways - SW Unit



Author: gmaynard
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ROADWAYS

Figure 13- Recommend Roadways Phasing Plan - SW Unit



Author: gmaynard
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ROADWAYS

6.4 COMMUNITY COLLEGE DISTRICT UNIT - ROADWAYS

6.4.1 Recommended Roadway Network – CCD Unit

The CCD Unit has seen a greater degree of land use and infrastructure planning than the NW and SW Units. As a result, the long-range network identified in the SLDC contains a well-developed system of roads. The roads identified in the recommended network are a subset of the long-range network, and many of the roads contained in the recommended network are included in the 2040 MTP. Unlike the NW and SW Units, where land access is a major determining factor in the location and phasing of new roadway facilities, the recommended network for the CCD Unit emphasizes connectivity and access to known or planned subdivisions. The following roads are recommended for the CCD Unit:

- Road A: Southeast Connector is a north-south facility that connects Rabbit Road and the I-25 Frontage Road with the Rancho Viejo Windmill Ridge and Oshara Village subdivisions, as well as the eastern edge of the Santa Fe Community College campus. The corridor becomes Road G (Sunshine Mesa Road) to the south of Road C (Avenida del Sur east extension). The SE connector and is classified as a minor arterial.
- Road B: East-west facility that partially follows the existing Rabbit Road alignment and connects to Richards Avenue, serving as a frontage road to I-25. This roadway is also referred to as the Northeast Connector and is classified as a minor arterial.
- Road C: East-west facility that extends Avenida del Sur east from Richards Avenue. The Avenida del Sur extension is part of the proposed SE connector and is proposed as a two-lane minor arterial.
- Road D: Richards Avenue is an existing north-south principal arterial that connects the I-25 Frontage Road with Santa Fe Community College and residential communities in the center of the CCD unit. Richards Avenue has previously been proposed as a four-lane facility. The completion of the SE connector makes widening of Richards Avenue unnecessary. The IBA recommends that Richards Avenue be improved to include on-street bicycle facilities.
- Road E: Vista del Monte/Avenida del Sur is an east-west facility that connects NM 14 with the central portion of the CCD Unit and currently terminates at Richards Avenue. The route is subject to improvements per the 2040 MTP, including added bicycle lanes. Vista del Monte/Avenida del Sur is classified as a minor arterial.
- Road F: Rancho Viejo Boulevard is an existing east-west facility that connects NM 14 with Avenida del Sur. Rancho Viejo Boulevard is scheduled for improvements per the 2040 MTP, including added bicycle lanes. The road is classified as a major collector.
- Road G: North-south facility that approximately follows the existing Sunshine Mesa Road alignment. Road G is an extension of Road A (SE connector) to the south of Road C (Avenida del Sur extension).
- Road H: North-south facility that mostly follows the alignments of existing dirt roads Old Galisteo Way and Meador Lane. The corridor is proposed as a minor collector.
- Road I: East-west facility that extends from existing southern leg of the Community College circulation road to the proposed SE connector (Road A). The corridor is proposed as a minor collector.

ROADWAYS

- Road J: Dinosaur Trail is an existing east-west facility that runs parallel to I-25 and provides direct access to residential streets in the La Pradera subdivision. The Santa Fe County IBA recommends widened shoulders to allow for on-street bicycle travel into and out of the La Pradera subdivision. Dinosaur Trail is currently a local road but would be more appropriate as a rural collector.
- Road K: East-west facility that would connect Old Galisteo Way and Old Galisteo Road. Road K is proposed as a local road.
- Road L: Extension of existing East Chili Line Road east to Sunshine Mesa Road (Road G). The connection improves access between the Rancho Viejo Windmill Ridge subdivision, the proposed center at the southern end of the SE connector, and north to I-25. The facility is proposed as a local road.
- Road M: East-west facility that connects between Rabbit Road and Old Galisteo Way. The proposed road is classified as a minor collector.
- Road N: North-south facility that extends existing San Antonio Peak Road between the Rancho Viejo Windmill Ridge subdivision and the Avenida del Sur extension (Road C). The facility is proposed as a local road.
- Road O: East-west facility that extends existing College Drive east to the SE connector (Road A). The facility is proposed as a minor collector and is expected to be privately funded.

The recommended roadway network is informed by projects contained in the Santa Fe MPO's TIP, including the proposed Northeast (NE) Connector and Southeast (SE) Connector.

Portions of Rabbit Road currently function as a frontage road, but the route is currently diverted through the Oshara Village subdivision. The NE connector is a planned new roadway that would connect between Richards Avenue and the northern portion of Rabbit Road that runs parallel to I-25. The NE Connector includes an upgrade to the existing I-25 Frontage Road. The SE connector would create a parallel facility to Richards Avenue by extending Avenida del Sur to the east and following a north-south alignment that terminates at Rabbit Road (I-25 Frontage Road).

Also noteworthy, Richards Avenue is identified in the MTP as a Study Road with the potential of widening the road to four lanes. Once NE and SE connectors are constructed, the improved connectivity should spread trips across the network and there may not be a need to go to four lanes.

Several facilities in the CCD Unit are included in the roadway improvements list, but do not require capacity expansion at this time. Rather, the IBA proposes bicycle lanes or widened shoulders to improve the multi-modal transportation network and create on-street bicycle connections across this portion of Santa Fe County.

The estimated total cost for all recommended roads in the CCD Unit is \$22,697,372.

ROADWAYS

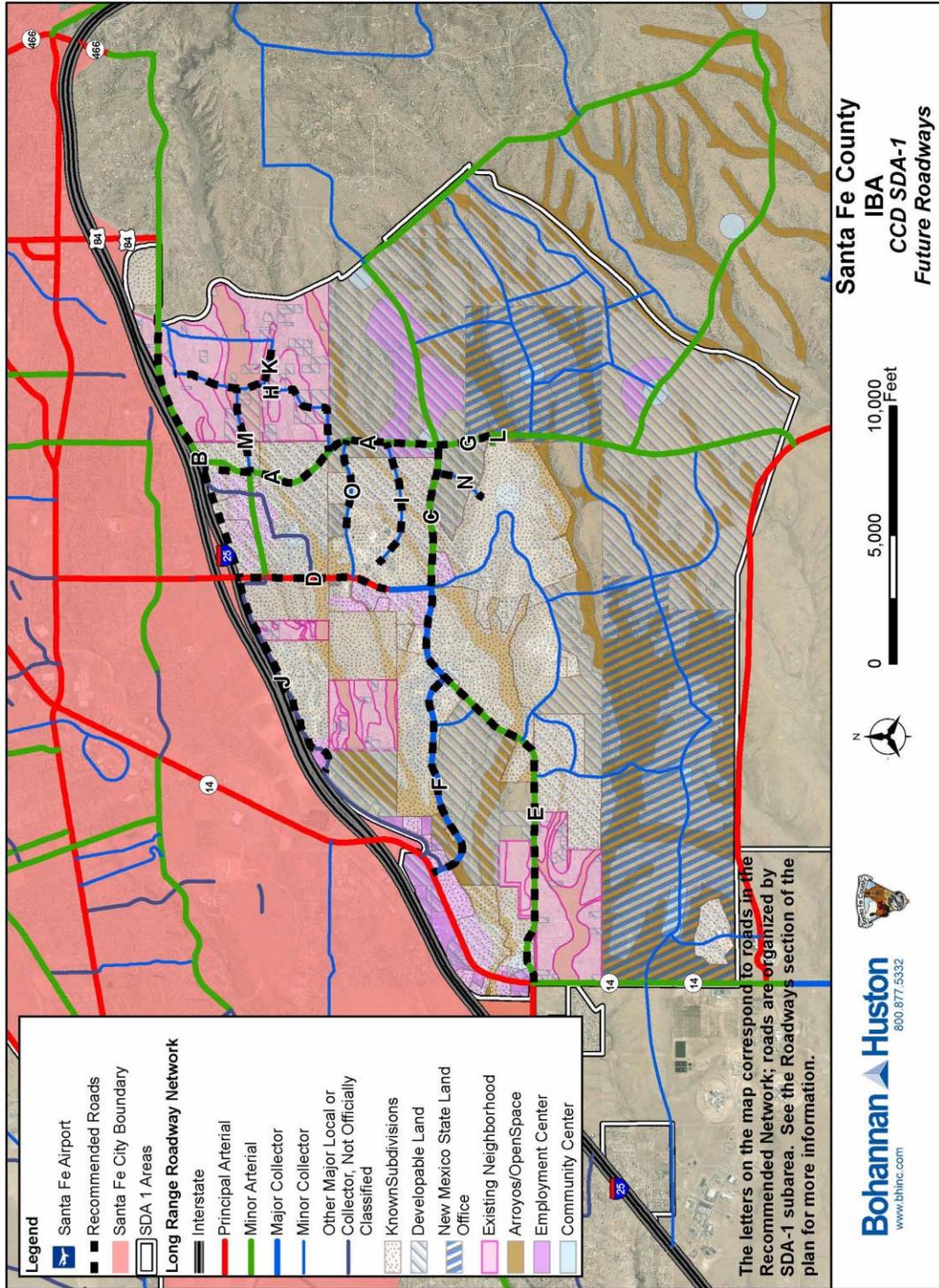
Table 25 - Recommended Roads in the CCD Unit¹⁹

Phase	Road Label	Name / Description	Length (miles)	Classification	MTP Status	Cost Estimates
1	A	SE Connector	1.86	Minor Arterial	Programmed in TIP	\$4,104,803
1	B	NE Connector	1.98	Minor Arterial	Programmed in TIP	\$4,384,515
1	C	Avenida del Sur / SE Connector	1.06	Minor Arterial	Programmed in TIP	\$2,343,833
2	D	Richards Ave Bike Lanes	1.13	Principal Arterial	MTP Study Road	\$1,000,000
2	E	Avenida del Sur Bike Lanes	3.30	Minor Arterial	Identified in MTP	\$1,000,000
2	F	Rancho Viejo Blvd Bike Lanes	1.67	Major Collector	Identified in MTP	\$1,000,000
3	G	Sunshine Mesa	0.41	Minor Arterial	MTP Study Road	\$903,923
3	H	Old Galisteo Way / Meador Ln	1.55	Minor Collector	MTP Study Road	\$2,505,461
3	I	Campus Rd extension	0.96	Minor Collector	MTP Study Road	\$1,553,003
3	J	Dinosaur Trail Bike Lanes	1.64	Major Collector	MTP Study Road	\$1,000,000
3	K	Old Galisteo Rd connection	0.34	Local	MTP Study Road	\$373,756
3	L	Chili Line Rd extension	0.06	Local	Not included	\$68,665
3	M	N/A	0.62	Local	MTP Study Road	\$675,991
3	N	San Antonio Peak extension	0.40	Minor Collector	Not included	\$639,538
3	O	College Dr extension	0.71	Minor Collector	Not included	\$1,143,885

¹⁹ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

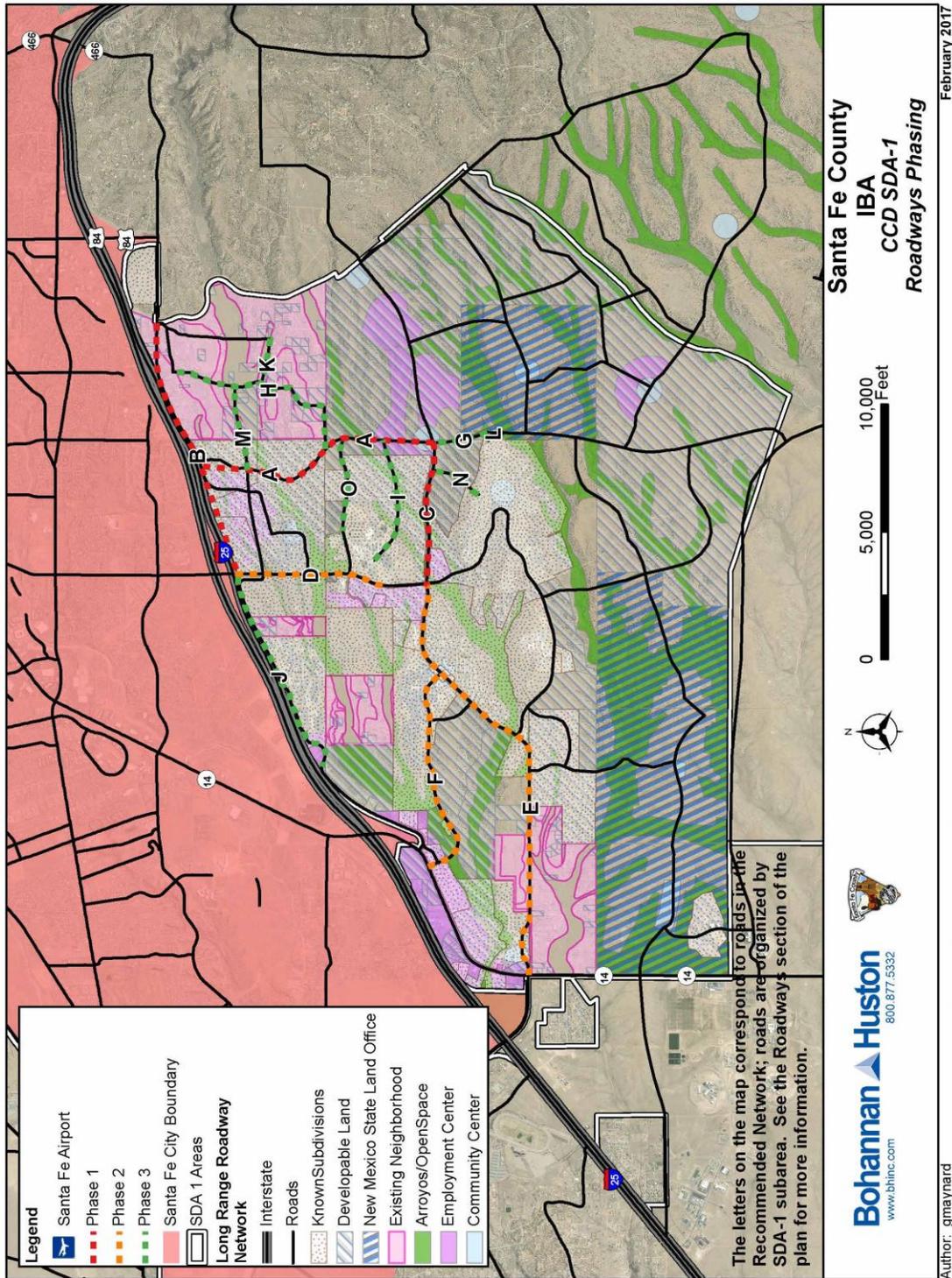
ROADWAYS

Figure 14 - Future Roadways - CCD Unit



ROADWAYS

Figure 15 - Recommended Roadways Phasing Plan - CCD Unit



ROADWAYS

6.5 SUMMARY COST ESTIMATES - ROADWAYS

The table below provides summary cost estimates by subarea and by phase. Phase 3 is noteworthy for the higher cost estimates, reflecting the fact that roadway construction is contingent upon the locations of new development and the pace at which that development occurs.

Table 26 - Summary Costs Estimates by Subarea and Phase²⁰

	Phase 1 Years 2017-2023	Phase 2 Years 2024-2030	Phase 3 Years 2031-2040	Total
NW Unit	\$0	\$7,783,396	\$3,499,648	\$11,283,044
SW Unit	\$2,246,021	\$3,134,092	\$9,673,371	\$15,053,485
CCD Unit	\$10,833,150	\$3,000,000	\$8,864,222	\$22,697,372
Total	\$13,079,171	\$13,917,488	\$22,037,241	\$49,033,900

²⁰ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

7 WATER AND WASTEWATER

7.1 ASSUMPTIONS AND METHODOLOGY

This section of the IBA includes a summary of the demand calculations, design criteria, and recommendations for water and wastewater infrastructure.

The following infrastructure recommendations are based on 2040 demand projections. Also analyzed are the infrastructure needs under the capacity scenario (i.e. full buildout) to determine if the 2040 recommendations are sufficient at buildout, if it is more prudent to upsize the 2040 recommendations, or if the County should anticipate parallel water and wastewater lines in the future.

The SLDC, which sets water projections and infrastructure provision standards, is used as the basis for analysis in this study. All water demand projections and recommendations are based on the developable land, population, and employment analyses, which are summarized in the Population Projection Overview section. Wastewater projections are based on a water-to-wastewater ratio of 0.8.

In Table 12-1 of the SLDC, the residential water demand is stated as 0.25 acre-feet (ft) per year per residence. Based on direction from the Santa Fe County Utilities Division staff, this number has been modified to 0.2 acre-ft per year per residence for this analysis which equates to approximately 180 gallons per day per dwelling unit (gpd/DU). This number is consistent with the billing data received from the County which shows an average of approximately 165 gpd/DU for County customers.

As shown in Table 12-1 of the SLDC, non-residential demand guidelines are to be determined by the Administrator based on water budget approval and not directly specified. The latest known study which includes an analysis per land use type based on billing data is the City of Santa Fe's Water Transmission and Storage System Master Plan (WMP). This study was published in 2009 for the City which projects water demands within the City of Santa Fe and metropolitan Santa Fe County. The IBA references the City's 2008 Long-Range Supply Plan and includes information provided by the County on population projections and water demands.

The average day demand (ADD) unit use rates found in the WMP report are relevant to the local area, and were used to project future water demand for the IBA. The published WMP rates are included in Table 27. These unit use rates are in gallons per minute per acre (gpm/acre).

The IBA land-use designations do not correspond directly with the land-use designations from the City's WMP. Table 28 which provides the correlation between the terms.

Water and wastewater infrastructure recommendations are based on peak day demands (PDD) plus fire flow. In the WMP, the County specified the provided demand projections and specified an ADD to PDD peaking factor of 2. The PDD unit rate is included as a separate column in Table 28. For reference, in the WMP the City's ADD to max daily demand (MDD) scaling factor was 1.61 based on 2007 SCADA and billing data.

Future water projections are calculated based on identifying the developable land within the NW Unit, SW Unit and CCD areas. Based on the growth projections and recommended roadway corridors for 2040, specific parcels are identified as most likely to develop. The parcel acreages are summed up by land use and multiplied by the unit use rates defined in Table 27 to calculate future water demand.

WATER AND WASTEWATER

The SLDC does not state a water to wastewater ratio for calculating wastewater rates. The Civil Engineering Reference Manual gives a range of 50 to 250 gallons per capita per day for domestic wastewater volume rates. The IBA assumes that all new development is directly connected to the wastewater collection and treatment system, which would increase the existing wastewater return rate as opposed to development that has onsite wastewater collection through septic systems. Based on discussions with the County, a water to wastewater ratio of 0.8 has been used for this analysis. A household per capita wastewater use of 62 gpcd has been calculated using 180 gpd per household with SDA-1 2040 Projections by Subarea (per capita of 2.32 people per household) as shown in Table 29. This is on the low side on the range given in the Civil Engineering Reference Manual but more consistent the County's understanding of their system.

WATER AND WASTEWATER

Table 27 - City of Santa Fe WMP Land-Use Types and Use Rates²¹

Land-Use Type	Description	ADD ²² Unit Use Rate (GPM/acre)
High Density Residential	12 to 29 Dwellings per Acre	1.25
Medium Density Residential	7 to 12 Dwellings per Acre	0.64
Moderate Density Residential	7 to 9 Dwelling per Acre	0.57
Low Density Residential	3 to 7 Dwellings per Acre	0.39
Very Low Density Residential	1 to 3 Dwellings per Acre	0.11
Mountain/Corridor Residential	1 Dwelling per 10+ Acres	0.09
Greater Agua Fria Area	Agua Fria and adjacent lands within joint planning jurisdiction of City and County.	0.1
Neighborhood Commercial	Mix of Commercial, Civic Religious, Offices, and Residential	0.78
Community Commercial	Retail Shopping incl. Restaurants, auto, financial, personal, educational and social services	0.78
Regional Commercial	Existing Retail shopping areas. Santa Fe Outlets Centers, Villa Linda Mall and De Vargas Mall	0.38
Transitional Mixed Use ²³	Transitional spaces between commercial corridors and residential.	0.32
Office	Administrative, financial, business professional, medical and public offices.	0.28
Business Park	Moderate to low intensity Industrial and Commercial near residential areas.	0.27
Industrial	Manufacturing, processing and distribution.	0.23
Institutional	Schools, museums, libraries, fire and police stations, government offices	0.13
Parks	Parks, Golf Courses, Recreational Complexes	0.17
Open Space	Riparian Corridors	0.07

²¹Table is based on Table 3-5 of City of Santa Fe WMP

²²Average day demand

²³Not defined in Appendix E of 2009 WMP.

WATER AND WASTEWATER

Table 28- SF County Buildout Study Land Use Type Unit Use Rates

Santa Fe WMP Land Use Type	SF County IBA Land Use Type	Water ADD ²⁴ Unit Use Rate (GPM/acre)	Water PDD ²⁵ Unit Use Rate (GPM/acre)	Wastewater PDD Unit Use Rate (GPM/acre)	Equivalent Residential Unit
Medium Density Residential ²⁶	Between 7 and 12 Units per Acre, Condominium Residential, Mobile Home Park - Rental, Vacant Land - SF Housing in Fringe,	1.24	2.48	1.98	10
Low Density Residential ²⁷	3 to 7 Units per Acre, Village	0.44	.88	0.70	3.5
Very Low Density Residential ²⁸	1 to 3 Units per Acre, Residential Estate, Existing Neighborhood Zones	0.125	0.25	0.20	1
N/A	Known Subdivisions ²⁹	0.32	0.65	0.52	2.6
Regional Commercial	Commercial General	0.38	0.76	0.60	3
Transitional Mixed Use	Mixed Use, Commercial Media District, Fringe	0.32	0.64	0.51	2.6
Industrial	Industrial, Industrial General, Industrial Light	0.23	0.46	0.37	1.9
Institutional	Public/Institutional, Community Center, Institutional Campus	0.13	0.26	0.21	1
Parks	Federal and State Public Lands	0.17	0.34	0.27	1.4
Business Park	Employment Center	0.27	0.54	0.43	2.2
No Use	Utilities, Transportation, and Communication	0	0	0	0

²⁴ Average day demand

²⁵ Peak day demand

²⁶ Medium Density Residential ADD was modified from Table 1 to reflect an ADD demand of 180 gpd/DU for a density of 10 DU/acre

²⁷ Low Density Residential ADD was modified from Table 1 to reflect an ADD demand of 180 gpd/DU for a density of 3.5 DU/acre. 3.5 DU/acre is the assumed residential density to determine land needs in CCD area outside of subdivisions as stated in the Population Projections and Methodology Section.

²⁸ Very Low Density Residential ADD was modified from Table 1 to reflect an ADD demand of 180 gpd/DU for a density of 1 DU/acre

²⁹ New land use category based on known subdivisions within the CCD Area. Equivalent residential unit based on projected units for 2040 and average of the known subdivision densities.

WATER AND WASTEWATER

Table 29 - Water to Wastewater Ratio Analysis

Water Demand (gpd)	Wastewater Return Rate	Wastewater Demand (gpd)	Wastewater Demand per Capita³⁰ (gpcd)
180	0.8	144	62

7.2 INFRASTRUCTURE DESIGN CRITERIA – WATER AND WASTEWATER

The water and wastewater design criteria are based on the references stated in the SLDC.

7.2.1 Water

The Recommended Standards for Water Facilities by the New Mexico Environment Department (NMED) is referenced as the design guidelines for water infrastructure and is supplemented with the Sangre de Cristo Water Division Design Criteria.

The water analysis considered the City of Santa Fe water distribution system existing pressure zones to maintain consistency between the County and City water distribution systems as the City can provide service to the County through master meters and the Wild West pressure reducing valve (PRV).

7.2.1.1 Service Pressures

Customer pressures within the City of Santa Fe typically range between 40 pounds per square inch (psi) and 125 psi. In order to provide customers with water pressure within this range the City has divided its water distribution system into approximately eleven (11) pressure zones. Typically pressure zones are served from storage tanks or pressure reducing valves which govern customer pressures.

7.2.1.2 Transmission Line Velocity

Transmission lines are defined as the backbone infrastructure to the community used primarily to convey water throughout the system and not intended for service connections. The design criteria for the transmission lines under normal conditions is as follows:

- Pipeline Velocity of 5 feet per second or
- 3 feet of headloss per 1,000 feet of pipe

7.2.1.3 Fire Flow

Transmission lines will be sized to accommodate fire flow. For the water infrastructure analysis fire flow capacities are assumed to be:

- 1,500 GPM for residential development
- 3,000 GPM for non-residential development
 - Pipeline Velocity at 10 feet per second including domestic demand

³⁰ Based on a per capita of 2.32 as calculated by 2040 Household Population and 2040 Housing Units in SDA-1 Projections by Subarea.

WATER AND WASTEWATER

In the NMED recommended water criteria, 4,000 GPM is noted as typical fire flow for commercial construction “for illustration purposes”. For this analysis 3,000 GPM for non-residential fire flow will be used based on direction from the County Fire Department and the County Utilities Division.

The County adopted the 1997 Uniform Fire Code (UFC) in August of 1998 to determine fire flow protection. Similar to the International Fire Code (IFC), the UFC determines fire flow based on a buildings square footage and construction type. Under both codes the Fire Marshal determines the final fire flow requirements for individual structures.

7.2.2 Wastewater

The Recommended Standards for Wastewater Facilities by the NMED is a design guideline for this section.

Wastewater trunk line sizes are based on the following criteria:

- Manning’s formula with an “n” value of 0.013 for pipe capacity
- A minimum trunk line velocity of 2 feet per second

Minimum wastewater diameter shall be 8-inch based on the Recommended Standards for Wastewater Facilities by the New Mexico Environment Department. Table 30 summarizes minimum slope by pipe diameter and resulting capacity flow.

Wastewater force main lines are sized based on the following criteria:

- A minimum pipe velocity of 3 feet per second
- A maximum pipe velocity of 9 feet per second

Design Flow will be 80% of water PDD as discussed previously.

Table 30 - Wastewater Minimum Slope and Pipe Capacity

Pipe Diameter (inches)	Minimum Slope (ft/ft)	Velocity (ft/sec)	Full Flow (ft³/sec)	Full Flow (GPM)
8	0.004	2	0.8	347
10	0.0028	2	1.2	527
12	0.0022	2	1.7	760
16	0.0014	2	2.9	1,305
24	0.0008	2	6.4	2,908

WATER AND WASTEWATER

7.3 NORTHWEST UNIT – WATER AND WASTEWATER

7.3.1 Projections

As previously established in the Population Projection section, the NW Unit contains approximately 5,905 acres. Of this area, 1,404 acres are currently developed as of 2015. For the capacity scenario (buildout) an additional 561 acres are projected to be developed by 2040.

Based on the 2040 projected population growth for the NW Unit, approximately 479 acres are required to meet an additional household population of 1,110 with an assumed density of one dwelling unit (DU) per acre. The remaining non-residential land use required is approximately 54 acres to meet the employment projections of 566 people. The employment projections include a variety of vocations including mining, construction, healthcare and government. Due to the variety of job types a general land use type of Mixed Use for these 50 acres is recommended. An additional 28 acres is projected for a medium density senior campus.

The 2015, 2040 and capacity scenario water and wastewater demands are summarized in Table 31. It is important to note that since there is no residential land use identified in the NW Unit, residential demand is calculated as part of the Mixed Use land use category. Additionally, existing demands are based on the existing developed acreage by land use type multiplied by the unit use rates in Table 31. As indicated in the Population Projections section, and illustrated in Figure 4, Mixed Use areas in the capacity scenario are assumed to develop at the following rates: 9% Medium Density Residential (at 10 DU/acre); 10% Commercial; 81% Very Low Density Residential (1 DU/acre).

WATER AND WASTEWATER

Table 31 - NW Unit Water and Wastewater Demand

Land Use	PDD ³¹ Unit Use Rate (GPM/acre)	Developed Area (acre)	Water Demand			Wastewater Demand	
			GPM	gpd	ac-ft/yr	GPM	gpd
2015 Water and Wastewater Demands							
Mixed Use ³²							
Very Low Density Residential	0.25	0.0	0	0	0	0	0
Medium Density Residential	2.48	0.0	0	0	0	0	0
Commercial	0.64	94.8	61	87,327	98	49	69,861
Public / Institutional	0.26	544.8	142	203,973	229	113	163,178
Industrial General	0.46	539.6	248	357,399	402	199	285,919
Industrial Light	0.46	0	0	0	0	0	0
Residential Estate	0.25	225.2	56	81,072	91	45	64,858
Total		1,404.3	507	729,771	820	405	583,817
2040 Water and Wastewater Demands							
Mixed Use							
Very Low Density Residential	0.25	479.0	120	172,440	194	96	137,952
Medium Density Residential	2.48	28.0	69	99,994	112	56	79,995
Commercial	0.64	54.0	35	49,766	56	28	39,813
2015 Demands		1,404.3	507	729,771	820	405	583,817
Total		1,965.3	731	1,051,971	1,182	584	841,577
Capacity Scenario Water and Wastewater Demands							
Mixed Use							
Very Low Density Residential	0.25	1,948.9	487	701,619	788	390	561,295
Medium Density Residential	2.48	216.5	537	773,340	869	430	618,672
Commercial	0.64	240.6	154	221,746	249	123	177,397
Public / Institutional	0.26	285.0	74	106,704	120	59	85,363
Industrial General	0.46	858.1	395	568,405	639	316	454,724
Industrial Light	0.46	190.3	88	126,055	142	70	100,844
Residential Estate	0.25	200.3	50	72,108	81	40	57,686
2040 Demand		1,965.3	731	1,051,971	1,182	584	841,577
Total		5,905.1	2,515	3,621,948	4,070	2,012	2,897,558

³¹ Peak Day Demand

³² Refer to Figure 4, in the Population Projections and Methodology Section. Mixed Use is comprised of 81% Very Low Density Residential, 9% Medium Density Residential and 10% Commercial.

WATER AND WASTEWATER

The total water demand needed to be supported by new infrastructure is approximately 731 GPM for 2040 projections and 2,515 GPM for the capacity scenario at peak day.

The total wastewater generation for the NW Unit is approximately 584 GPM for 2040 projections and 2,012 GPM for the capacity scenario at peak day.

7.3.2 Water Infrastructure Analysis and Recommendations – NW Unit

The NW Unit elevation ranges between 6,558 feet and 6,180 feet and general slopes Northeast to Southwest. Maintaining consistency with the City of Santa Fe’s water distribution system pressure zones SDA-1 would be a part of Pressure Zone 8 and Pressure Zone 9. The Buckman Regional Water Treatment Plant pumps water into Zone 7 which is a higher hydraulic grade line than SDA-1 which would require PRVs to serve Zone 8 and Zone 9.

A 16-inch looped transmission line system which follows the projected roadway alignments is recommended. A looped system provides redundancy in the event of a line break as well as helps divide the flow rates along the corridor to decrease headloss in the transmission line network. Table 32 summarizes the pipeline calculations.

Based on when development occurs, specific design analysis and project funds will need to be evaluated. Infrastructure looping may not be required immediately in order to provide service and fire protection but is recommended to be completed. The subsequent analysis assumes infrastructure looping.

Table 32 - NW Unit Water Pipeline Calculations

Scenario	Diameter (in)	Flow (GPM)	Velocity (fps)
2040	16	365 ³³	0.58
Capacity (buildout)	16	1,258 ³⁴	2.01
Capacity + Fire Flow ³⁵	16	4,258	6.79

16-inch transmission lines are sufficient to provide domestic and fire flow to customers under all demand conditions. 12-inch transmission lines will exceed 10 fps under the capacity scenario plus fire flow analysis.

The recommended infrastructure to support 2040 projections is shown Table 32. All recommended infrastructure considered master planned roadways.

7.3.3 Wastewater Infrastructure Analysis and Recommendations – NW Unit

Due to the location of the development it is assumed that all wastewater flows in the NW Unit will be conveyed to the City of Santa Fe Wastewater Treatment Facility.

³³ Water demands halved to account to infrastructure looping

³⁴ Projected demands have been split in half to flow along East and West planned roadways.

³⁵ Fire Flow equals 3,000 GPM.

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If conveyance to the City of Santa Fe Wastewater Treatment Facility is not permitted, other considerations include additional wastewater

infrastructure to transfer the waste to the Quill WWTP or design a new wastewater treatment facility for the NW Unit.

Based on when development occurs, specific design analysis and project funds will need to be evaluated. It is assumed that the wastewater flow will be distributed amongst the trunk lines based on land use development.

Topography in the NW Unit generally slopes from northeast to southwest with ephemeral arroyos flowing east to west. Wastewater trunk pipelines are located along proposed roadways. Lift stations are located at low elevations where gravity drainage is not possible, and lifted to nearest high point in the topography. Parallel gravity lines are proposed to provide wastewater service to all developed areas of the NW Unit area.

Wastewater infrastructure recommendations include four lift stations, approximately 32,800 feet of gravity wastewater mains, and 5,100 feet of wastewater force main. An optional 26,000 feet of force main is recommended to lift wastewater from the NW Unit to the Quill WWTP.

Table 33 summarizes pipe capacity calculations using pipe slopes along proposed roadways. Pipe segments are named based on proposed roadways as presented in Chapter 6, Roadways.

Table 33 - NW Unit Wastewater Pipeline Calculations

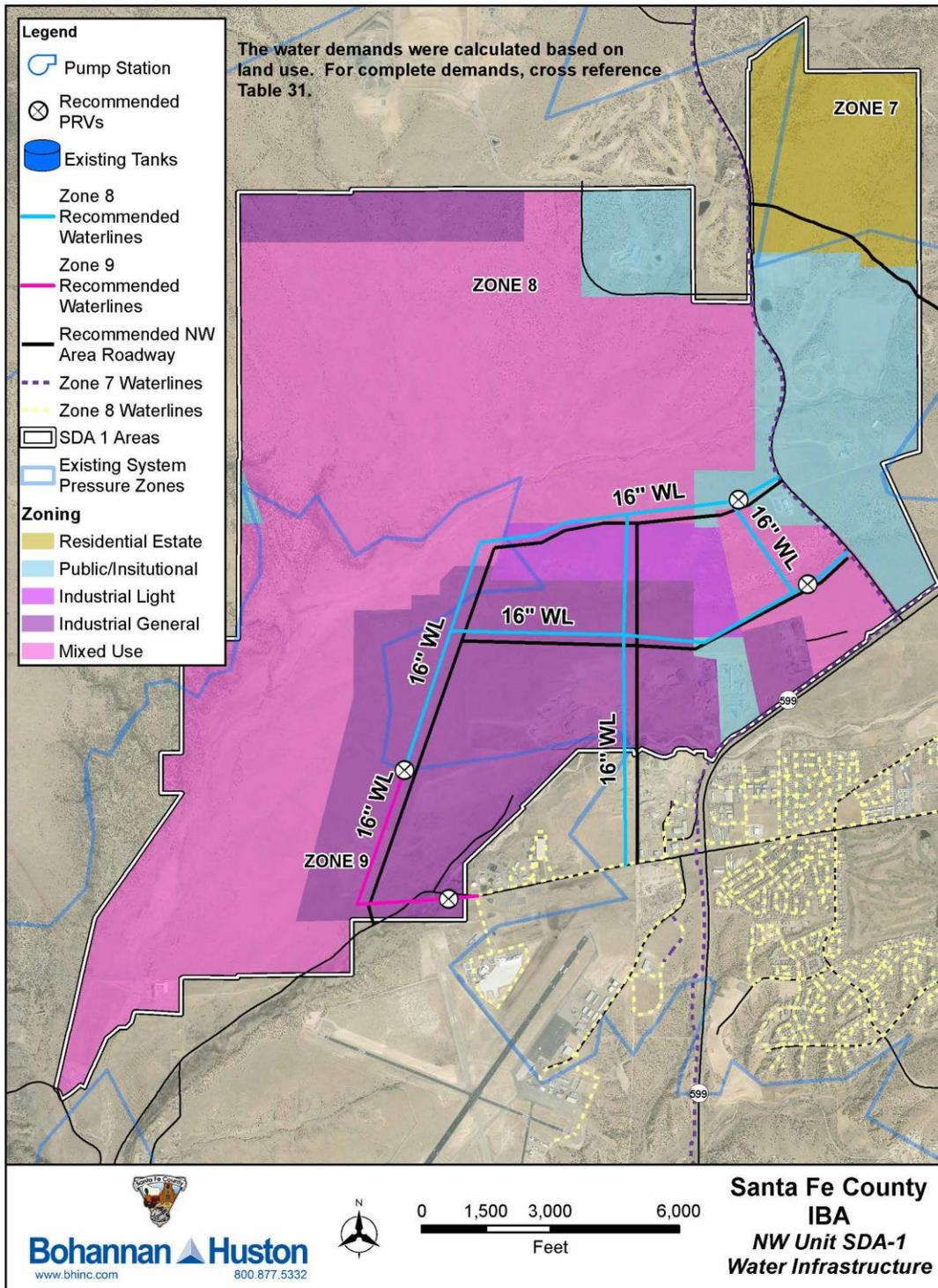
Phase	Pipe Alignment	Diameter	Slope	Velocity	Pipe Capacity	Pipe Capacity	Demand
		(inches)	(ft/ft)	(ft ³ /sec)	(ft ³ /sec)	(GPM)	(GPM)
1	A - 1	8	0.03	6	2	951	781
1	A - 2	8	0.015	4	1	673	100
1	B - 1	8	0.02	5	2	777	225
1	B - 2	8	0.025	5	2	868	113
2	C	8	0.014	4	1	650	372
2	Caja del Rio - 1	8	0.011	4	1	576	85
2	Caja del Rio - 2	8	0.019	5	2	757	200
2	E - 1	8	0.03	6	2	951	502
2	E - 2	8	0.03	6	2	951	70
3	F	8	0.011	4	1	576	316
3	G - 1	8	0.011	4	1	576	390
3	G - 2	10	0.013	5	2	1135	906
3	H	8	0.022	5	2	815	290

Recommended wastewater trunk lines and lift stations to support capacity projections are shown in

Figure 17 - NW Unit Future Wastewater System. Detail for recommended wastewater infrastructure in the NW Unit is included in Appendix B.

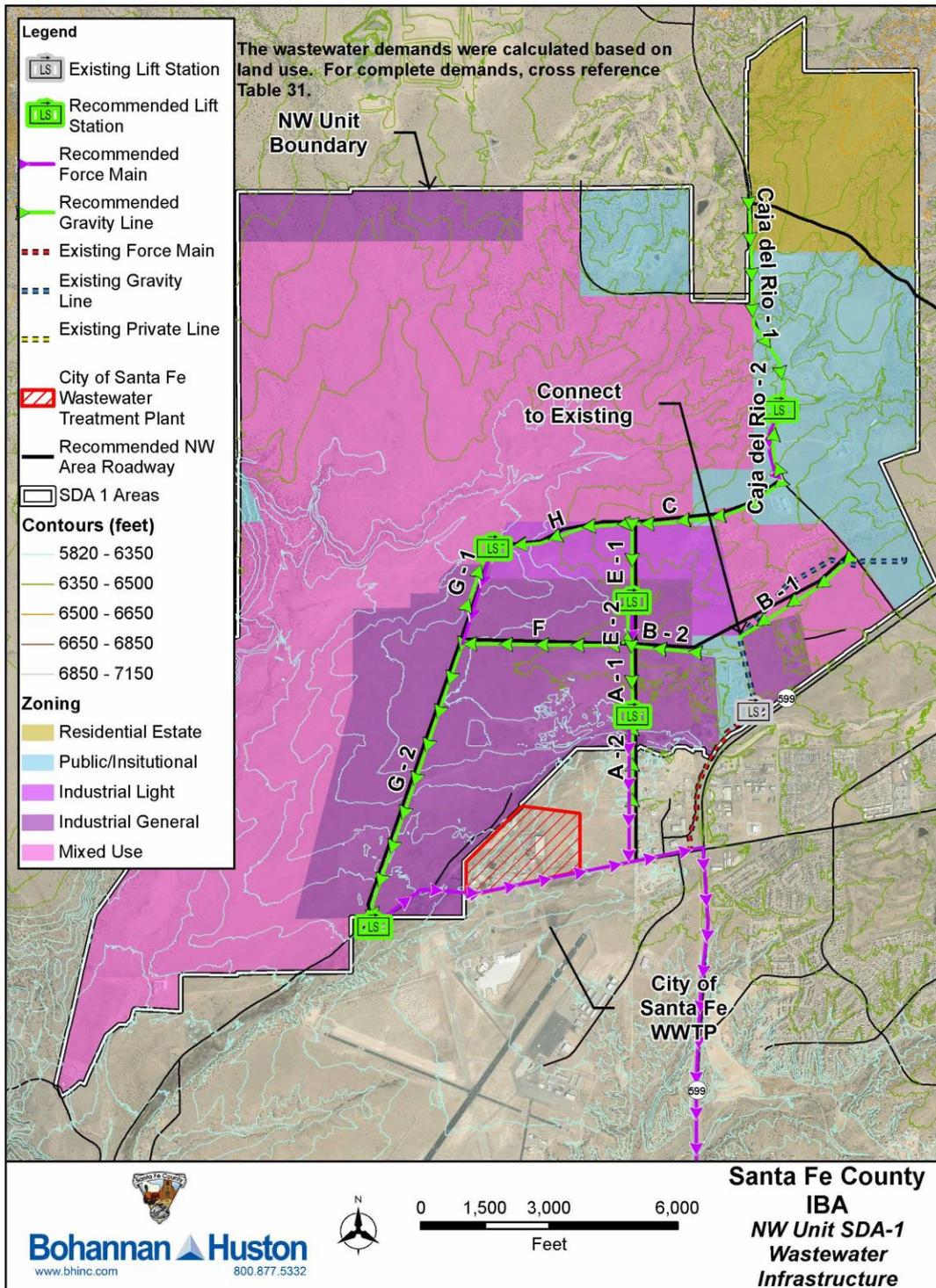
WATER AND WASTEWATER

Figure 16 - NW Unit Future Water System



WATER AND WASTEWATER

Figure 17 - NW Unit Future Wastewater System



WATER AND WASTEWATER

7.4 SOUTHWEST UNIT – WATER AND WASTEWATER

7.4.1 Projections

As presented in the Population Projection section, the SW Unit is a total of 5,421 acres. Of this area, 1,440 acres are currently developed as of 2015. For the capacity scenario an additional 3,980 acres are developable, of which 561 acres are projected to be developed by 2040.

Based on the 2040 projected population growth for the SW Unit, approximately 483 acres are required to meet an additional household population of 1,683 with an assumed density of one dwelling unit (DU) per acre. The remaining non-residential land-use required is approximately 32.7 acres to meet the employment projections of 391 people. The employment projections include a variety of vocations including profession and technical services, construction, healthcare and government. Due to the variety of job types, a general land use type of Mixed Use for these 32.7 acres is assumed.

The 2015, 2040 and capacity scenario water and wastewater demands are summarized in Table 34. The existing demands are based on the existing developed acreage by land use type multiplied by the unit use rates in Table 34.

As defined in the Population Projections section, and illustrated in Table 14, Mixed Use areas are defined as 9% Medium Density Residential (at 10 DU/acre), 10% Commercial, 81% Very Low Density Residential (1 DU/acre).

WATER AND WASTEWATER

Table 34 - SW Unit Water and Wastewater Demand

Land Use	Unit Use Rate (GPM/acre)	Developed Area (acre)	Water Demand			Wastewater Demand	
			GPM	gpd	ac-ft/yr	GPM	gpd
2015 Water and Wastewater Demands							
Mixed Use							
Very Low Density Residential	0.25	0.0	0	0	0	0	0
Medium Density Residential	2.48	0.0	0	0	0	0	0
Commercial	0.64	129.1	83	118,979	134	66	95,183
Public / Institutional	0.26	904.3	235	338,570	380	188	270,856
Industrial Light	0.46	321.6	148	213,028	239	118	170,422
Commercial General	0.76	85.3	65	93,352	105	52	74,682
Federal and State Public Lands	0.34	0.0	0	0	0	0	0
Total		1,440.3	531	763,929	858	424	611,143
2040 Water and Wastewater Demands							
Mixed Use							
Very Low Density Residential	0.25	483.0	121	173,880	195	97	139,104
Medium Density Residential	2.48	0	0	0	0	0	0
Commercial	0.64	32.7	21	30,136	34	17	24,109
2015 Demands		1,440.3	531	763,929	858	424	611,143
Total		1,956.0	672	96,7945	1,088	538	774,356
Capacity Scenario Water and Wastewater Demands							
Mixed Use							
Very Low Density Residential	0.25	2,246.1	562	808,607	909	449	646,885
Medium Density Residential	2.48	249.6	619	891,264	1,001	495	713,012
Commercial	0.64	277.3	177	255,560	287	142	204,448
Public / Institutional	0.26	133.0	35	49,795	56	28	39,836
Industrial Light	0.46	398.8	183	264,165	297	147	211,332
Commercial General	0.54	115.4	62	89,735	101	50	71,788
Federal & State Public Lands	0.34	45.0	15	22,032	25	12	17,626
2040 Demands		1,956.0	672	967,945	1,088	538	774,356
Total		5,421.2	2,326	3,349,103	3,763	1,861	2,679,283

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The total water demand needed to be supported by new infrastructure is approximately 672 GPM for 2040 projections and 2,326 GPM for the buildout scenario at peak day.

The total wastewater generation for the SW Unit is approximately 538 GPM for 2040 projections and 1,861 GPM for the capacity scenario at peak day.

7.4.2 Water Infrastructure Analysis and Recommendations – SW Unit

The SW Unit elevation ranges between 6,310 feet and 6,040 feet and general slopes northeast to southwest. Maintaining consistency with the City of Santa Fe’s water distribution system pressure zones SDA-1 would be a part of Pressure Zones 8, 9 and 10. The Buckman Regional Water Treatment Plant pumps water into Zone 7 which is a higher hydraulic grade line than SDA-1 which would require PRVs to serve these pressure zones.

A 16-inch looped transmission line system which follows the projected roadway alignments is recommended. A looped system provides redundancy in the event of a line break as well as helps divide the flow rates along the corridor to decrease headloss in the transmission line network. Table 35 summarizes the pipeline calculations.

Based on when development occurs, specific design analysis and project funds will need to be evaluated. Infrastructure looping may not be required immediately in order to provide service and fire protection but is recommended to be completed. Subsequent analysis assumes infrastructure looping.

Table 35 - SW Unit Water Pipeline Calculations

Scenario	Diameter (in)	Flow (GPM)	Velocity (fps)
2040	16	336 ³⁶	0.55
Capacity (buildout)	16	1,163	1.97
Capacity + Fire Flow ³⁷	16	4,163	6.75

16-inch transmission lines are sufficient to provide domestic and fire flow to customers under all demand conditions. 12-inch transmission lines will exceed 10 fps under the capacity plus fire flow scenario.

The recommended infrastructure to support 2040 projections is shown in Table 35. All recommended infrastructure considered master planned roadways presented in Chapter 6, Roadways.

7.4.3 Wastewater Infrastructure Analysis and Recommendations – SW Unit

Due to the location of the development it is assumed that all wastewater flows in the SW Unit will be conveyed to the County’s Quill WWTP. Based on when development occurs, specific design analysis and

³⁶ Water demands halved to account to infrastructure looping – consider comparing with previous foot notes

³⁷ Fire Flow equals 3,000 GPM

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project funds will need to be evaluated. It is assumed that the flow will be distributed amongst the trunk lines based on land use development.

Topography in the SW Unit generally slopes from northeast to southwest with ephemeral arroyos flowing through the area. Wastewater trunk lines are recommended to follow topography and utilize existing wastewater infrastructure. Significant elevation change occurs between arroyo bottoms and ridge tops, and affects north/south wastewater infrastructure. Lift stations are located at low elevations where gravity drainage is not possible, and lifted to nearest high point in the topography. Parallel gravity lines are proposed to provide wastewater service to all developed areas in the SW Unit area.

Wastewater infrastructure recommendations include trunk lines along conceptual roadways and New Mexico State Road 14 (NM 14) that split the flow between the area north of the Quill WWTP and the area south of the Quill WWTP. Wastewater infrastructure north of Quill WWTP includes approximately 9,700 feet of gravity wastewater lines that drain to an existing lift station. Infrastructure south of Quill WWTP is located along NM 14 and the area west of NM 14 that drains to I-25. Infrastructure along NM 14 includes two lift stations, approximately 7,400 feet of gravity wastewater line, and 5,300 feet of force main line that connects to existing infrastructure. Wastewater infrastructure west of NM 14 includes two lift stations, approximately 48,700 feet of gravity wastewater line, and approximately 16,900 feet of force main west of NM 14 that connects to the Quill WWTP.

Table 36 - SW Unit Wastewater Pipeline Calculations summarizes pipe capacity calculations using pipe slopes along proposed roadways. Pipe segments are named based on proposed roadways as presented in Chapter 6, Roadways.

Recommended wastewater trunk lines and lift stations to support capacity projections are shown on Figure 19. Detail for recommended wastewater infrastructure in the SW Unit is included in Appendix C.

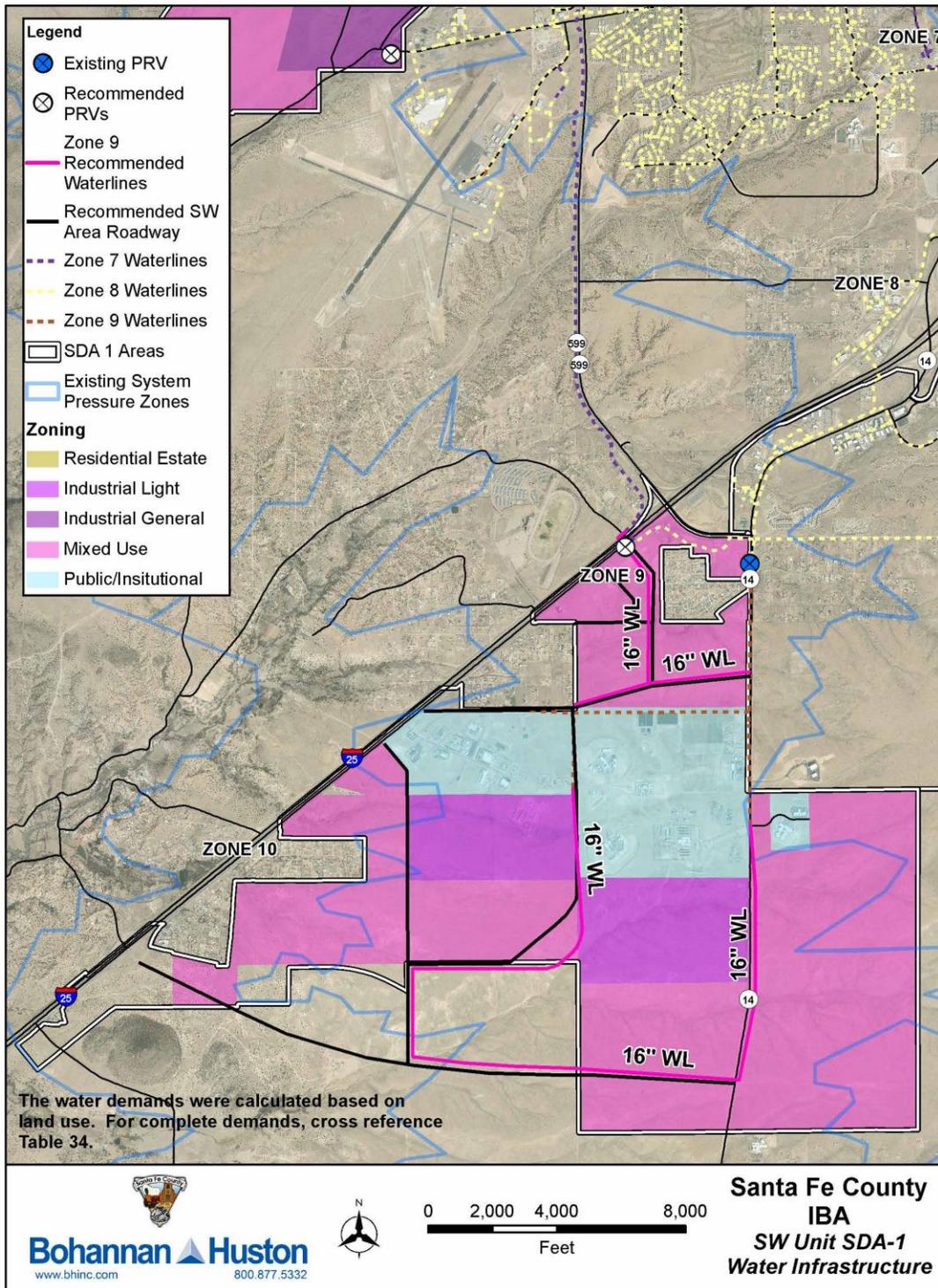
WATER AND WASTEWATER

Table 36 - SW Unit Wastewater Pipeline Calculations

Phase	Pipe Alignment	Diameter	Slope	Velocity	Pipe Capacity	Pipe Capacity	Demand
		(inches)	(ft/ft)	(ft ³ /sec)	(ft ³ /sec)	(GPM)	(GPM)
1	A	8	0.024	5	2	851	152
1	B	8	0.032	6	2	983	183
1	D	8	0.006	3	1	425	249
2	E - 1	8	0.01	3	1	549	83
2	E - 2	8	0.004	2	1	347	118
2	E - 3	8	0.015	4	1	673	318
2	E - 4	8	0.02	5	2	777	676
3	F - 1	8	0.019	5	2	757	627
3	F - 2	8	0.03	6	2	951	577
3	F - 3	12	0.0024	2	2	793	577
3	F - 4	8	0.016	4	2	695	295
3	G	8	0.011	4	1	576	142
3	H - 1	8	0.018	5	2	737	270
3	H - 2	8	0.038	7	2	1071	28
2	NM 14 - 1	8	0.017	5	2	716	188
2	NM 14 - 2	8	0.01	3	1	549	100
2	NM 14 - 3	8	0.047	8	3	1191	100
2	NM 14 - 4	8	0.015	4	1	673	47

WATER AND WASTEWATER

Figure 18 - SW Unit Future Water System

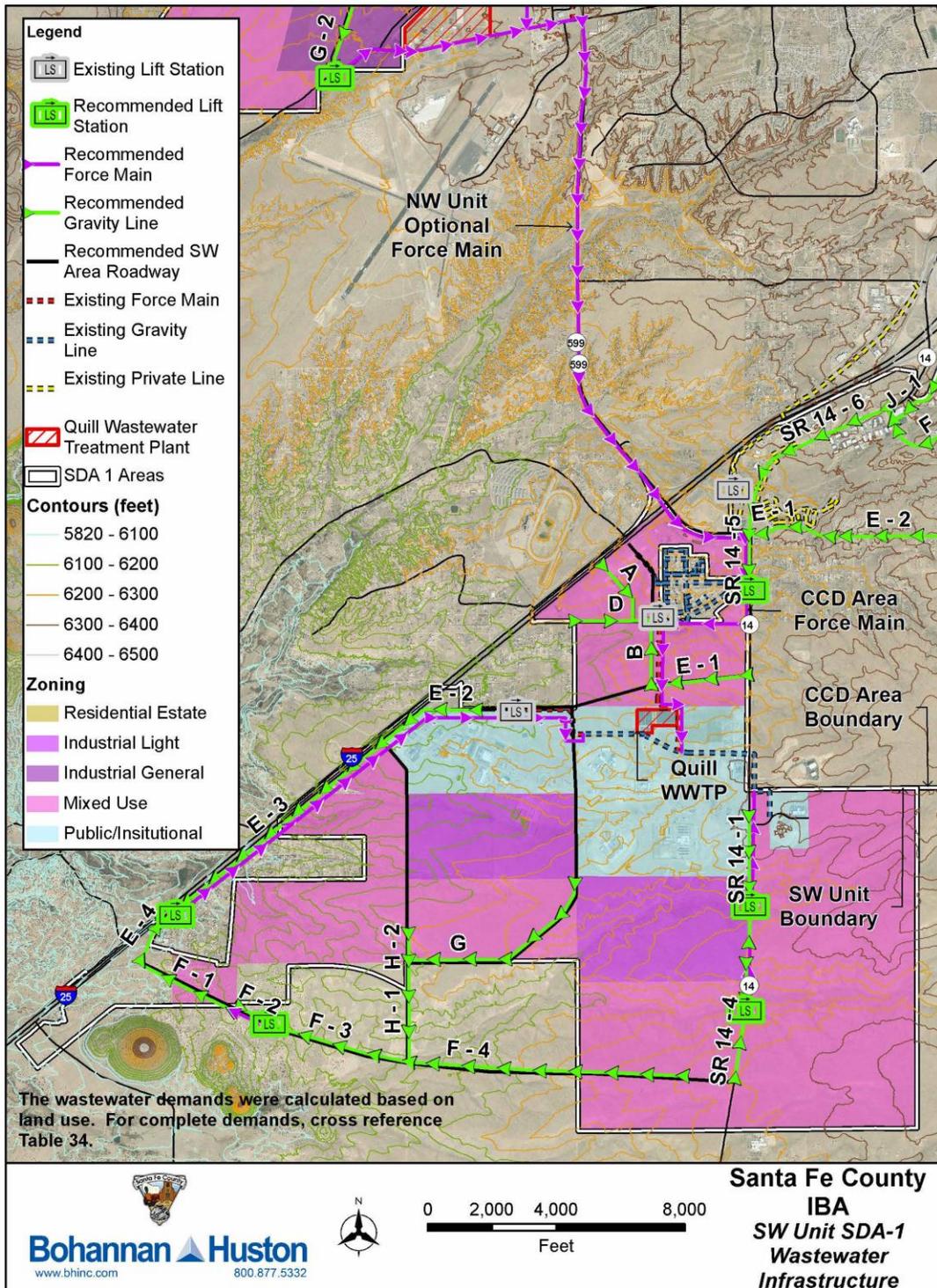


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Figure 19 - SW Unit Future Wastewater System



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WATER AND WASTEWATER

7.5 COMMUNITY COLLEGE DISTRICT – WATER AND WASTEWATER

7.5.1 Projections

As previously presented in the Population Projections section, the CCD area is a total of 11,376 acres. Of this area, approximately 2,087 acres are developed as of 2015. For the capacity scenario an additional 3,580 acres are developable of which 1,062 acres are projected to be developed by 2040.

Based on the 2040 projected population growth for the CCD, approximately 2,794 housing units are required to meet an additional household population of 6,204³⁸. Of the 2,794 housing units, 2,051 new units are projected to develop within existing subdivisions for approximately 781.1 acres at 2.6 housing units per acre.

The remaining 743 housing units are located outside of subdivisions, requiring approximately 212 acres at 3.5 housing units per acre. For this demand analysis, that development would be infill within the Village areas, as identified in the Community College District Plan. See Appendix A for more information on land use and development assumptions.

Based on the 2040 projected employment growth, the remaining developable acres required for non-residential is approximately 68.6 acres to meet the employment projections of 752 people. The employment projections include a variety of vocations including Institutional, Construction, Healthcare and Government. Due to the variety of job types, a general land use type of Employment Center³⁹ for these 68.6 acres has been assumed.

The 2015, 2040 and capacity scenario water and wastewater demands are summarized in Table 37. The existing demands are based on the existing developed acreage by land use type multiplied by the unit use rates in Table 37.

³⁸ Based on capita per unit of 2.32 from the CCD household population divided by the number of projected 2040 units.

³⁹ Mixed Use is not a land use type in the CCD Area.

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Table 37 - CCD Unit Water and Wastewater Demand

Land Use	Unit Use Rate (GPM/acre)	Developed Area (acre)	Water Demand			Wastewater Demand	
			GPM	gpd	ac-ft/yr	GPM	gpd
2015 Water and Wastewater Demands							
Commercial	0.54	106.1	57	82,507	93	46	66,006
Condominium Residential	2.48	2.7	7	9,683	11	5	7,747
Industrial	0.46	42.3	19	27,989	31	16	22,391
Mobile Home Park - Rental	2.48	2.9	7	10,300	12	6	8,240
Public/Institutional	0.26	375.8	98	140,683	158	78	112,546
SF Residential - All Lot Sizes	0.25	1,518.9	380	546,806	614	304	437,445
Utilities, Transportation, and Communication	0	38.7	0	0	0	0	0
Total		2,087.3	568	725,778	815	403	580,623
2040 Water and Wastewater Demands							
CCD Subdivisions	0.65	781.1	508	731,110	821	406	584,888
Village	0.88	212.0	187	268,646	302	149	214,917
Employment Center	0.54	68.6	37	53,343	60	30	42,675
2015 Demands		2,087.3	568	725,778	815	403	580,623
Total		3,149.0	1,299	1,778,878	1,999	988	1,423,102
Capacity Scenario Water and Wastewater Demands							
Existing Neighborhood Zones	0.25	270.3	68	97,290	109	54	77,832
Community Center	0.26	29.9	8	11,202	13	6	8,962
Employment Center	0.54	250.5	135	194,812	219	108	155,850
Institutional Campus	0.26	69.9	18	26,167	29	15	20,933
Media District	0.64	50.9	33	46,882	53	26	37,505
Fringe	0.64	920.2	589	848,102	953	471	678,482
Vacant land - SF housing in Fringe Zones	2.48	8.9	22	31,784	36	18	25,427
Village	0.88	107.4	95	136,155	153	76	108,924
CCD Subdivisions	0.65	810.3	527	758,441	852	421	606,753
2040 Demands		3,149.0	1,299	1,774,481	1,994	986	1,419,585
Total		5,667.4	2,793	3,925,316	4,410	2,181	3,140,253

The total water demand needed to be supported by new infrastructure is approximately 1,299 GPM for 2040 projections and 2,793 GPM for the buildout scenario at peak day. There is currently 16-inch transmission lines which transfer water to the existing developments.

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The total wastewater generation for the CCD Area is approximately 988 GPM for 2040 projections and 2,181 GPM for the capacity scenario at peak day.

7.5.2 Water Infrastructure Analysis and Recommendations – CCD Unit

The CCD elevation ranges between 6,895 feet and 6,310 feet and generally slopes northeast to southwest. Maintaining consistency with the City of Santa Fe’s water distribution system pressure zones SDA-1 would be a part of Pressure Zones 5, 6, 7, 8, and 9. The Buckman Regional Water Treatment Plant pumps water into Zone 7 which is a higher hydraulic grade line than SDA-1 which would require PRVs to serve these pressure zones.

The 16-inch transmission lines which serve the existing developments are capable of serving the future demands. Where infrastructure currently does not exist, a 16-inch looped transmission line system which follows the projected roadway alignments to meet 2040 projections is recommended. A looped system provides redundancy in the event of a line break as well as helps divide the flow rates along the corridor to decrease headloss in the transmission line network.

Based on when development occurs, specific design analysis and project funds will need to be evaluated. Infrastructure looping may not be required immediately in order to provide service and fire protection but is recommended to be completed. Subsequent analysis assumes infrastructure looping.

Table 43 summarizes the pipe velocities for 16-inch transmission lines at the calculated demands.

Table 38 - CCD Unit Water Pipeline Calculations

Scenario	Diameter (in)	Flow (GPM)	Velocity (fps)
2040	16	650 ⁴⁰	1.04
Capacity (buildout)	16	1,396	2.23
Capacity + Fire Flow ⁴¹	16	4,396	7.02

16-inch transmission lines are sufficient to provide domestic and fire flow to customers under all demand conditions. 12-inch transmission lines will exceed 10 fps under the capacity plus fire flow scenario. This recommendation also validates the sizing of the existing infrastructure currently in place.

The recommended infrastructure to support 2040 projections is shown on Figure 20. All recommended infrastructure was developed with consideration for master planned roadways.

7.5.3 Wastewater Infrastructure Analysis and Recommendations – CCD Unit

Due to the location of the development it is assumed that all wastewater flows in the CCD Unit will be conveyed to the County’s Quill WWTP.

⁴⁰ Water demands halved to account to infrastructure looping

⁴¹ Fire flow equals 3,000 GPM

WATER AND WASTEWATER

Based on when development occurs, specific design analysis and project funds will need to be evaluated. It is assumed that the flow will be distributed among the trunk lines based on land development.

Topography in the CCD generally slopes from northeast to southwest with ephemeral arroyos throughout the area. Wastewater trunk lines recommendations follow existing topography and utilize existing wastewater infrastructure. Lift stations are located at low elevations where gravity drainage is not possible, and lifted to nearest high point in the topography. Parallel gravity lines are proposed to provide wastewater service to all developed areas in CCD.

Wastewater infrastructure recommendations include trunk lines along existing and conceptual roadways. Wastewater infrastructure includes two lift stations, approximately 100,500 feet of gravity wastewater line, and 9,400 feet of wastewater force main.

Table 39 summarizes pipe capacity calculations using conceptual pipe slopes. Pipe segments are named based on proposed roadways as presented in Chapter 6, Roadways.

Recommended wastewater trunk lines and lift stations to support capacity projections are shown in Table 39. Detail for recommended wastewater infrastructure in the CCD Unit is included in Appendix D.

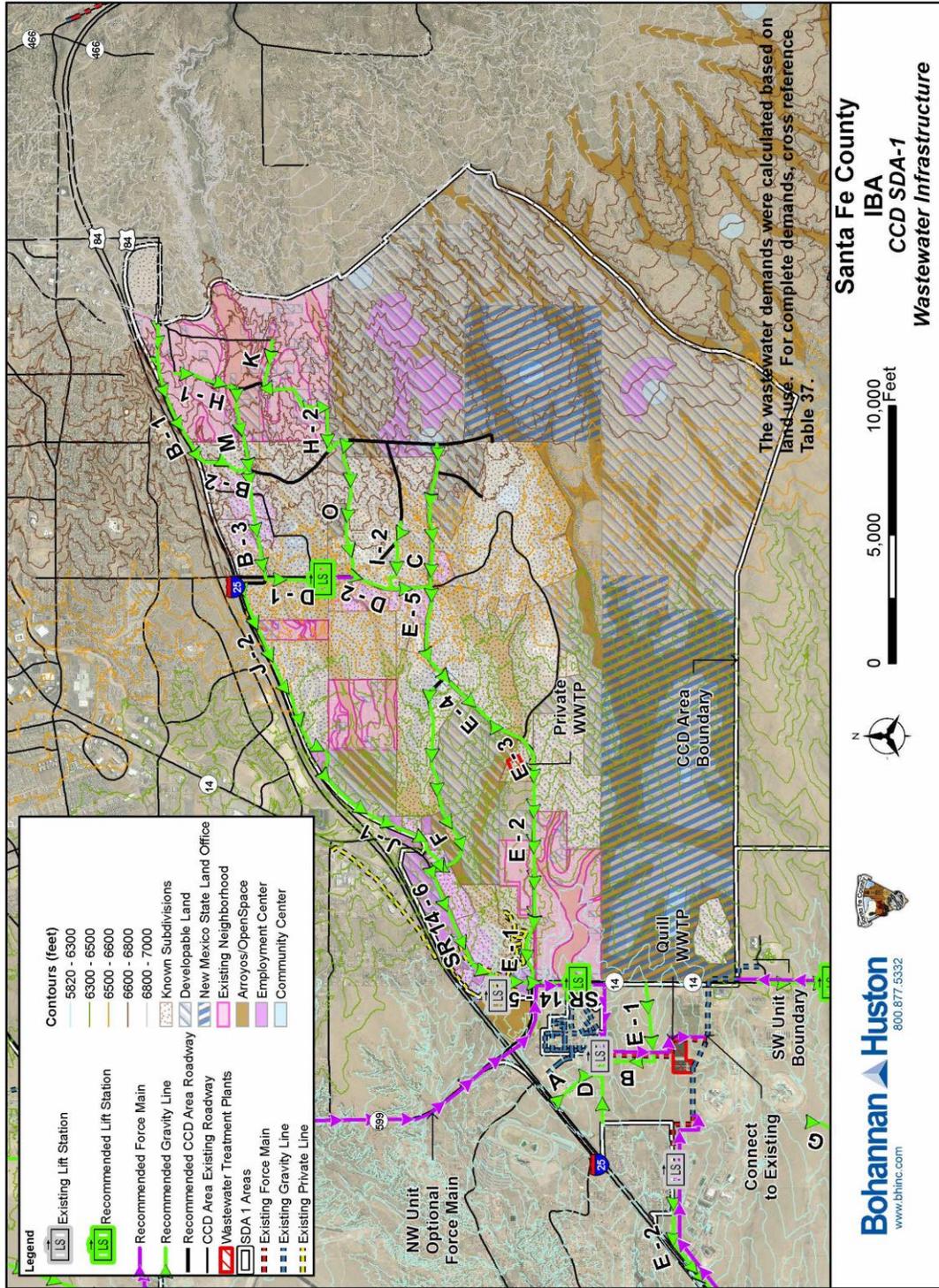
WATER AND WASTEWATER

Table 39 - CCD Unit Wastewater Pipeline Calculations

Phase	Pipe Alignment	Diameter	Slope	Velocity	Pipe Capacity	Pipe Capacity	Demand
		(inches)	(ft/ft)	(ft ³ /sec)	(ft ³ /sec)	(GPM)	(GPM)
1	A	8	0.025	5	2	868	223
1	B - 1	8	0.026	6	2	886	25
1	B - 2	8	0.004	2	1	347	51
1	B - 3	8	0.023	5	2	833	471
1	C	8	0.023	5	2	833	106
2	D - 1	10	0.004	3	1	630	571
2	D - 2	10	0.014	5	3	1178	1055
2	E - 1	16	0.005	4	5	2466	1628
2	E - 2	12	0.023	7	5	2456	1578
2	E - 3	16	0.004	3	5	2206	1428
2	E - 4	10	0.021	6	3	1443	1407
2	E - 5	12	0.01	5	4	1619	1307
2	F	8	0.018	5	2	737	292
3	H - 1	8	0.028	6	2	919	75
3	H - 2	8	0.01	3	1	549	208
3	I - 1	8	0.022	5	2	815	77
3	I - 2	8	0.004	2	1	347	56
3	J - 1	8	0.018	5	2	737	145
3	J - 2	8	0.017	5	2	716	65
3	K	8	0.019	5	2	757	50
3	M	8	0.014	4	1	650	225
3	O	8	0.016	4	2	695	382
2	NM 14 - 5	12	0.02	6	5	2290	2181
2	NM 14 - 6	8	0.011	4	1	576	537

WATER AND WASTEWATER

Figure 21 - CCD Unit Future Wastewater System



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7.6 PHASING AND COST ESTIMATES – WATER AND WASTEWATER

As previously presented, recommended infrastructure developments are split into three phases that span a period of twenty years. The water and wastewater pipelines will follow the projected roadway alignments in the NW Unit, SW Unit, and CCD Unit, and coincide with the roadway phasing. Wastewater infrastructure is also phased to convey flow to an existing wastewater treatment facility. Final infrastructure design and phasing should be assessed as development occurs.

A summary of the water and wastewater pipeline phasing can be seen in the tables below. The alignment names correspond to the labelling convention for the roadways in each unit respectively, and are shown in Figure 16.

7.6.1 Phase 1

Phase 1 includes water and wastewater pipelines along the Caja del Rio/Paseo Real Connector in the NW Unit along the recommended Road A and B alignments. A wastewater lift station is proposed on Road A alignment at a low elevation.

Phase 1 also includes water pipelines in the northeast section of the SW unit along proposed roads B and C. Wastewater pipelines are proposed along roads A, B, and D.

Phase 1 recommendations in the CCD Unit includes water pipelines along proposed roads A and B in the CCD. Wastewater infrastructure includes Phase I roadways and continues to the Quill WWTP. Wastewater pipelines in Phase I are along roads B, C, D, E and NM 14. A lift station is recommended at the low point in alignment D and NM 14 alignment 5.

Cost Estimates for Phase 1 water pipelines are displayed below in Table 40, and wastewater infrastructure cost estimates are summarized in Table 41.

Table 40 - Phase 1 Water and Wastewater Phasing Plan

Phase	Phasing Summary		
	Unit	Alignment	
		Wastewater	Water
1	NW	A	A
		B	B
	SW	A	C
		B	B
		D	-
	CCD	B	A
		C	B
		D	-
		E	-
		NM 14 - 5	-

WATER AND WASTEWATER

Table 41 - Phase 1 Water Cost Estimate⁴²

Description	Unit	Unit Cost	Quantity	Total
NW Unit 16-inch Waterline Pipe and Appurtenances	LF	\$100	11,300	\$1,130,000
SW Unit 16-inch Waterline Pipe and Appurtenances	LF	\$100	5,000	\$500,000
CCD 16-inch Waterline Pipe and Appurtenances	LF	\$100	15,800	\$1,580,000
PRV in Vault	EA	\$60,000	3	\$180,000
Total				\$3,390,000

Table 42 - Phase 1 Wastewater Cost Estimate⁴³

Description	Unit	Unit Cost	Quantity	Total
Lift Station	EA	\$150,000	3	\$450,000
8-inch Force Main	LF	\$35	13,000	\$455,000
8-inch Wastewater Main	LF	\$28	32,700	\$915,600
10-inch Wastewater Main	LF	\$30	9,100	\$273,000
12-inch Wastewater Main	LF	\$35	9,700	\$339,500
16-inch Wastewater Main	LF	\$40	3,800	\$152,000
Manholes	EA	\$2,500	140	\$350,000
Total				\$2,935,100

7.6.2 Phase 2

Phase 2 includes water pipeline alignments along proposed roads C and E in the NW unit. Wastewater expansion includes pipelines along road alignments C, E, and Caja del Rio in the NW Unit. Lift stations are recommended on Caja del Rio and on road alignment E to accommodate low elevations.

Water infrastructure in the SW Unit includes a pipeline along proposed road E. Wastewater infrastructure includes wastewater lines along E and on NM 14. Two lift stations are located at low elevations on NM 14, and one lift station is located at the low elevation adjacent to I-25.

CCD Unit water infrastructure in Phase 2 includes a pipeline along proposed road alignment F. Recommended wastewater infrastructure is located along roads F, J, and NM 14 in the CCD Unit in Phase 2.

⁴² All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

⁴³ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

WATER AND WASTEWATER

Table 43 - Phase 2 Water and Wastewater Phasing Plan

Phase	Phasing Summary		
	Unit	Alignment	
		Wastewater	Water
2	NW	C	C
		Caja del Rio	E
		E	-
	SW	E	E
		NM 14 (1-4)	-
	CCD	F	F
		J	-
		NM 14 - 6	-

Table 44 - Phase 2 Water Cost Estimate⁴⁴

Description	Unit	Unit Cost	Quantity	Total
NW Unit 16" Waterline Pipe and Appurtenances	LF	\$100	10,100	\$1,010,000
SW Unit 16" Waterline Pipe and Appurtenances	LF	\$100	5,600	\$560,000
CCD Unit 16" Waterline Pipe and Appurtenances	LF	\$100	11,700	\$1,170,000
PRV's	EA	\$60,000	1	\$60,000
Total				\$2,800,000

Table 45 - Phase 2 Wastewater Cost Estimate⁴⁵

Description	Unit	Unit Cost	Quantity	Total
Lift Station	EA	\$150,000	4	\$600,000
8-inch Force Main	LF	\$35	8,200	\$287,000
8-inch Wastewater Main	LF	\$28	37,900	\$1,061,200
10-inch Wastewater Main	LF	\$30	0	\$0
12-inch Wastewater Main	LF	\$35	1,600	\$56,000
16-inch Wastewater Main	LF	\$40	0	\$0
Manholes	EA	\$2,500	100	\$250,000
Total				\$2,254,200

⁴⁴ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

⁴⁵ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

WATER AND WASTEWATER

7.6.3 Phase 3

Phase 3 encompasses proposed water pipeline along roads F, G, and H in the NW Unit. Wastewater infrastructure in the NW Unit includes wastewater pipes along F, G, and H. Lift stations are located at low elevations along road G and west of the City of Santa Fe WWTP. An optional force main is included to pump wastewater flows to the Quill WWTP.

In the SW Unit, Phase 3 includes water pipeline roads F, G, and H. Wastewater infrastructure is included on roads E, F, G, and H. Lift stations would be necessary along E and F at low elevations.

No water pipelines are proposed for Phase 3 in the CCD Unit. Wastewater infrastructure improvements are proposed along roads A, H, I, and K in Phase 3.

Phase 3 wastewater pipeline improvements include piping along proposed road alignments D and B in the NW unit, along alignments A, B, E, and along I-25 in the SW Unit.

Table 46 - Phase 3 Water and Wastewater Phasing Plan

Phase	Phasing Summary		
	Unit	Alignment	
		Wastewater	Water
3	NW	F	F
		G	G
		H	H
	SW	E	F
		F	G
		G	H
		H	-
	CCD	A	-
		H	-
		I	-
		K	-
		M	-
		O	-

WATER AND WASTEWATER

Table 47 - Phase 3 Water Cost Estimate⁴⁶

Description	Unit	Unit Cost	Quantity	Total
NW Unit 16" Waterline Pipe and Appurtenances	LF	\$100	20,000	\$2,000,000
SW Unit 16" Waterline Pipe and Appurtenances	LF	\$100	31,200	\$3,120,000
CCD Unit 16" Waterline Pipe and Appurtenances	LF	\$100	0	\$0
PRV's	EA	\$60,000	2	\$120,000
Total				\$5,240,000

Table 48 - Phase 3 Wastewater Cost Estimate⁴⁷

Description	Unit	Unit Cost	Quantity	Total
Lift Station	EA	\$150,000	4	\$600,000
8-inch Force Main	LF	\$35	21,900	\$766,500
8-inch Wastewater Main	LF	\$28	79,900	\$2,237,200
10-inch Wastewater Main	LF	\$30	6,900	\$207,000
12-inch Wastewater Main	LF	\$35	4,400	\$154,000
16-inch Wastewater Main	LF	\$40	0	\$0
Manholes	EA	\$2,500	230	\$575,000
Total				\$4,539,700

⁴⁶ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

⁴⁷ All costs presented include construction only (2015 dollars). An additional 20-30% increase is expected for design, environmental, and contingency, and that ROW acquisition costs would also be added but determined on a project-specific basis. Numbers are for planning purposes only.

8 COUNTY-WIDE INFRASTRUCTURE

8.1 LEVEL OF SERVICE

In addition to transportation, water, and wastewater, the IBA evaluates the need for additional infrastructure and capital projects on a County-wide basis for emergency response, parks, trails, and open space. Note that County-wide infrastructure needs are specific to the unincorporated areas of the County as incorporated areas are provided with similar or identical services from the local jurisdiction. The analysis resulted in quantitative totals of necessary improvements and equipment for each service type, based on current, adopted Level of Service (LOS) thresholds listed in Table 12-1 of the SLDC and SGMP. These totals are based on the population projections for SDA-1 as a whole and the unincorporated County-wide population projections between 2015 and 2040. A summary of the projected population growth between 2015 and 2040 is as follows, with a more comprehensive explanation previously provided in Chapter 4 Population and Employment Projection Overview.

Table 49 - Population Growth, 2015-2040

Geography	Population Growth 2015-2040
All Unincorporated Areas	14,440
SDA-1 Areas (Combined Total)	9,297
All Areas Outside of SDA-1	7,857

8.2 ANALYSIS OF COUNTY-WIDE INFRASTRUCTURE BASED ON APPROVED LOS THRESHOLDS

Analysis to determine unincorporated County-wide infrastructure recommendations was completed and is based on the following current LOS thresholds provided in Table 12-1 of the SLDC and the SGMP.

Table 50 - Adopted LOS Thresholds for County-Wide Facilities

Type	LOS Threshold
Sherriff Vehicles	2.4 vehicles per 1000 new population projection
Sheriff Facilities	120 square feet per 1000 new population projection
Park Land	1.25 acres per 1000 new population projection
Trails	0.5 miles per 1000 new population projection
Open Space	84 acres per 1000 new population projection
Fire Vehicles	2.12 vehicles per 1000 new population projection
Fire Facilities	26729 square feet per 1000 new population projection

Based on the adopted LOS thresholds included in Table 50, the projected population growth between 2015 and 2040 will result in the need for the following increase in facilities and services. It is broken down into two separate sets of recommendations. The first is identified as what improvements are needed on an unincorporated County-wide basis, to meet the approved LOS thresholds.

COUNTY-WIDE INFRASTRUCTURE

The second is identified as the recommended improvements within the SDA-1 area only, to meet the approved LOS thresholds. The calculations for the SDA-1 area only are included in the unincorporated County-wide calculations but are shown as a sub-set for planning purposes.

Table 51 - Recommended Improvements Required to Meet Approved LOS Thresholds⁴⁸

Type	Unincorporated County-Wide	SDA-1 Areas
Sherriff Vehicles	35 new Sheriff's vehicles	23 new Sheriff's vehicles
Sheriff Facilities	1733 square feet of additional Sheriff facilities	1116 square feet of additional Sheriff facilities
Park Land	18.05 acres of additional Park Land	11.63 acres of additional Park Land
Trails	7.22 miles of additional trail length	4.65 miles of additional trail length
Open Space	1212.96 acres of additional Open Space	780.95 acres of additional Open Space
Fire Vehicles	31 new Fire Vehicles	20 new Fire Vehicles
Fire Facilities	385,967 square feet of additional Fire Facilities	248,500 square feet of additional Fire Facilities.

8.3 ANALYSIS OF COUNTY-WIDE INFRASTRUCTURE BASED ON PROPOSED LOS THRESHOLDS

The following discussion on Proposed LOS thresholds is for informational purposes only. The current, adopted LOS thresholds listed above were established at the time the SLDC and SGMP documents were completed. However, at the time of the writing of this report, efforts were ongoing to modify these thresholds. A separate calculation is provided below using the proposed (yet unapproved) threshold levels provided in Table 52.

An analysis of these thresholds and possible additional updates to them will likely occur after the completion of this study. These thresholds were not intended to establish absolute limits or specific quantities of required infrastructure for each type listed. This is evidenced by the lack of clear definition of infrastructure detail; for example, types of vehicles and surface material of trail mileage is not defined. Actual infrastructure and capital needs in each area will be as defined by the impacted agency and based on several factors, including funding sources, population needs and benefits, human resources budget capabilities, etc. Accordingly, the following quantities are included as a platform for decision-making and to allow further discussion and analysis of the LOS thresholds to occur.

Proposed levels of service are based on input from staff of each impacted agency and have been adjusted to better reflect actual community needs and/or services provided since the writing of the SLDC and SGMP documents. The LOS thresholds have been established on an unincorporated County-wide basis by each impacted County department and not separated from those required for the SDA-1 development area. Additionally, the Sheriff's management staff have chosen to omit the inclusion of vehicles for this analysis at this time.

⁴⁸ Cost estimates have been omitted pending revised LOS thresholds

COUNTY-WIDE INFRASTRUCTURE

Table 52 - Proposed LOS Thresholds for County-Wide Facilities

Type	Proposed LOS Threshold
Sherriff Vehicles	omitted from this analysis
Sheriff Facilities	645 square feet per 1000 new population projection adjusted to 15,000 square feet total to accommodate 3 new 5,000 square foot substations
Park Land	2.35 acres per 1000 new population projection
Trails	0.88 miles per 1000 new population projection
Open Space	137 acres per 1000 new population projection
Fire Vehicles	2.12 vehicles per 1000 new population projection ⁴⁹
Fire Facilities	2993 square feet per 1000 new population projection

For the purpose of establishing a quantity in this report, the same LOS thresholds listed in the current SGMP (i.e., per 1000 residents) are used in Table 53.

Table 53 - Proposed Resulting Quantities Utilizing the LOS Thresholds in SGMP

Type	County-Wide
Sherriff Vehicles	omitted for this study
Sheriff Facilities	15,000 square feet of additional Sheriff facilities
Park Land	33.93 acres of additional Park Land
Trails	12.71 miles of additional trail length
Open Space	1978.28 acres of additional Open Space
Fire Vehicles	31 new Fire Vehicles
Fire Facilities	43,219 square feet of additional Fire Facilities.

⁴⁹Fire Vehicles quantities are not specified in the proposed LOS thresholds of Table 12-1 of the SLDC. Instead, reference is made to achieving an ISO 7/9 rating. This is consistent with the current, adopted LOS language in the SLDC.

COUNTY-WIDE INFRASTRUCTURE

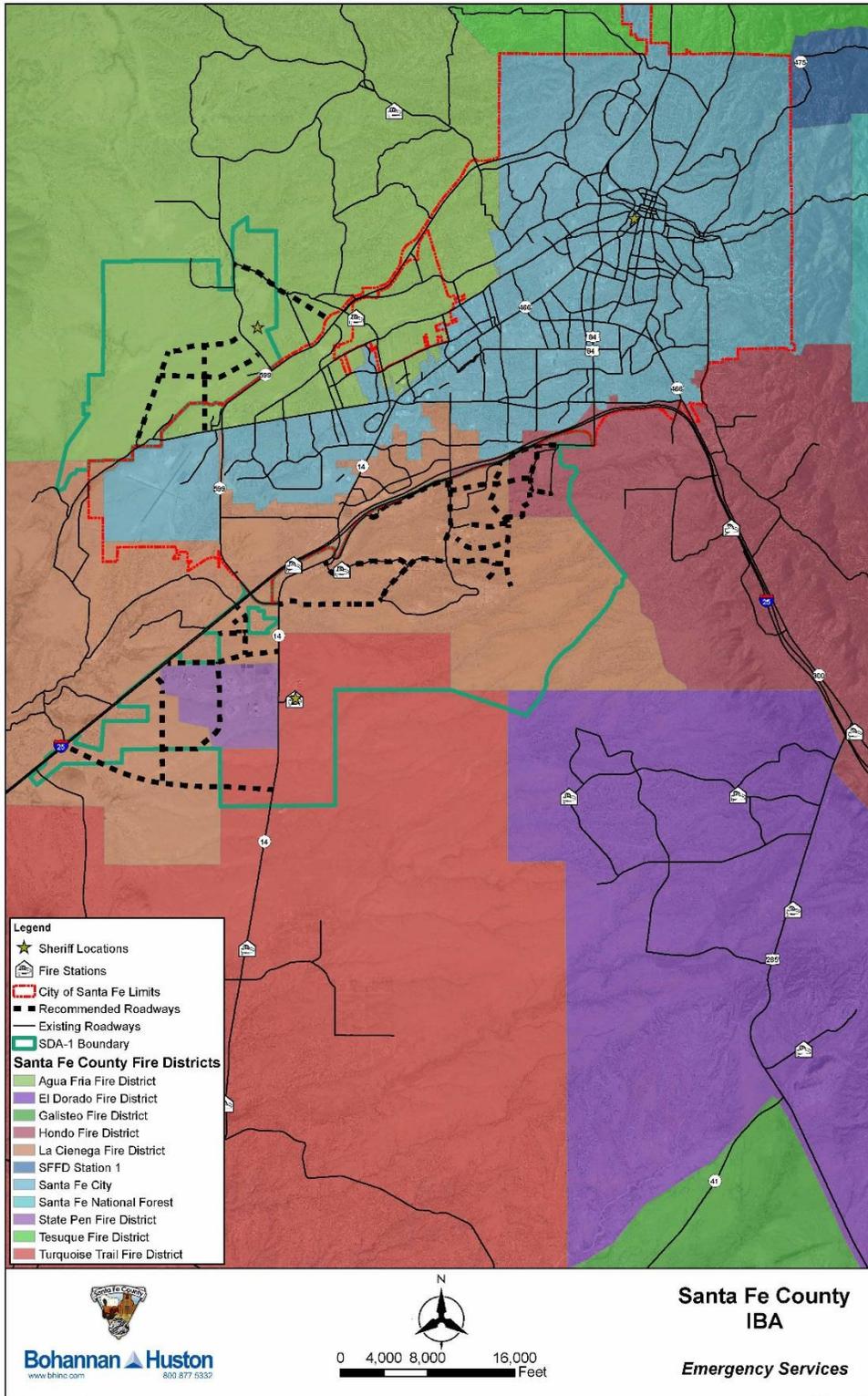
8.4 DISCUSSION ON EMERGENCY RESPONSE RECOMMENDATIONS

Emergency response personnel are responsible for deciding which emergency service personnel should be called to a situation. Emergency response is the office or offices where the dispatchers are located. This would be the office that would manage dispatch services and would regulate number and type of emergency responders for the situation. This is part of the Sheriff's department and the Fire Department. The LOS thresholds for facilities include accommodation of personnel occupying these spaces in their facilities threshold requirements.

The Impact Areas of the Emergency Services facility types are County-wide, so the total for County-wide calculations listed above are probably more applicable to the unincorporated areas of the County than those for the SDA-1 areas alone. Decisions surrounding logical locations for new facilities and or expansion of existing facilities could be made by the study team based on land use and population growth. The above information is provided as a guideline for additional facility footprint and quantity of vehicles; however, it is more appropriate for the detailed decisions to be made by the emergency response providers who are much more familiar with their facility needs and the most appropriate locations for new facilities and/or additions to existing facilities.

COUNTY-WIDE INFRASTRUCTURE

Figure 22 - Emergency Services



Author: gmaynard
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COUNTY-WIDE INFRASTRUCTURE

8.5 PARKS, TRAILS, AND OPEN SPACE

The impact areas of the parks, trails, and open space are also County-wide, so the total for County-wide calculations listed above are probably more applicable to the unincorporated areas of the County than those for the SDA-1 areas alone. As with emergency services, decisions surrounding logical locations for new facilities and or expansion of existing facilities could be made by the study team based on land use and population growth. It is apparent however, that significant planning efforts have already occurred outlining open space areas, trails corridors, and potential park locations (Table 54). As such, it seems more appropriate for parks, trails, and open space personnel to establish a logical and most beneficial need for the specific locations and timing of these improvements based on past planning efforts and actual population growth location. Below is a table of the proposed projects listed in the County ICIP, related to Parks, Trails, and Open Space.

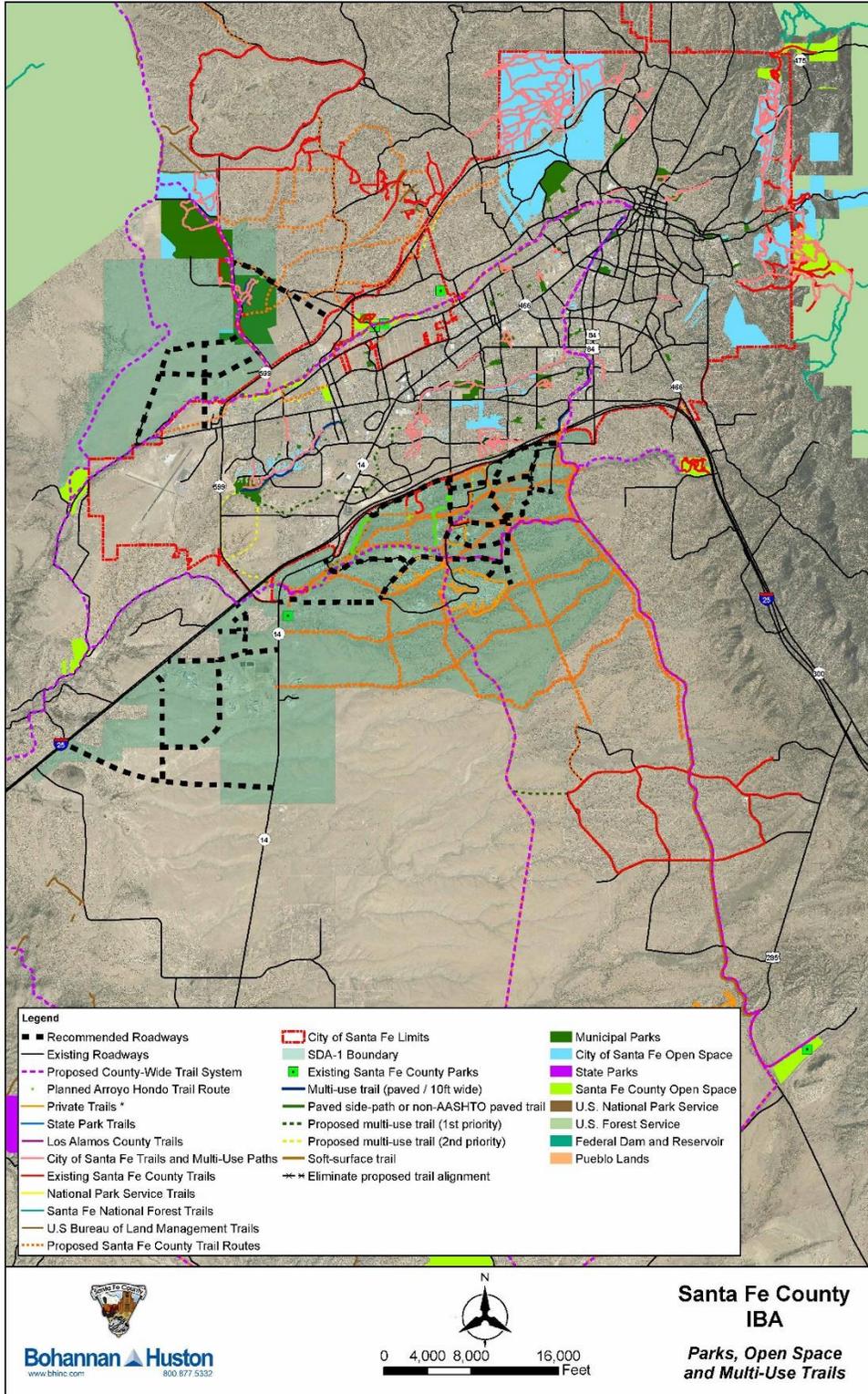
COUNTY-WIDE INFRASTRUCTURE

Table 54 - ICIP Listed Acquisition Projects

Department	Project Title	Cost	Project Type	Project Summary	Year
Growth Management	Santa Fe River Greenway Trail: Acquire and Design Segment 2 --> Siler to San Isidro Crossing	1,592,000.00	OSTP	Acquisition of approximately 31 parcels along 1 mile of the Santa Fe River corridor between Siler Rd. and San Ysidro Crossing (as part of the Santa Fe River Greenway Trail Project).	FY2018
Growth Management	Purchase Agricultural Conservation Easements	1,000,000.00	OSTP	Purchase of Agricultural Easements in Commission Districts 1, 3 and 4.	FY2018
Growth Management	Acquire and Design Santa Fe River Greenway Trail: NM 599 to WWTP Segment VI	2,811,000.00	OSTP	Design, Acquire and Construct Santa Fe River Greenway Trail from NM 599 to Paseo Real.	FY2018
Growth Management	Acquire Nambe Park	85,000.00	OSTP	Acquire approximately 1 acre parcel that is currently being leased from Mead Martin Family to protect County's investment in Nambe Park	FY2020
Growth Management	Acquire and Design Santa Fe River Greenway Trail; Caja del Oro Cottonwood Dr. Segment IV	3,159,000.00	OSTP	Design and Acquisition of Santa Fe River Greenway Trail from Caja del Oro to Cottonwood Dr. (8,200 feet length) in accordance with conceptual plan.	FY2020
Growth Management	Arroyo Hondo Trail NM14 to Rancho Viejo Fire Station - Phase II	1,480,000.00	OSTP	This 1.4 mile paved trail segment of the Arroyo Hondo Trail connects the intersection of NM14 and Fire Place Road with the Rancho Viejo Fire Station.	FY2020
Growth Management	Capital Improvements identified in open space management plans	150,000.00	OSTP	To improve County-owned open space, trails and parks in accordance with SGMP Policy 22.10. Completed Management Plans identify recommended capital improvements.	FY2020
Growth Management	Capital Improvements identified in open space management plans	150,000.00	OSTP	To improve County-owned open space, trails and parks in accordance with SGMP Policy 22.10. Completed Management Plans identify recommended capital improvements.	FY2021
Growth Management	Santa Fe River Greenway Trail: Construct Segment 2 --> Siler to San Isidro Crossing	4,580,000.00	OSTP	Trail construction along 1 mile of the Santa Fe River corridor between Siler Rd. and San Ysidro Crossing (as part of the Santa Fe River Greenway Trail Project).	FY2021
Growth Management	Arroyo Hondo Trail Rancho Viejo Fire Station to La Pradera (Cerrillos Interchange) Phase IV	\$1,450,000	OSTP	This 1.2 mile paved trail will connect the Arroyo Hondo Trail system to La Pradera and Cerrillos Road at the new interchange.	FY2021, NMDOT TAP grant funding 11/2016
Growth Management	Arroyo Hondo Trail Natural Surface Trail Petchesky Preserve - Phase VI	50,000.00	OSTP	This 2.5 mile natural surface trail at 18" wide loops through the Petchesky Ranch west of Richards Avenue.	FY2021
Growth Management	Construct Santa Fe River Greenway Trail: Cottonwood to NM 599 - Segment V	686,000.00	OSTP	Complete the trail and river restoration from Cottonwood to the completed El Camino Real Park and from the Park to NM599. Requires acquisition of 5 parcels.	FY2021
Growth Management	Chili Line Soft-Surface Trail Easement	264,000.00	OSTP	.80 trail connecting SW corner of La T. Trails to Pipeline Road Trail and Thistle Lane MPO C1	FY2021
Growth Management	Design and Acquire Santa Fe River Greenway Trail: Cottonwood to NM 599 - Segment V	527,000.00	OSTP	Complete the trail and river restoration from Cottonwood to the completed El Camino Real Park and from the Park to NM599. Requires acquisition of 5 parcels.	FY2021
Growth Management	Walking Path / Trail along Caliente Road between Avenida Eldorado and Avenida Vista Grande	40,000.00	OSTP	Acquire / Verify easements, design and construct a walking path along Caliente Road. Approximately 0.6 miles.	FY2021
Growth Management	Construct Santa Fe River Greenway Trail: NM 599 to WWTP Segment VI	2,757,000.00	OSTP	Design, Acquire and Construct Santa Fe River Greenway Trail from NM 599 to Paseo Real.	FY2021

COUNTY-WIDE INFRASTRUCTURE

Figure 23 - Parks, Trails and Open Space



COUNTY-WIDE INFRASTRUCTURE

8.6 COST ESTIMATE – COUNTY-WIDE INFRASTRUCTURE

The following cost estimates are based on the current, adopted LOS thresholds established in the SLDC and SGMP documents, adjusted per the direction of the Sheriff and Fire Departments for each respective agency. Because these documents do not define specific infrastructure details, assumptions were made which are listed with the estimates. (In the case of the Fire Vehicles listing, a list of projected vehicle types and an estimate of the cost of each was provided by the Fire Department, so that information is included herein.) These assumptions, including those specified by the Fire Department, may or may not reflect actual future needs to accommodate population growth; however, they establish a framework for decision-making. As discussed above, actual infrastructure needs in each area will be as defined by the impacted agency and based on several factors, including funding sources, population needs and benefits, human resources budget capabilities, etc.

Table 55 - County-Wide Infrastructure Recommendations Based on LOS Adjustments

Infrastructure/Facility	Quantity/Size	Cost per quantity/size	Total
Sheriff Vehicles ⁵⁰	NA	NA	NA
Sheriff Facilities ⁵¹	15,000 sq ft	\$250 per sq ft	\$3,750,000
Fire Vehicles ⁵²	Various*	See below	\$8,770,000
Fire Facilities	43,219 sq ft	\$250 per sq ft	\$10,804,750
Park Land ⁵³	33.93 acres	\$15,000 per acre	\$508,950
Trails (concrete – 10 ⁵⁴ ft wide)	12.71 miles	\$32.5 per linear ft	\$2,181,036
Open Space ⁵⁵	1978.28 acres	\$5000 acres	\$9,891,400
Total			\$35,906,136

*The IBA anticipates the following needs regarding fire vehicles:

- Eight Administrative vehicles at \$45,000 each
- Four brush trucks at \$180,000 each
- Two rescue squads at \$250,000 each
- Three ambulances at \$300,000 each
- One squad type vehicles at \$200,000 each
- Two Command vehicles at \$45,000 each
- Six Engine Trucks at \$600,000 each
- One ladder truck at \$900,000 each
- Five Tender trucks at \$300,000 each.

⁵⁰ Cost estimates have been omitted pending revised LOS thresholds. This number includes specialty vehicles.

⁵¹ This does not include animal control facilities.

⁵² Fire Vehicle costs are in 2017 dollars.

⁵³ Costs are from 2015 and are for land acquisition only. Amenities are separate.

⁵⁴ Table 8-32 of the SLDC specifies Trail Standards with minimum trail widths defined based on the trail category. These widths range from 5 feet for Equestrian and Local trails up to 8 feet for District Trails. Chapter 8.10.3.7 6g provides definitions of each category. While the SLDC provides these specific width requirements, it is noted that they are listed as “minimum” dimensions. A review of AASHTO standards for paved multi-use paths specified a minimum width of 10’ for this type of amenity. This document utilizes 10’ as it conforms to the AASHTO standards while also meeting the minimum widths defined in the SLDC.

⁵⁵ Costs are from 2015 and are for land acquisition only. Amenities are separate.

APPENDIX A

White Paper: Final Population and Employment Projections for the *Santa Fe County Infrastructure Build-Out Plan*

Introduction

The *Santa Fe County Infrastructure Build-Out Plan* considers the public services and infrastructure required to support future population and employment growth in the County's designated Sustainable Development Areas (SDAs) over a 20-year period. SDAs collectively comprise the extent of unincorporated Santa Fe County land, with SDA-1 areas consisting of locations where new development is to be concentrated as part of the County's growth management policy. Initial forecasts were developed for the aggregate of SDA-1 areas; however, infrastructure planning requires an understanding of the extent of new development projected by location. To ensure the data supports Santa Fe County planning efforts, the following additional analyses have been performed:

- County and sub-area level projections were extended from 2030 to 2040 to meet the 20-year build-out horizon from the present time.
- The distribution of population and employment within the SDA-1 subareas were determined.
- A "capacity" scenario was developed that calculates the maximum number of housing units and jobs that could be accommodated in Santa Fe County, based on the total amount of developable land and SDA-1 area future land use types.

I. 2040 Population and Employment Projections for SDA-1 Areas

In 2014, Santa Fe County contracted with the University of New Mexico Bureau of Business and Economic Research (BBER) to develop population and employment estimates by County subarea. As part of its estimates, BBER produced population and employment forecasts for the year 2030 for each of the SDA types within Santa Fe County. To meet the 20-year horizon for the *Santa Fe County Infrastructure Build-Out Plan*, County-level projections were extended from 2030 to 2040 using a variety of extrapolation methods.

This amendment to the BBER reports considers the population and employment projections already produced for Santa Fe County to be a baseline. Projections utilize the existing estimates and forecasts to ensure as much consistency as possible with BBER forecasts. The BBER forecasts, as well as the projections contained here, rely on County-level estimates as a control total. Population and employment projections for unincorporated areas of Santa Fe County were then developed in order to determine estimates by SDA type.

Summary

Population and Housing Units

There will be over 14,000 additional residents in unincorporated portions of Santa Fe County between 2015 and 2040. More than 9,000 of those additional residents will be located in SDA-1 areas, requiring almost 3,800 additional housing units. The extended projections reflect the fact that there will be an increasing share of residents of unincorporated Santa Fe County located in SDA-1 areas. By 2040, approximately one quarter of Santa Fe County’s unincorporated population will reside in SDA-1 areas, compared to around 14 percent in 2015. Table 1 provides the population growth by geographic area across Santa Fe County, while Table 2 projects housing units and household population for SDA-1 areas.

Table 1: Population Estimates and Projections, 1990-2040

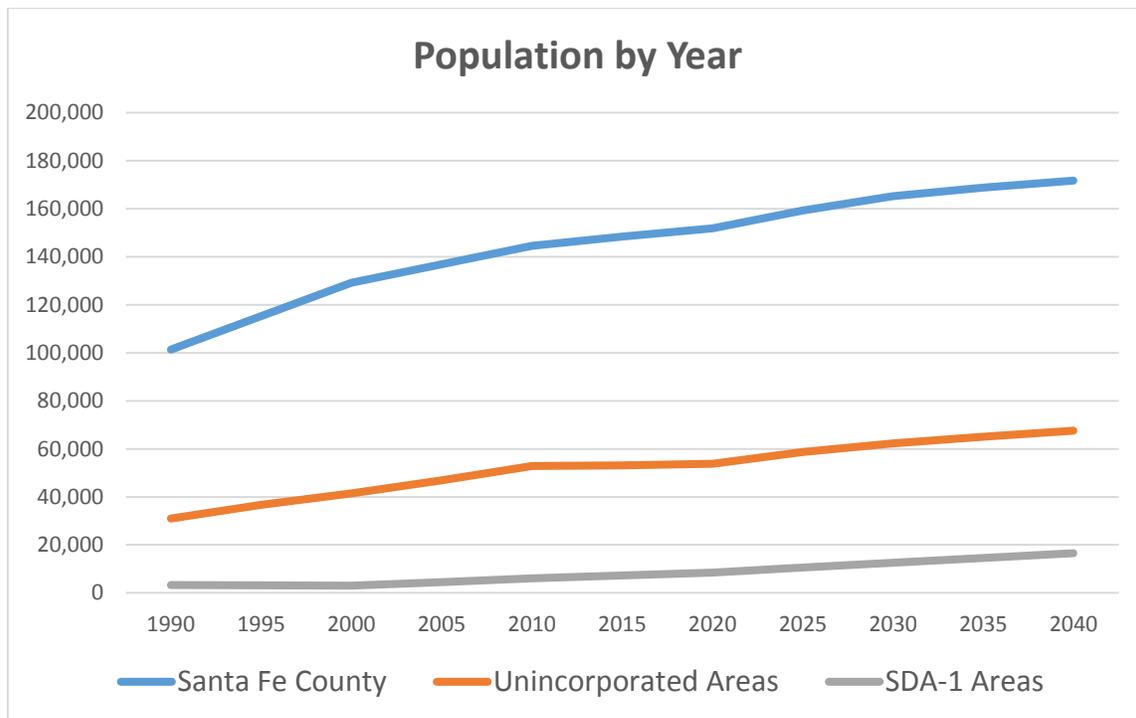
Year	Santa Fe County	Unincorporated Areas	SDA-1 Areas
1990	101,373	30,937	3,326
1995	115,266	36,752	3,197
2000	129,160	41,457	2,972
2005	136,853	46,937	4,500
2010	144,546	52,813	6,018
2015	148,402	53,062	7,255
2020	151,910	53,815	8,524
2025	159,257	58,670	10,565
2030	165,289	62,217	12,553
2031	166,034	62,795	12,967
2032	166,754	63,362	13,357
2033	167,448	63,917	13,749
2034	168,118	64,462	14,143
2035	168,764	64,997	14,540
2036	169,387	65,520	14,938
2037	169,988	66,032	15,339
2038	170,568	66,533	15,742
2039	171,126	67,023	16,146
2040	171,665	67,502	16,552

Note: Custom projections shown in blue.

Table 2: Annual Population Growth Rates by Location, 1990-2040

Year	Santa Fe County	Unincorporated Areas	SDA-1 Areas
1990-1995	2.6%	3.5%	-0.8%
1995-2000	2.3%	2.4%	-1.4%
2000-2005	1.2%	2.5%	8.7%
2005-2010	1.1%	2.4%	6.0%
2010-2015	0.5%	0.1%	3.8%
2015-2020	0.5%	0.3%	3.3%
2020-2025	0.9%	1.7%	4.4%
2025-2030	0.7%	1.2%	3.5%
2030-2035	0.4%	0.9%	3.0%
2035-2040	0.3%	0.8%	2.6%
2015-2040	0.6%	1.0%	3.4%

Figure 1: Population by Year, 1990-2040



Definitions

- Household population refers to the inhabitants of all residential housing units. The household population plus the group quarters population equals the total population.

- *Group quarters* refers to the residents of group living facilities, such as penitentiaries, group homes, dormitories, and nursing facilities. Residents of group quarters are generally not related to each other. Primary group quarters facilities in Santa Fe County SDA-1 areas include the New Mexico State Penitentiary and the Santa Fe County Adult Correctional Facility. The proposed Senior Campus @ Caja del Rio is considered a group quarters facility housing 300 residents (on average 1.5 persons per unit).
- *Household population / housing unit ratio* refers to the number of inhabitants on average for each residential housing unit. The ratios are based on the total number of housing units and do not adjust for the fact that not all housing units are occupied. Therefore, actual average household sizes are likely to be somewhat larger than the values provided. The average household size in Santa Fe County was 2.28 in 2010 and is expected to increase over time. The 2015 base year value was calculated from BBER estimates and a growth factor was applied for future years.
- *Housing units*: Housing unit numbers were developed based on a ratio of the total household population and the rate of persons per housing unit. The housing unit control total was used as the basis for disturbing growth across the SDA-1 areas (see below).

Table 3: Household Population and Housing Unit Projections for SDA-1 Areas, 2010-2040

Year	Total Population	Household Population	Group Quarters Population	Housing Units	Household Population / Housing Unit Ratio
2010	6,018	4,607	1,411	2,108	2.19
2015	7,255	5,844	1,411	2,647	2.21
2020	8,524	7,113	1,411	3,190	2.23
2025	10,565	8,854	1,711	3,932	2.25
2030	12,553	10,842	1,711	4,768	2.27
2031	12,967	11,256	1,711	4,941	2.28
2032	13,357	11,646	1,711	5,102	2.28
2033	13,749	12,038	1,711	5,264	2.29
2034	14,143	12,432	1,711	5,426	2.29
2035	14,540	12,829	1,711	5,588	2.30
2036	14,938	13,227	1,711	5,751	2.30
2037	15,339	13,628	1,711	5,914	2.30
2038	15,742	14,031	1,711	6,077	2.31
2039	16,146	14,435	1,711	6,240	2.31
2040	16,552	14,841	1,711	6,403	2.32

Note: Custom projections shown in blue.

Employment

Santa Fe County employment totals are projected to increase by 16,500 from 2015 to 2040, including about 4,400 additional jobs in unincorporated Santa Fe County and nearly 1,700 jobs in SDA-1 areas.

Employment in SDA-1 areas is expected to grow at rates higher than Santa Fe County overall, as well as other unincorporated portions of Santa Fe County. The average annual employment growth rate in SDA-1 areas, 1.7%, is approximately twice the overall County growth rate, indicating a disproportionate level of economic activity will take place in these areas over time. Table 4 projects total employment growth by area through 2040, while Table 5 provides annualized growth rates over time.¹

Table 4: Employment Estimates and Projections by Location, 2002-2040

Year	Santa Fe County	Unincorporated Areas	SDA-1 Areas
2002	58,731	4,678	1,364
2005	62,587	5,964	1,890
2010	61,538	8,104	2,968
2015	62,048	8,145	2,640
2020	65,984	9,166	3,017
2025	69,063	9,997	3,325
2030	73,464	10,982	3,682
2031	72,940	10,999	3,721
2032	73,565	11,166	3,786
2033	74,191	11,333	3,851
2034	74,816	11,501	3,916
2035	75,442	11,668	3,981
2036	76,067	11,835	4,046
2037	76,693	12,002	4,111
2038	77,319	12,169	4,176
2039	77,944	12,337	4,241
2040	78,570	12,504	4,306

¹ The employment projections produced by BBER use 2002 as a base year while the population projections provide historical data to 1990.

Table 5: Annual Employment Growth Rates by Location, 1990-2040

Year	Santa Fe County	Unincorporated Areas	SDA-1 Areas
2002-2005	2.1%	1.6%	8.4%
2005-2010	-0.3%	-1.2%	6.3%
2010-2015	0.2%	0.2%	0.1%
2015-2020	1.2%	1.1%	2.4%
2020-2025	0.9%	0.8%	1.8%
2025-2030	1.2%	1.1%	1.9%
2030-2035	0.5%	0.4%	1.2%
2035-2040	0.8%	0.7%	1.4%
2015-2040	0.9%	0.8%	1.7%

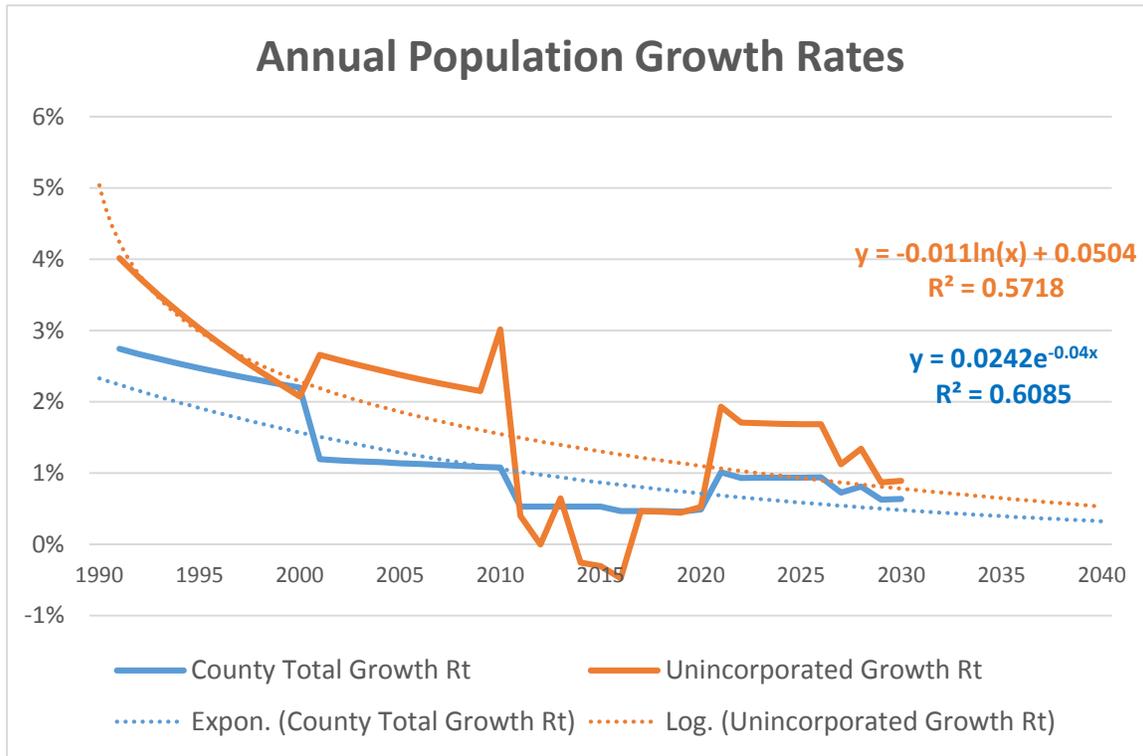
Methodology

Populations Projections for Santa Fe County and Unincorporated Areas

The first step in extending the BBER population forecasts from 2030 to 2040 was to review recent growth patterns and the population growth rates anticipated by BBER between 2013 and 2030. It is important to note that while population across Santa Fe County grows in the coming decades, the rate of growth decreases steadily over time. SDA-1 areas are projected to grow at higher rates than the County at-large.

The population growth rates were projected forward using an *exponential formula trend line*, and new annual population projections were developed based on projected annual growth rates. The figure below contains annual growth rates for Santa Fe County and unincorporated lands using data from 1990-2030 (the existing year). For both the County overall and unincorporated lands, population is expected to increase between 2030 and 2040, though growth will occur at decreasing rates.

Figure 2: Annual Population Growth Rates, 1990-2040

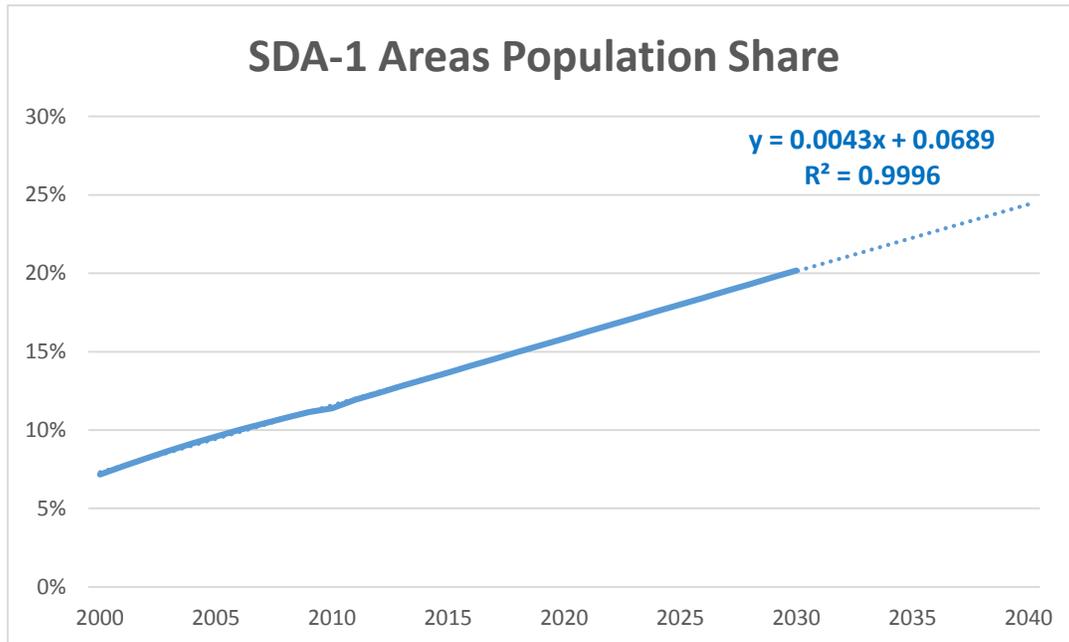


SDA-1 Projections

Extended population projections for SDA-1 area were developed using a *shift share methodology* based on the changing share of the Santa Fe County population located in unincorporated lands. The figure below indicates the historical share of the County population located in SDA-1 areas (years 2000-2012) and the share of unincorporated Santa Fe County population contained in SDA-1 areas based on BBER forecast data for 2013-2030.

A linear trend line was developed to create the projected shares for 2031-2040. The projected share of the population in SDA-1 areas was applied to unincorporated area control totals to create annual SDA-1 population projections.

Figure 3: Share of Unincorporated Santa Fe County Population in SDA-1 Areas, 2000-2040



Note: The data from 1990-2000 was not utilized in the SDA-1 area methodology since these locations were losing population at the time. The inclusion of this data results in a distorted average and a trend line below levels observed from 2000 to present.

Notes on Population Projections

- The BBER county-level forecast is utilized in the Santa Fe MPO’s 2015-2040 Metropolitan Transportation Plan. However, the MTP does not provide population projections for unincorporated Santa Fe County, nor does the document contain employment projections for the extent of Santa Fe County (the Santa Fe MPO area contains portions of unincorporated County land, but does not contain the extent of the County).
- BBER uses different timeframes for analysis depending on available data: population estimates consider historical period from 1990 to 2012, while employment forecasts consider a historical data period from 2002 to 2012. The historical data ranges and forecasts provided by BBER are utilized here to develop projections through extrapolation methods.

Employment Projections

Unlike population, which is projected to grow at decreasing rates over time, the BBER estimates indicate that annual employment growth rates are more volatile on a year-to-year basis. Overall, employment levels are expected to follow a pattern of modest but linear growth over time.

BBER estimates for the years 2009-2030 provide the baseline for the 2031-2040 projections. Employment values for the years 2002-2008 were excluded from the analysis due to the volatility of the data. (The early 2000s were marked by significant job growth, followed by large jobs losses as a result of the Great Recession).

A linear trend line was created for data from 2009-2030 and was advanced to the year 2040 to create annual employment projections for Santa Fe County. (By removing the 2002-2009 data, the line of best fit is highly correlated with the BBER estimates.) The total levels of employment in unincorporated lands and in SDA-1 areas were developed using similar methodologies.

Figure 4: Total Employment in Santa Fe County, 2009-2040

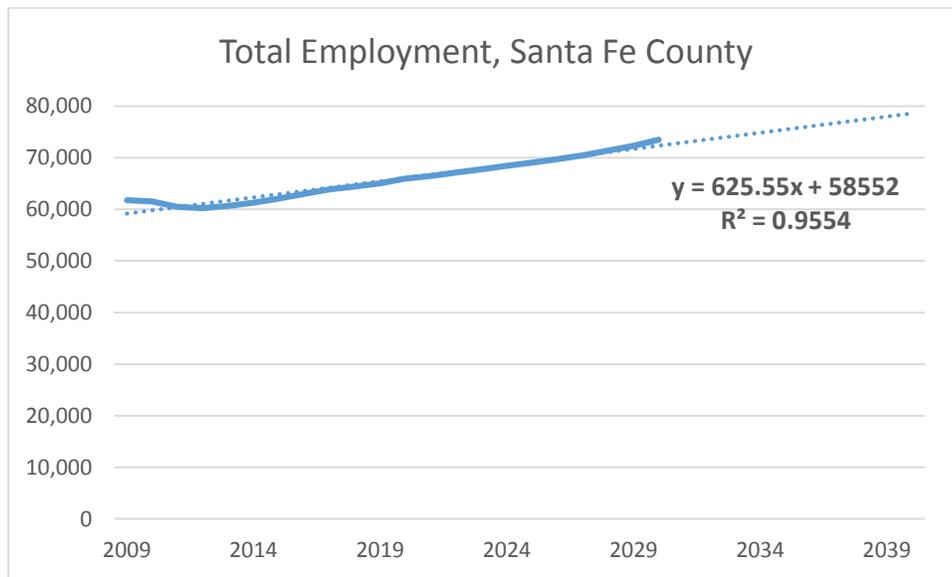
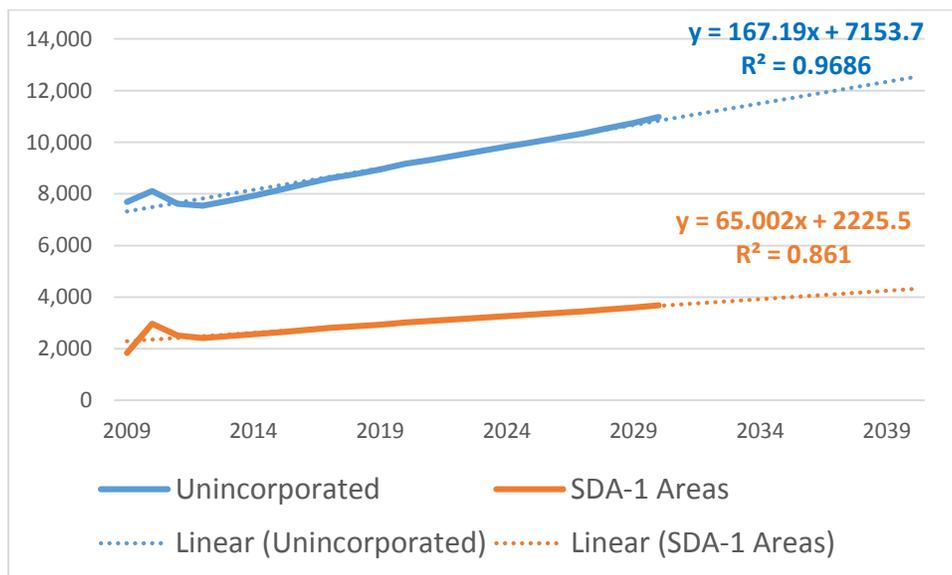


Figure 5: Employment in Unincorporated Santa Fe County and SDA-1 Areas



II. Subarea Population and Employment Projections

The table below contains summary projections by subarea for population, housing units, group quarters, and employment for the 2015 base year and the 2040 horizon year. Base year estimates for each subarea were developed using a combination of 2010 Census data and the zone level estimates for 2015 produced by the Santa Fe MPO. The project team considered a series of factors to develop these projections, including existing land uses and current activity levels, near-term master plan development acres of developable land by type, and existing and anticipated roadway infrastructure. The subarea numbers are consistent with the County-level control totals produced by the project team through the year 2040. More information can be found in the methodology section below.

The projections by subarea consider three distinct units:

1. Southwest (SW) Unit, located to the west of NM 14
2. Santa Fe Community College District (CCD) Unit, located to the east of NM 14
3. Northwest (NW) Unit, located to the north of NM 599

The CCD unit features the most highly developed infrastructure of the three subareas, and permits residential densities that are much greater than the NW and SW units. The CCD unit is marked by the presence of Santa Fe Community College and the Rancho Viejo master planned community. The SW and NW units feature large tracts of undeveloped land and relatively limited roadway infrastructure. The SW unit is noteworthy for the presence of two prison facilities. These sites contained 839 inmates at the time of the 2010 Census; inmates are considered part of the group quarters population.

Table 6: SDA-1 Projections by Subarea

Summary Statistics	SW Unit	CCD Unit	NW Unit	SDA-1 Total
2015 Population	967	6,276	12	7,255
2040 Population	1,654	12,293	992	16,552
2015 Household Population	128	5,704	12	5,844
2040 Household Population	815	11,721	692	14,841
2015 Group Quarters Population	839	572	0	1,411
2040 Group Quarters Population	839	572	300	1,711
2015 Housing Units	56	2,586	5	2,647
2040 Housing Units	355	5,096	301	6,403
2015 Employment	557	1,959	124	2,640
2040 Employment	905	2,711	690	4,306

Table 7: Growth by SDA-1 Subarea, 2015-2040

Difference 2015-2040	NW Unit	SW Unit	CCD Unit	SDA-1 Total
Total Population	1,410	1,121	6,766	9,297
Housing Units	479	483	2,794	3,756
Employment	566	348	752	1,666

Table 8: Share of Total Growth by SDA-1 Subarea, 2015-2040

Share of Growth	NW Unit	SW Unit	CCD Unit	SDA-1 Total
Total Population	15%	18%	67%	100%
Housing Units	13%	13%	74%	100%
Employment	34%	23%	43%	100%

The fastest growing subarea is the CCD unit, which absorbs almost 2,800 new housing units and more than 5,600 additional residents between 2015 and 2040. These numbers represent about three quarters of new residential growth in the SDA-1 areas. About one out of two new jobs are also located in the CCD unit. The remaining housing unit, population, and job growth between 2015 and 2040 are split relatively evenly between the NW and SW units.

Housing Unit and Population Projection Methodology

Population projections were developed based on the numbers of existing and anticipated future housing units in each SDA-1 subarea and by applying a rate of persons per unit. The project team employed a two-part methodology for developing SDA-1 subarea housing unit projections. These steps include:

1. Calculation of housing units located in planned and known subdivisions, primarily in the CCD unit
2. An allocation of additional housing units based on developable land and existing and proposed roadway infrastructure

Subdivisions and Known Developments

There are a number of approved and partially constructed master planned communities in the CCD unit that provide a starting point for understanding expected growth patterns between 2015 and 2040. Many of these “known” or “planned” developments are subdivisions within the Rancho Viejo master planned community and have identified the total number of housing unit at full build-out as part of their site plans. To account for the increased likelihood of development in these locations relative to other SDA-1 subareas, the project team allocated housing units to these subdivisions in the CCD area before considering methodologies for distributing the remaining levels of future housing development.

Housing unit growth in the CCD subdivisions is based on the product of the proposed number of additional units (beyond the 2015 total) and a development ratio that reflects a reasonable level of build-out between 2015 and 2040 for an individual subdivision. For subdivisions that are partially built-out, such as La Pradera, a development ratio of 100% is assumed (in other words, all planned units are completed). A 100% build-out ratio is also assumed for multi-family housing developments since those projects are generally developed all at once rather than in phases. For most other subdivisions, a 50% build-out is assumed (that is, one half of all planned housing units are constructed by 2040).

Of the 3,756 additional housing units projected in all SDA-1 areas by 2040, 2,051 housing units, or 55% of new housing units, are located in “known” or “planned” developments in the CCD subarea.

Table 9: Approved and Proposed Subdivisions in CCD Unit

Subdivision	Land Use	Existing Units	Proposed Units	Development Ratio	Total New Units	Acres	Status
Arroyo Hondo	Mixed, mostly residential	0	256	75%	192	110.8	Proposed
Elevations	MF residential	0	214	100%	214	22.7	Vacant
Fireplace Apartments	MF residential	0	200	100%	200	8.1	Proposed
La Entrada	SF residential	131	456	50%	163	244.5	Partial
La Entrada Mixed Use	Mixed Use	0	26	50%	13	7.4	Vacant
La Pradera	Mixed Use	101	238	100%	137	165.4	Partial
Oshara Village	Mixed Use	60	735	50%	338	361.7	Partial
Rancho Viejo Windmill Ridge	SF residential	0	66	50%	33	123.8	Vacant only
Saleh	Mixed use	0	229	75%	172	65.5	No data
San Cristobal	Mixed use	0	2,781	0%	0	0.0	NMSLO-owned
Sonterra	Mixed use	0	520	50%	260	236.8	Vacant
St Francis South Business Park	Mixed use	0	250	50%	125	63.4	Vacant
Turquoise Trail Estates	SF residential	0	20	100%	20	5.8	Vacant
Turquoise Trail North Residential	SF residential	0	354	25%	89	101.2	Vacant w/ arroyos
Turquoise Trail South Residential	SF residential +23 MF units	184	313	75%	97	74.4	Vacant
Total		476	6,402		2,051	1,591.4	

Table 10: Growth in Housing Units by Source for SDA-1 Subareas, 2015-2040

Housing Units	SW Unit	CCD Unit	NW Unit	SDA-1 Total
Allocated Housing Units	483	743	479	1,705
CCD Subdivision Units	0	2,051	0	2,051
Total New Housing Units	483	2,794	479	3,756

Housing Unit Allocation

The remaining stock of additional housing units are allocated to the SDA-1 subareas based on an average of two scenarios: 1) proportional growth based on the acres of developable land (i.e. vacant land identified for mixed-use or residential development); and 2) infrastructure by subarea. As part of the proportional growth approach, assumptions were made about the amount of mixed-use land eligible for residential and commercial uses. The infrastructure scenario is based on the current and projected levels of roadway infrastructure. In this approach, infrastructure serves as a proxy for access and the likelihood of development, and population growth is a function of current and anticipated roadway infrastructure. The population projections are an average of the two scenarios.

Through the allocation method, the CCD units receives an additional 743 housing units for a total of 2,794 housing units in the CCD subarea through 2040. The remaining 962 housing units are split fairly evenly between the NW and SW units. See Table 10 for the housing units allocated via the two methodologies to each subarea.

Group Quarters

The projections assume the prison population remains constant over time. The change in group quarters is due to the proposed Senior Campus @ Caja del Rio, which will provide lodging for approximately 300 residents.

Employment Projection Methodology

The project team created employment projections for all SDA-1 areas by applying the same annualized growth rates by industry from 2010-2030, as developed by BBER, to the 2030-2040 growth totals developed by the project team.

The first step in developing subarea projections was to determine base year estimates by subarea using 2015 data from the Santa Fe MPO. A correction factor was applied to ensure the 2015 Santa Fe MPO data aligns with the BBER estimates. Based on BBER estimates and the extended forecast produced by the project team, SDA-1 areas are expected to receive slightly over 10% of all new jobs created in Santa Fe County through 2040. A proportional share of new jobs by industry were allocated to SDA-1 and distributed among the three SW, CCD, and NW units depending based on factors such as available land

and population. Employment growth for some industries that are likely to cluster, such as education and healthcare, was added to existing employment by subarea.

The tables below provide the sum total of employment by industry for Santa Fe County in 2040, as well as the distribution of employment by SDA-1 subarea. The largest industries in SDA-1 areas include education, professional and technical services, and government. SDA-1 areas are also likely to experience a gain in construction jobs over time. Population growth in SDA-1 areas will likely justify the construction of at least one elementary school by 2040, and healthcare services will expand to serve the increased number of senior citizens across Santa Fe County.

Table 11: Employment by Industry, Santa Fe County SDA-1 Areas

Industry	2010 Employment	2030 Employment	Change Employment 2010-2030	Share of Growth	2030-40 Employment Growth	2040 Employment Estimate
Mining & Agriculture	215	244	29	0.2%	11	255
Construction	2,792	4,494	1,702	13.2%	672	5,166
Manufacturing	770	814	44	0.3%	17	831
Wholesale Trade	1,005	1,361	356	2.8%	141	1,502
Retail Trade	8,416	9,304	888	6.9%	351	9,655
Transportation	669	690	21	0.2%	8	698
Information	1,049	1,076	27	0.2%	11	1,087
Finance & Insurance	1,694	1,762	68	0.5%	27	1,789
Real Estate	804	961	157	1.2%	62	1,023
Prof. & Tech. Services	2,568	3,640	1,072	8.3%	423	4,063
Management	223	207	-16	-0.1%	-4	203
Admin & Waste	1,615	3,486	1,871	14.5%	739	4,225
Education	1,196	1,367	171	1.3%	68	1,435
Healthcare	8,153	11,326	3,173	24.6%	1,253	12,579
Arts & Entertainment	890	1,119	229	1.8%	90	1,209
Accommodation & Food	8,031	9,016	985	7.6%	389	9,405
Other	2,356	2,495	139	1.1%	55	2,550
Government	18,094	20,102	2,008	15.5%	793	20,895
Total	60,540	73,464	12,924	100.0%	5,106	78,570

Table 12: Employment by Industry by Subarea, 2015 and 2040

Industry	SW Unit - 2015	CCD Unit - 2015	NW Unit - 2015	2015 SDA-1 Total	SW Unit - 2040	CCD Unit - 2040	NW Unit - 2040	2040 SDA-1 Total	Growth 2010-2040
Mining & Agriculture	0	2	2	4	0	2	8	10	6
Construction	30	257	45	332	83	304	120	507	175
Manufacturing	13	131	7	151	13	131	7	151	0
Wholesale Trade	2	57	69	128	19	72	92	183	55
Retail Trade	6	31	1	38	12	87	6	105	67
Transportation	0	0	0	0	0	0	0	0	0
Information	0	0	0	0	0	0	0	0	0
Finance & Insurance	0	6	0	6	0	6	0	6	0
Real Estate	0	0	0	0	0	17	0	17	17
Professional & Technical Services	199	469	0	668	248	512	69	829	161
Management	0	0	0	0	0	0	0	0	0
Admin & Waste	0	0	0	0	73	65	102	240	240
Education	89	766	0	855	89	816	0	905	50
Healthcare	57	11	0	68	83	275	100	458	390
Arts & Entertainment	0	0	0	0	0	8	14	22	22
Accommodation & Food	11	54	0	65	18	129	7	154	89
Other	0	0	0	0	0	8	0	8	8
Government	150	175	0	325	267	279	165	711	386
Total	557	1,959	124	2,640	905	2,711	690	4,306	1,666

Notes:

Base year data adjustments: The 2040 projections use BBER data as a baseline, requiring the use of BBER data for the 2015 base year for comparison purposes. The 2015 base year population and employment are derived from SF MPO data that have been adjusted through a correction factor to match the BBER estimates. The correction factor applies to the SW and CCD Units only since the housing unit and population totals for the NW unit are easily confirmed by Census data.

III. “Capacity” Scenario

The “capacity” scenario reflects the potential level of activity in SDA-1 areas if development occurs on *all* available land at assumed levels of intensity for both residential and commercial uses. It should not be interpreted as a plausible scenario for development in Santa Fe County, and is not associated with a particular point in time. Rather, the capacity values are based on an evaluation of the number of developable acres by land use type within each subarea and the identified allowable future land uses within each of those subareas. In other words, the capacity scenario is a reflection of the maximum level of development associated with current policy.

Methodology

Capacity scenario projections are the result of new growth added to the current or base year estimates for population, housing units, and employment totals for each of the SDA-1 subareas. Since potential new growth in the capacity scenario is a function of available land and allowable intensity of development, the project team determined the existing land uses, including the parcels classified currently as “vacant,” as well as large tracts of land in the SW and NW units within a developed parcel that could plausibly be subdivided or further developed. This land use inventory results in the number of developable acres by future land use type. The acres of developable land were summarized into categories based on the identified future land use, with development intensity levels assumed for residential and commercial lands.

In the capacity scenario, the level of activity in existing developments is considered to be static. That is, there is no projected change in population or employment levels in parcels that are currently developed.

Table 13: Developable Land by Subarea – Southwest Unit

Land Use	Total Acres	Developable Acres
Mixed Use	3,417.8	3,288.7
Public / Institutional	1,037.3	133.0
Industrial Light	720.4	398.8
Commercial General	200.7	115.4
Federal and State Public Lands	45.0	45.0
Total	5,421.2	3,980.9

Table 14: Developable Land by Subarea – Northwest Unit

Land Use	Total Acres	Developable Acres
Mixed Use	3,061.9	2,967.1
Public / Institutional	829.8	257.0
Industrial General	1,397.7	858.1
Industrial Light	190.3	190.3
Residential Estate	425.5	425.5
Total	5,905.1	4,726.0

Table 15: Developable Land by Subarea – CCD Unit*

Land Use Type	Vacant Acres	Developable Acres	Conversion to SDA-1 Land Use Type
Existing Neighborhood Zones	270.3	270.3	Residential Estate
Community Center	29.9	29.9	Mixed Use
Employment Center	319.1	319.1	Mixed Use
Institutional Campus	69.9	69.9	Public / Institutional
Media District	50.9	50.9	Commercial General
Fringe	3,679.4	1,690.4	Mixed Use
SF Housing in Fringe Zones	1,140.7	1,140.7	Mixed Use
Rural	2,390.5	0.0	Mixed Use
State Land Office	8.9	8.9	Mixed Use
Total	7,964.4	3,580.1	

*See the “Open Space Set-aside” section below for clarification on the difference between “vacant acres” and “developable acres.” 1,481 acres of the developable acres in the CCD unit are part of identified subdivisions.

Table 16: Total Developable Acres by Land Use Type and Share by SDA-1 Subarea

Land Use Type	Developable Acres	SW Unit Share	CCD Unit Share	NW Unit Share
Mixed Use	7,964.3	41%	21%	37%
Public / Institutional	487.9	27%	45%	27%
Industrial Light	589.1	32%	0%	68%
Industrial General	858.1	100%	0%	0%
Commercial General	166.3	0%	31%	69%
Federal and State Public Lands	45.0	0%	0%	100%
Residential Estate	695.7	0%	39%	61%
Total	10,806.4			

Open Space Set-aside

The CCD unit carries the additional requirement that 50% of the district, or about 5,688 acres, must be set aside for open space. Part of that requirement can be met through parcels associated with existing categories of land use that qualify as open space, including:

- Private conservation areas
- Private parks and open space
- Public parks and open space

Collectively, there are 1,309 acres of lands identified as open space, or about 23% of the required amount for the CCD unit. (There are an additional 2,713 acres of land identified as “open space – arroyos,” though much of this land overlaps with other CCD land use type distinctions, and much of the land is held privately or by the New Mexico State Land Office.)

The difference between total vacant land in the CCD unit and the total acreage of developable land (see table on “Developable Land by Subarea – CCD Unit” above) reflects the fact that in the capacity scenario an additional 3,678 acres of land has been set-aside to adhere to the open space requirement, resulting in a lower actual total of developable acres in the CCD unit.

Land set aside for open space in the capacity scenario is drawn from two sources. Because much of the land is traversed by arroyos, the parcels held today by the New Mexico State Land Office (NMSLO) have been allocated for open space. It is important to note that future development may occur on NMSLO land. However, if that land is not set-aside as open space, other land that is publically or privately-held must be established as open space instead. Another 1,989 acres of privately-held land located in the “fringe” development areas of the CCD unit were dedicated for open space rather than development in the capacity scenario.

Table 17: Land Allocated for Open Space in CCD Unit

Open Space Summary	Acres	Share of Open Space Requirement
Private Parks and Open Space	1,024	18%
Private Conservation Areas	279	5%
Public Parks and Open Space	5	0%
New Mexico State Land Office*	2,390	42%
Privately-Owned Vacant Land*	1,989	35%
Summary	5,688	100%

*Indicates land is newly-allocated for open space purposes.

Capacity Scenario Housing Unit and Population Projections

While the Sustainable Land Development Code establishes baseline average residential density levels for mixed use zones at one unit per acre, the provides the opportunity for higher densities (up to 20 units per acre) through a Transfer of Development Rights. To account for the possibility of increased density, the capacity assumes that 90% of mixed use zones will develop at the base density (one unit per acre), while 10% will develop at a rate of 10 housing units per acre.

To calculate the number of potential housing units, the acres of developable mixed use land were multiplied by the assumed density levels.

Assumptions

- The residential density in the SW and NW units is 1 housing unit per acre.
- Ten percent of mixed use land will develop at 10 units per acre through a Transfer of Development Right.
- Where the baseline density of one unit per acres is applied, 90% of mixed use land will be allocated for residential activity with the remaining 10% allocated for commercial activity.
- Where the increased density through a Transfer of Development Rights is applied in mixed use zones, all land is dedicated for residential purposes.
- The projected 2040 rate of 2.32 persons per household is maintained constant in the capacity scenario.

Table 18: Developable Land Use by Type & Assumed Residential Activity Levels, SW and NW Units

Location	Developable Acres	Housing Units / Acre	Residential Share	Capacity Housing
Mixed Use - SW Unit	2959.9	1	90%	2,664
Mixed Use - SW Unit (TDR Sites)	328.9	10	100%	3,289
Mixed Use - NW Unit	2670.4	1	90%	2,403
Mixed Use - NW Unit (TDR Sites)	296.7	10	100%	2,967
Residential Estate - NW Unit	200.3	0.4	100%	80

Table 19: Developable Land Use by Type & Assumed Residential and Commercial Activity Levels, CCD Unit

Land Use Type	Developable Acres	Subdivision Acres	Capacity Acres	Housing Units / Acre	Residential Share	Commercial Share
Existing Neighborhood Zones	270.3	0.0	270.3	0.4	100%	0%
Community Center	29.9	0.0	29.9	5.0	50%	50%
Employment Center	319.1	0.0	319.1	3.5	25%	75%
Institutional Campus	69.9	0.0	69.9	3.5	25%	75%
Media District	50.9	0.0	50.9	0.0	0%	100%
Fringe	1,690.4	770.2	920.2	1.0	75%	25%
Identified Single-Family Housing in Fringe Zones	8.9	0.0	8.9	1 per parcel (35 units)	100%	0%
Village	1,140.7	821.3	319.4	3.5	100%	0%
Total	3,580.1	1,591.4	1,988.7			

Similar to the 2040 projections, the capacity scenario considers the potential new growth associated with subdivisions in the CCD unit as a first step. A crucial difference is that in the capacity scenario the development ratio for all subdivisions is 100%, meaning that the identified subdivisions in the CCD unit could absorb a total of 3,401 new housing units. For the remaining locations within the CCD unit, the assumed housing units per acre value and the share of residential activity are multiplied by the acres of developable land to determine the number of additional housing units.

Equation

Housing unit estimates are a function of developable acres multiplied by the assumed number of housing units per acre and the residential share:

$$\text{Capacity housing (subarea)} = \text{Housing units} \times \text{developable land} \times \text{residential share}$$

Capacity Scenario Employment Projections

Employment projections for the capacity scenario are based on a land needs analysis using formulas developed by the Oregon Department of Land Conservation and Development. This approach assumes a certain level of employment associated with each acre of land by type.

Generating capacity employment by industry is neither plausible nor desirable since the future land use districts permit a range of uses and it is difficult to project employment by industry beyond a 20-year time horizon. However, it is possible to estimate capacity employment values by general industry sector based on land use types. The number of employees associated with each acre by general industry sector

(such as retail/services and industrial) as identified by the Oregon Department of Land Conservation were translated into the future land use districts contained in the SDA-1 areas.

Table 20: Capacity Scenario Land-Need Employment Assumptions

Sector	Employees per Acre
Industrial Light	10
Industrial General	5
Public / Institutional	10
Commercial General	15
Mixed Use	15

The project team made the following additional assumptions:

- 15% of land available for commercial development is dedicated to transportation and utilities infrastructure.
- 10% of mixed use land will be allocated for commercial activity.

It is important to note that while the capacity housing unit and population projections are about twice as high as the 2040 projections, the employment totals in the capacity scenario are substantially greater than the 2040 projections. The primary reason the employment totals are so much greater is that it is possible for a large number of employees to occupy each acre of land, especially in contrast with a residential density rate of one dwelling unit per acre (or 3.5 units per acre in the CCD unit). Therefore, a relatively small number of commercial acres has the potential to accommodate large levels of employment. While it is technically possible for SDA-1 areas to accommodate a total of 36,000+ employees, it is very unlikely that that much commercial activity will take place, given the County’s long-term population projections and the available labor pool.

Capacity Scenario Summary Tables

Table I: Base year (2015) housing unit, population, and employment totals in each SDA-1 subarea.

Table II: Total new development allowable in each SDA-1 subarea given quantities of developable land, allowable uses, and assumed intensity levels.

Table III: Sum of existing development (i.e. base year data in Table I) and the total new development in the capacity scenario (i.e. Table II). These values are substantially higher than the totals contained in the 2040 projections (see Table IV).

Table IV: 2040 Projections by SDA-1 subarea.

Table V: Difference between the capacity scenario and the 2040 projections. These numbers represent additional development that could be absorbed after the 2040 projections are realized.

Table VI: 2040 projections as share of Santa Fe County capacity. Tables 5 and 6 provide an understanding of how much additional growth could be accommodated within Santa Fe County after the 2040 projections are realized.

Capacity Scenario Summary Tables

I. Existing Conditions – 2015 Base Year Data

	NW Unit	SW Unit	CCD Unit	Total
Housing Units	5	56	2,586	2,647
Household Population	12	128	5,704	5,844
Employment	124	557	1,959	2,640

II. Maximum Amount of New Growth in Capacity Scenario

	NW Unit	SW Unit	CCD Unit	Total
Housing Units	5,451	5,953	5,906	17,309
Household Population	12,633	13,797	13,688	40,118
Employment	11,092	10,148	11,441	32,681

III. Capacity Scenario – Build Out Projection Levels

	NW Unit	SW Unit	CCD Unit	Total
Housing Units	5,456	6,009	8,492	19,957
Household Population	12,645	13,925	19,392	45,962
Employment	11,216	10,705	13,400	35,321

IV. 2040 Projections by SDA-1 Subarea

	NW Unit	SW Unit	CCD Unit	Total
Housing Units	484	539	5,380	6,403
Household Population	1,122	1,249	12,470	14,841
Employment	690	905	2,711	4,306

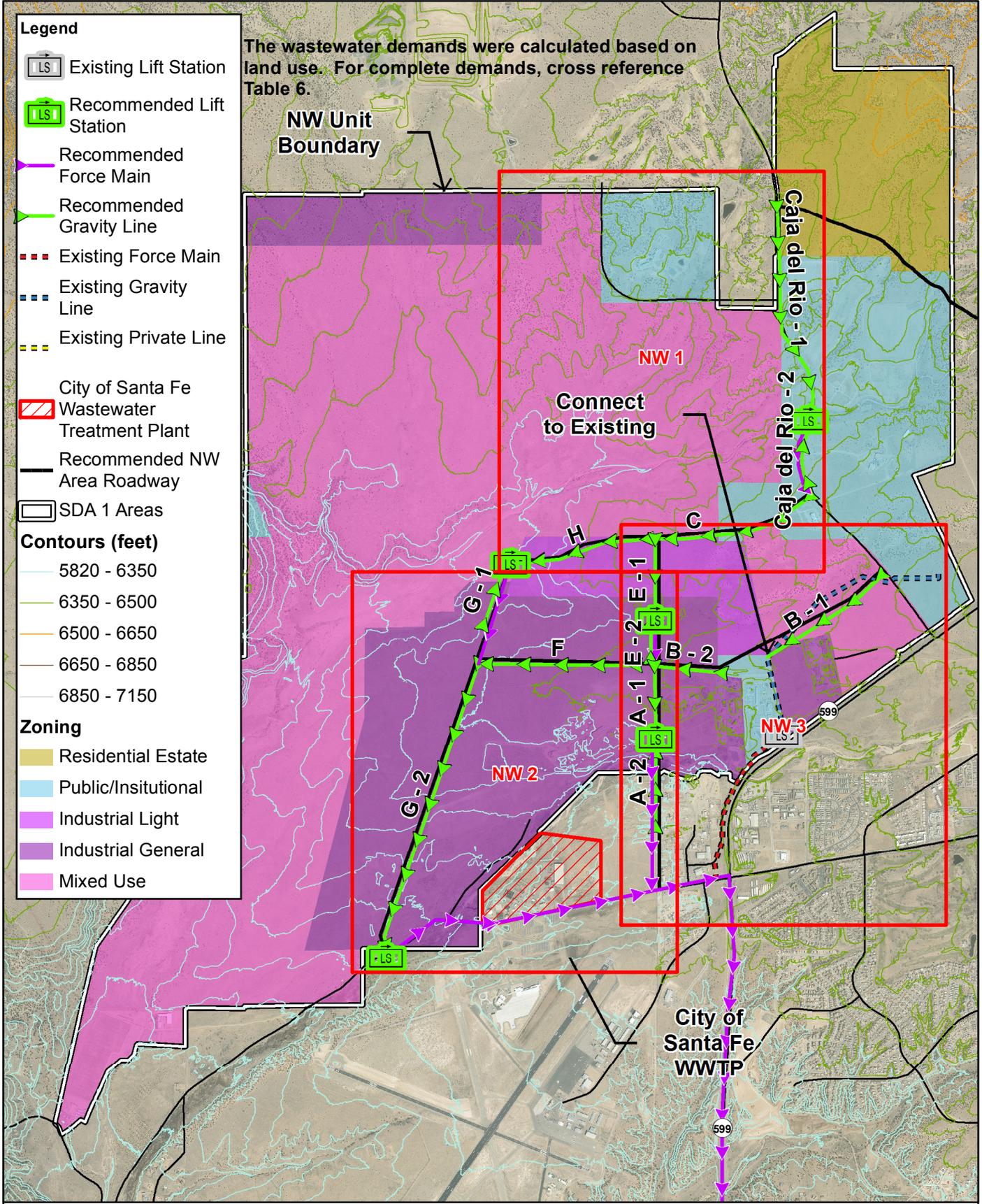
V. Difference Between Capacity Scenario and 2040 Projections

	NW Unit	SW Unit	CCD Unit	Total
Housing Units	4,972	5,470	3,112	13,554
Household Population	11,523	12,676	6,922	31,121
Employment	10,526	9,800	10,689	31,015

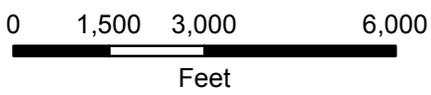
VI. 2040 Projections as a Share of Santa Fe County SDA-1 Subarea Capacity

	NW Unit	SW Unit	CCD Unit
Housing Units	9%	9%	63%
Household Population	9%	9%	64%
Employment	6%	8%	20%

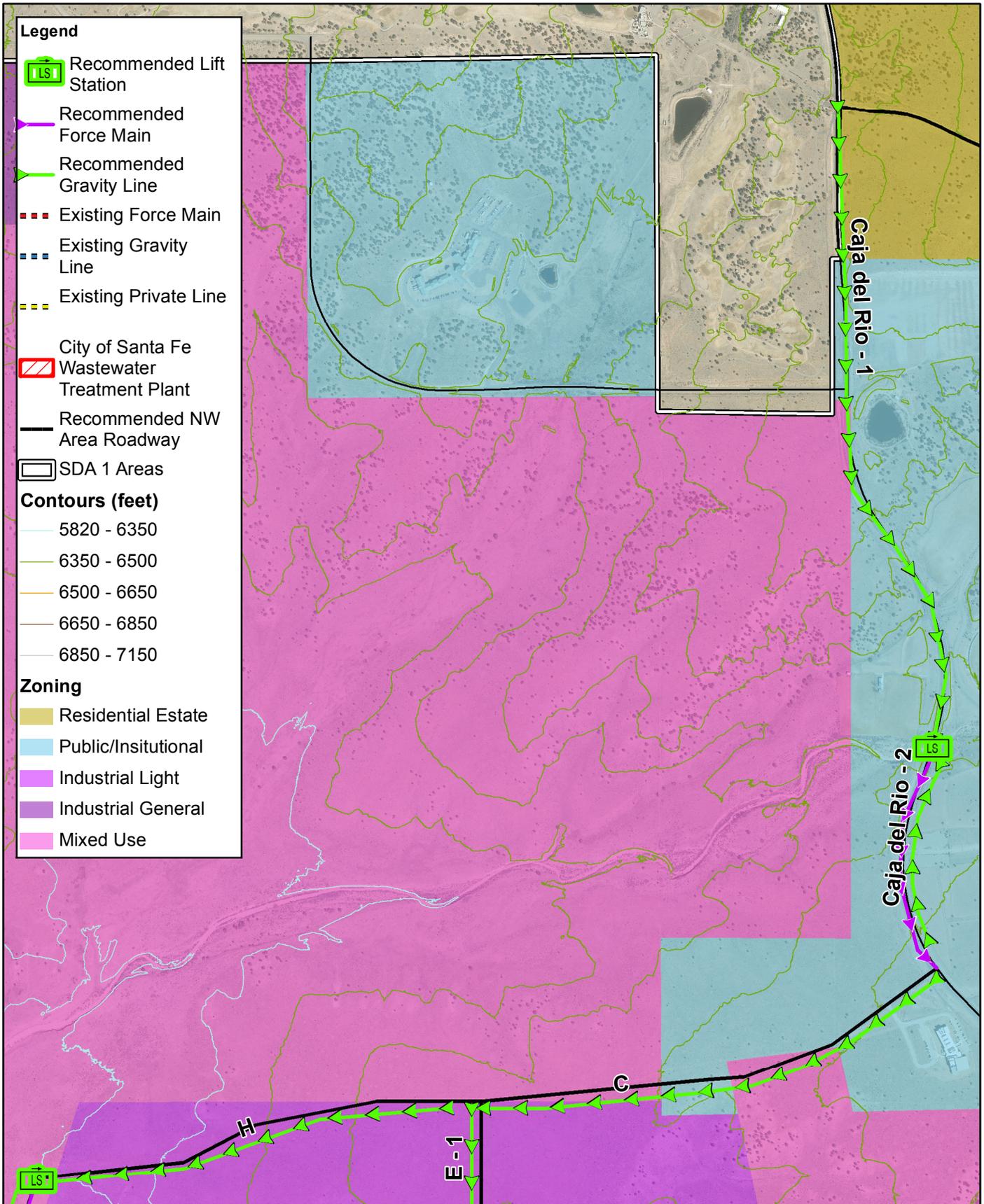
APPENDIX B



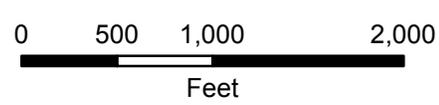
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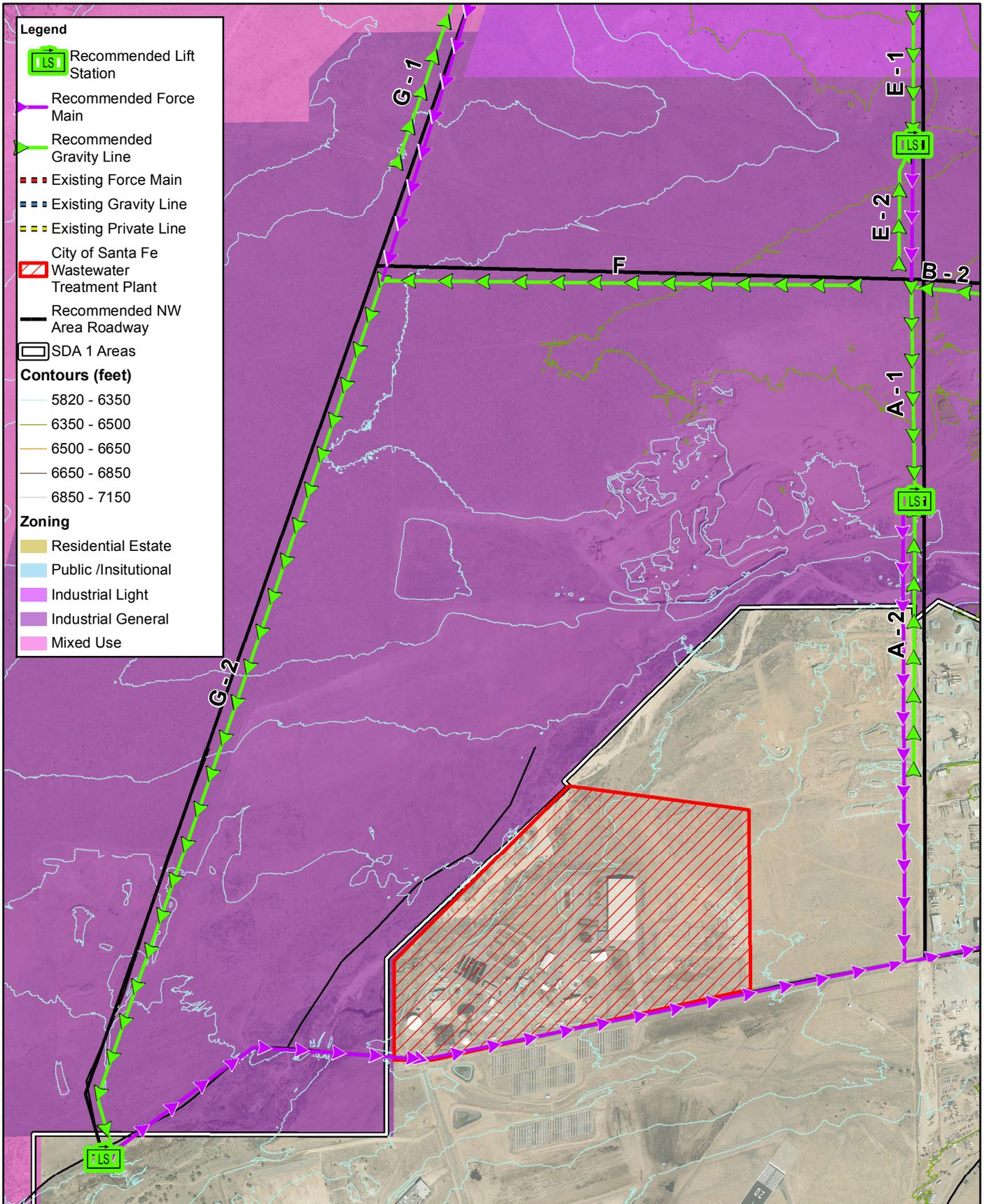
**Santa Fe County
IBA
NW Unit SDA-1
Wastewater
Infrastructure**



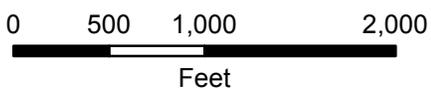
- Legend**
- Recommended Lift Station
 - Recommended Force Main
 - Recommended Gravity Line
 - Existing Force Main
 - Existing Gravity Line
 - Existing Private Line
 - City of Santa Fe Wastewater Treatment Plant
 - Recommended NW Area Roadway
 - SDA 1 Areas
- Contours (feet)**
- 5820 - 6350
 - 6350 - 6500
 - 6500 - 6650
 - 6650 - 6850
 - 6850 - 7150
- Zoning**
- Residential Estate
 - Public/Insitutional
 - Industrial Light
 - Industrial General
 - Mixed Use



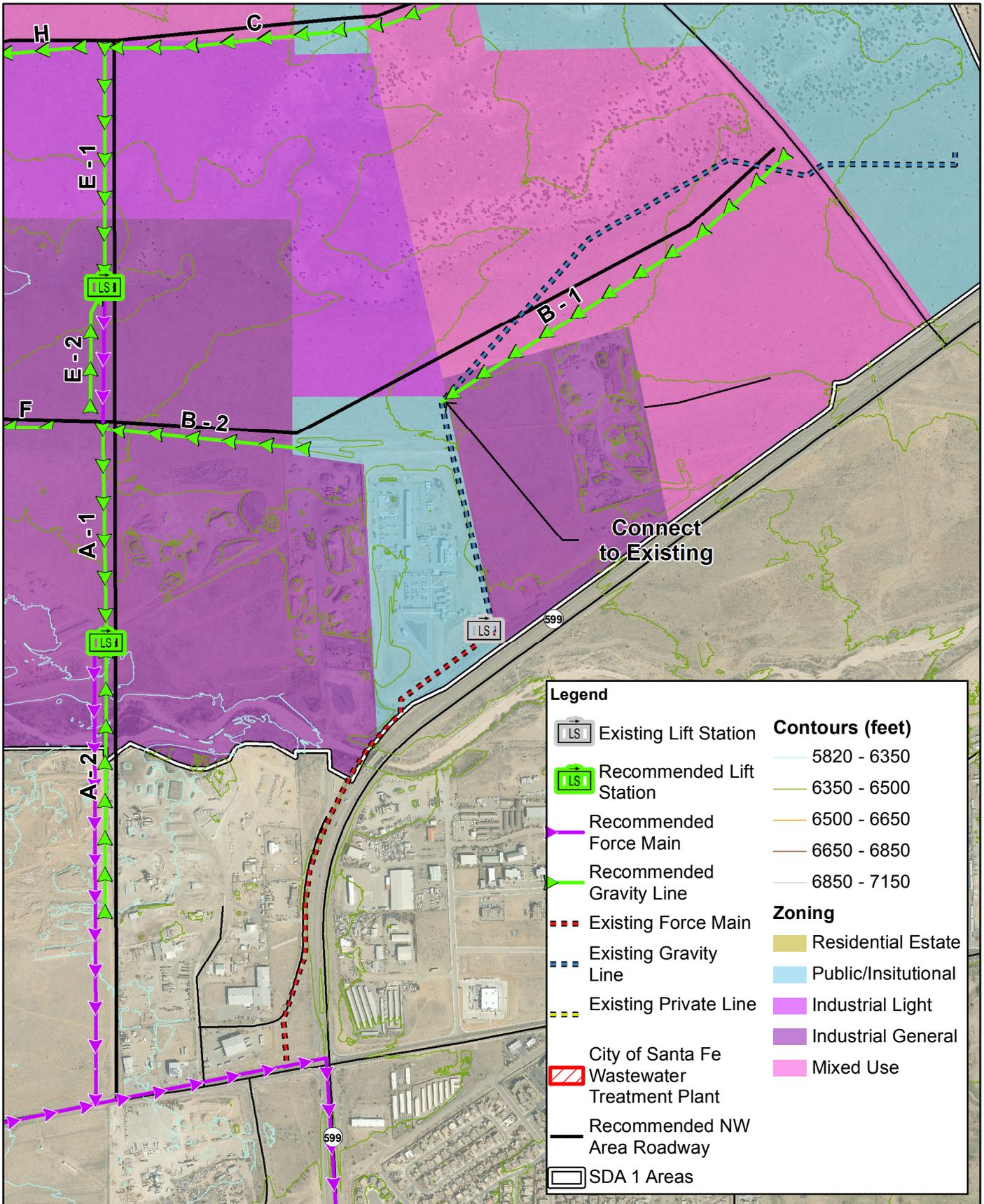
Santa Fe County
IBA
NW 1
Wastewater
Infrastructure



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**Santa Fe County
IBA
NW 2
Wastewater
Infrastructure**

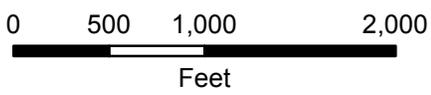


Legend

	Existing Lift Station	Contours (feet)
	Recommended Lift Station	5820 - 6350
	Recommended Force Main	6350 - 6500
	Recommended Gravity Line	6500 - 6650
	Existing Force Main	6650 - 6850
	Existing Gravity Line	6850 - 7150
	Existing Private Line	
	City of Santa Fe Wastewater Treatment Plant	Zoning
	Recommended NW Area Roadway	
	SDA 1 Areas	

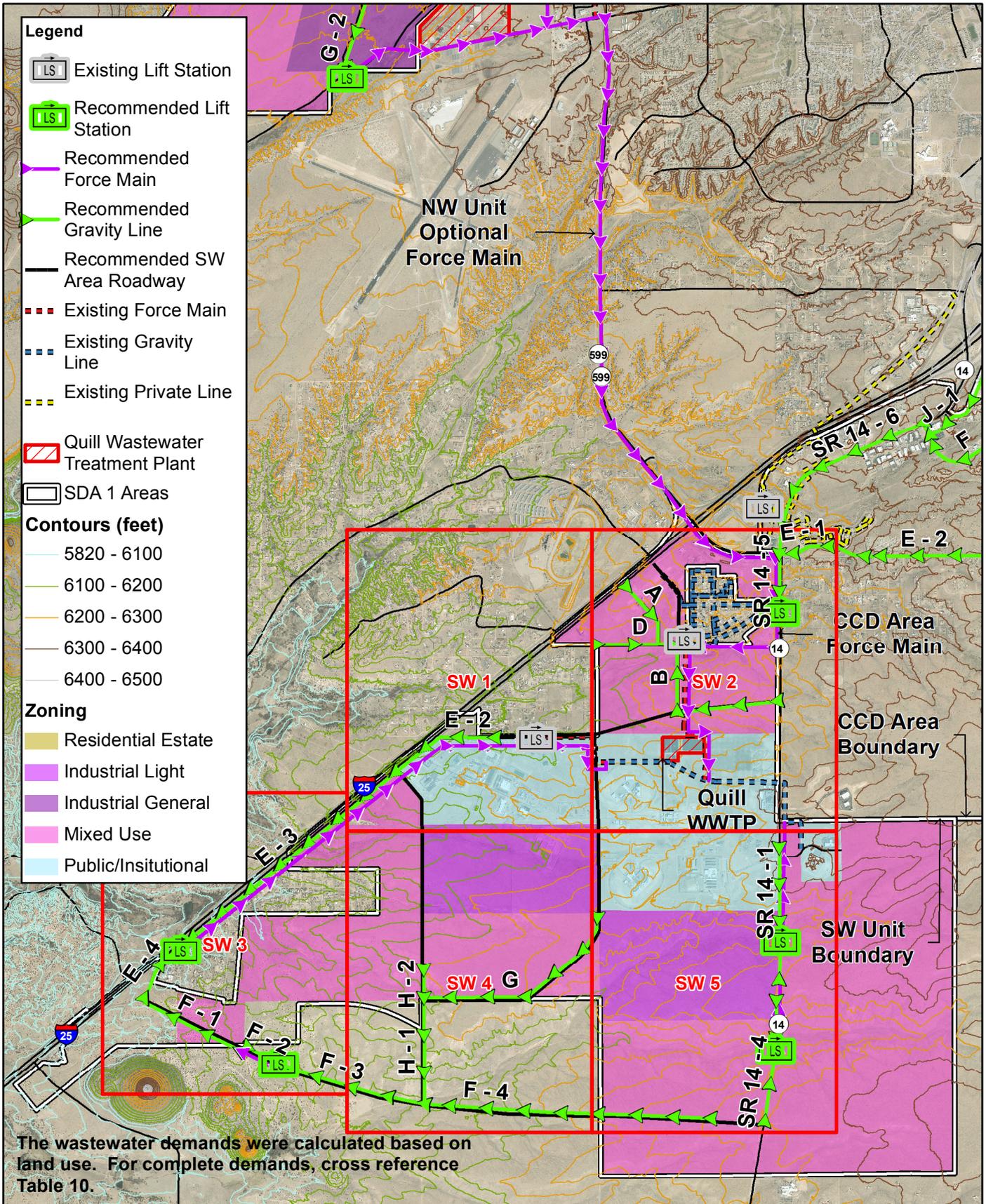


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Santa Fe County
IBA
NW 3
Wastewater
Infrastructure

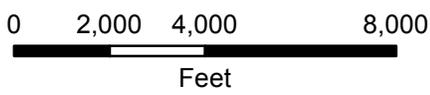
APPENDIX C



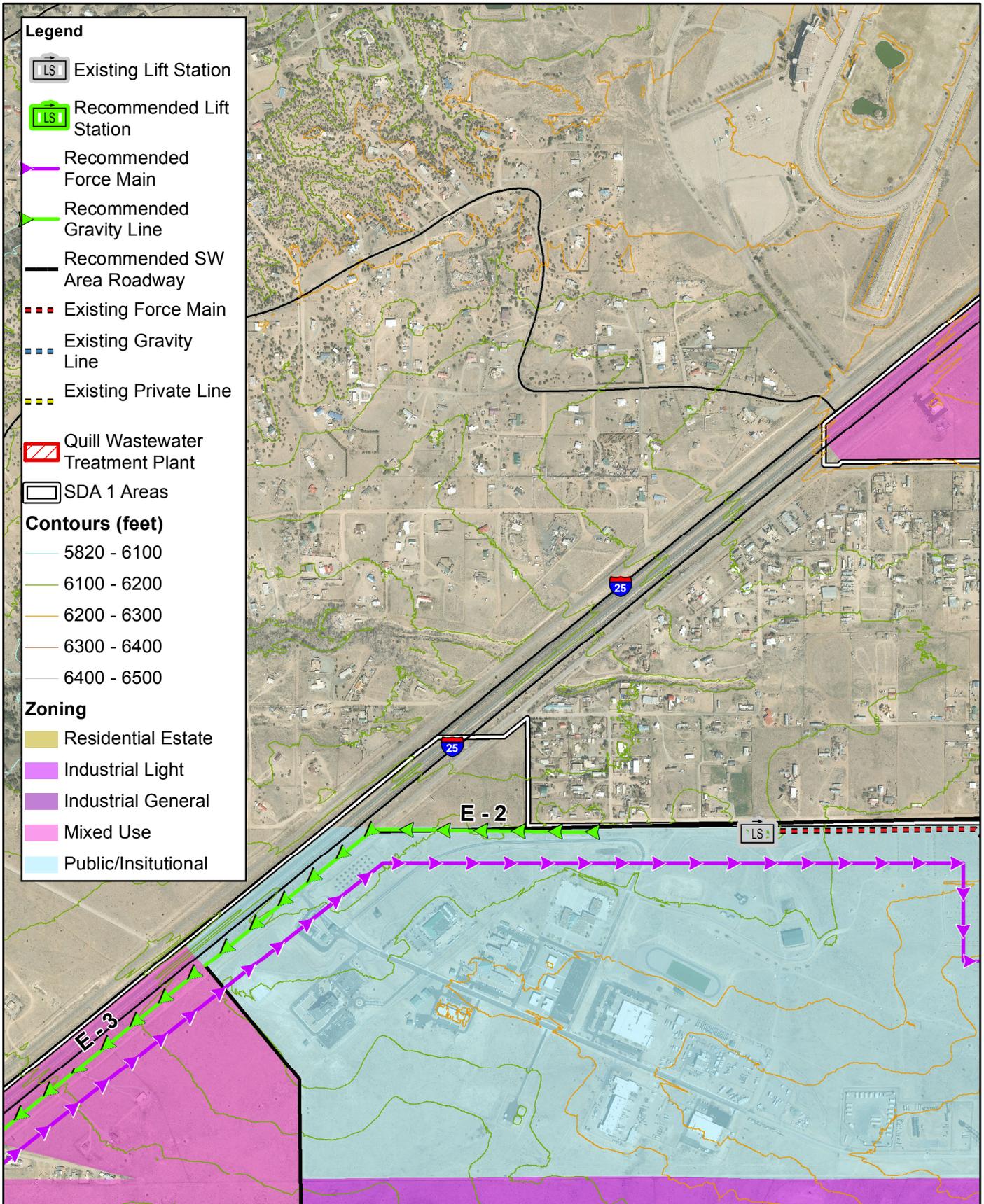
The wastewater demands were calculated based on land use. For complete demands, cross reference Table 10.



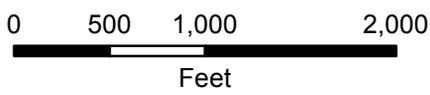
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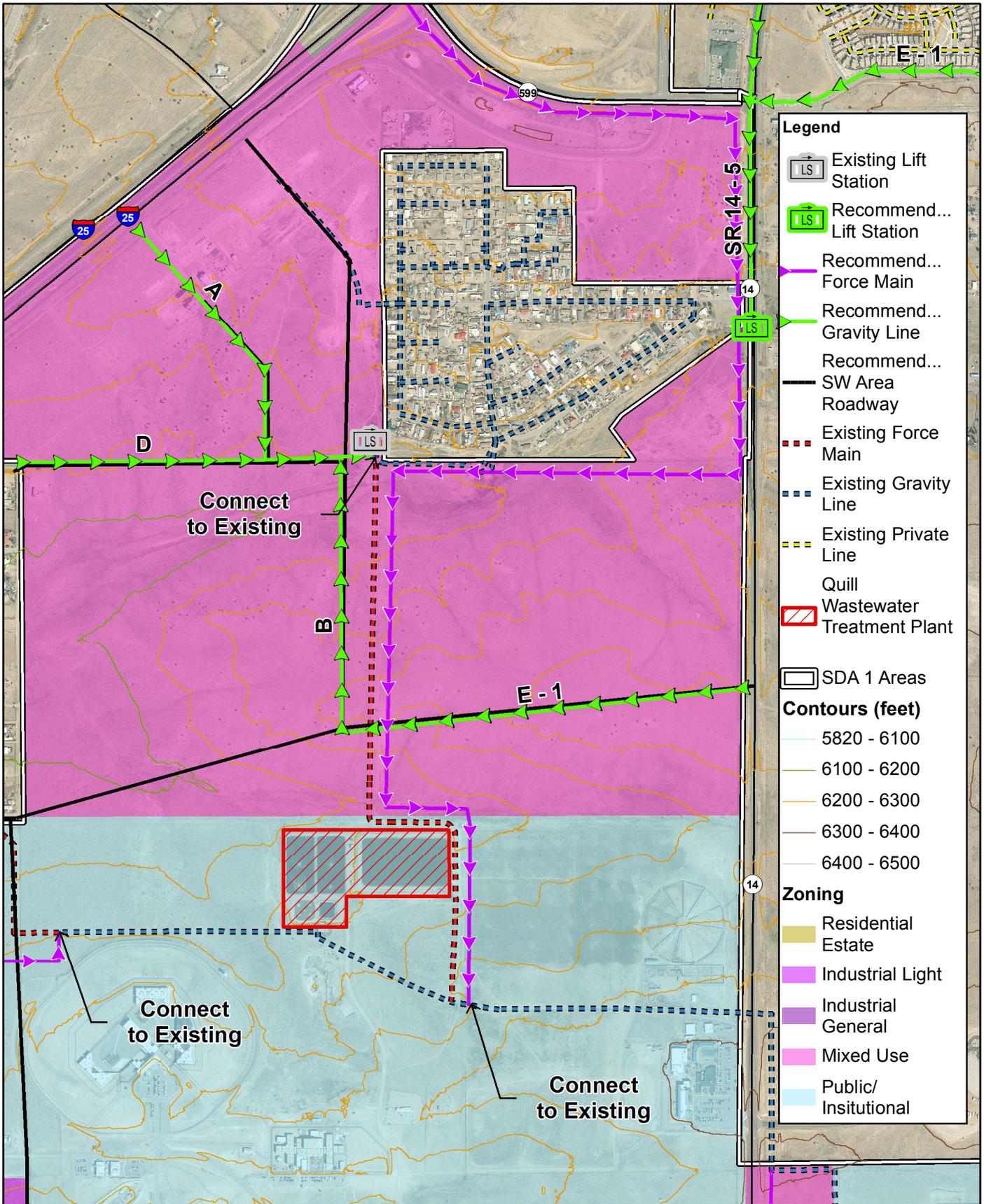
Santa Fe County
IBA
SW Unit SDA-1
Wastewater
Infrastructure



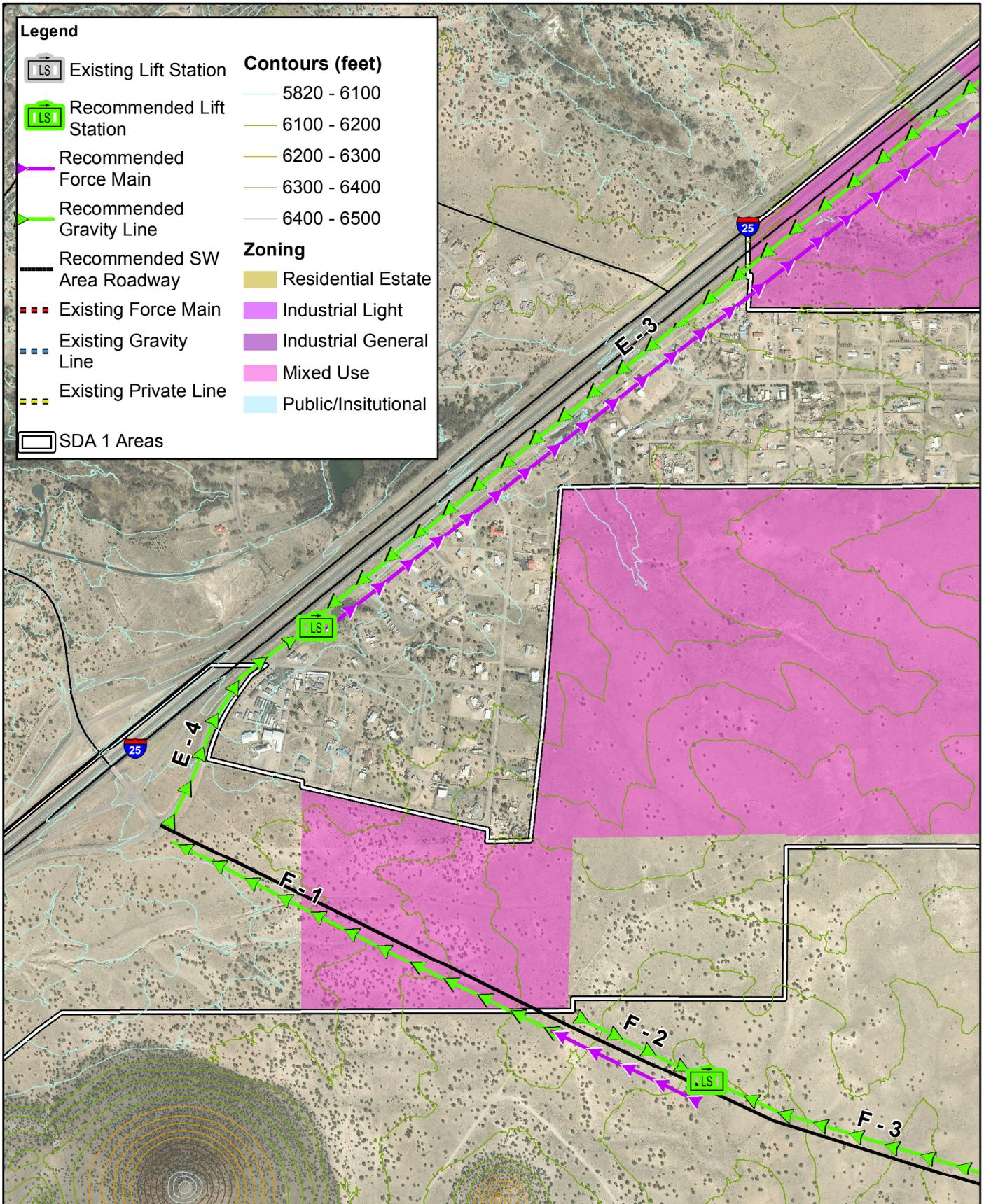
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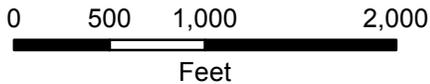
Santa Fe County
IBA
SW 1
Wastewater
Infrastructure



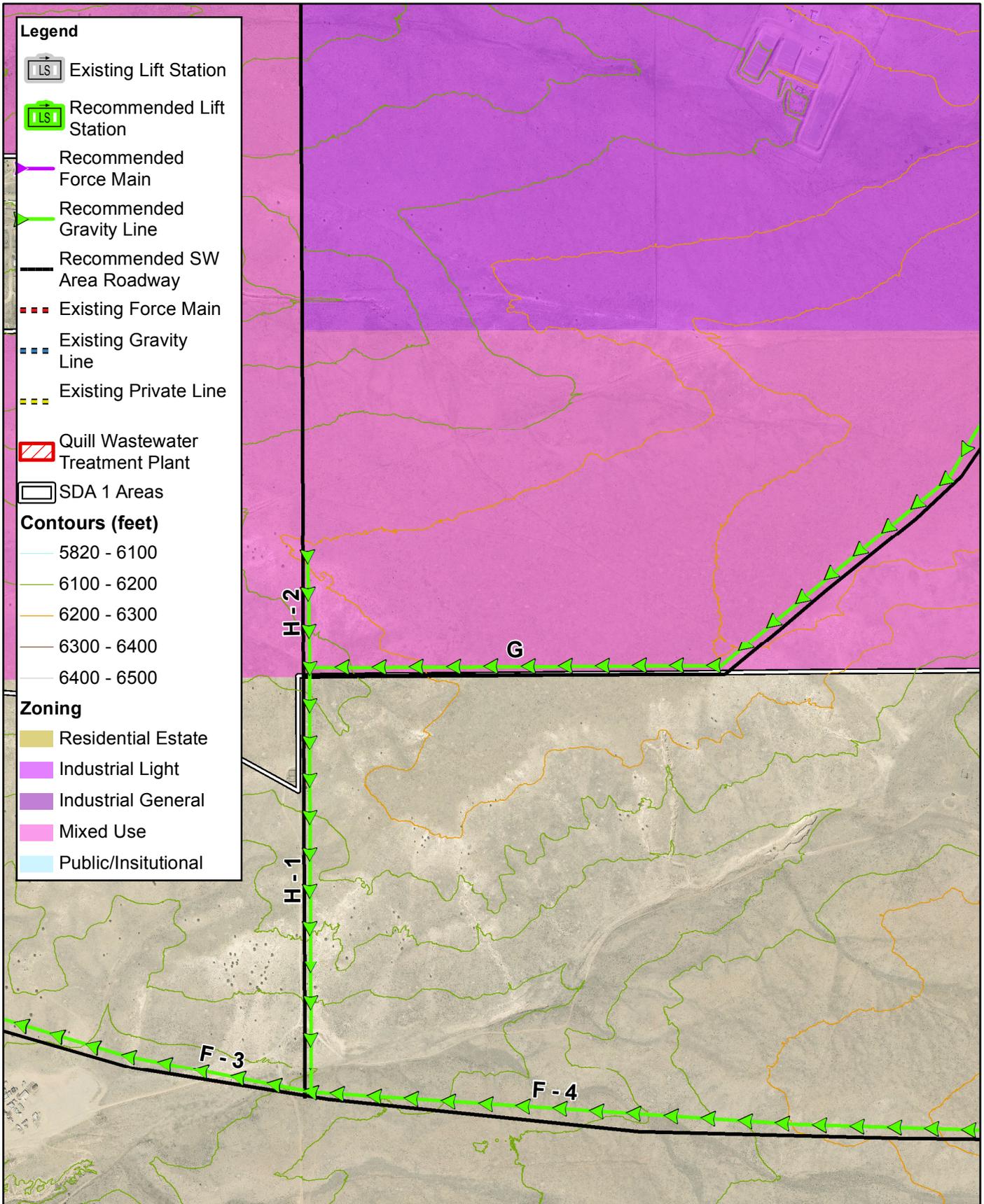
- Legend**
- Existing Lift Station
 - Recommend... Lift Station
 - Recommend... Force Main
 - Recommend... Gravity Line
 - Recommend... SW Area Roadway
 - Existing Force Main
 - Existing Gravity Line
 - Existing Private Line
 - Quill
 - Wastewater Treatment Plant
 - SDA 1 Areas
- Contours (feet)**
- 5820 - 6100
 - 6100 - 6200
 - 6200 - 6300
 - 6300 - 6400
 - 6400 - 6500
- Zoning**
- Residential Estate
 - Industrial Light
 - Industrial General
 - Mixed Use
 - Public/Insitutional



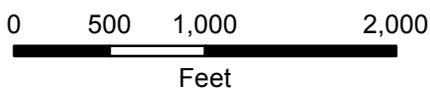
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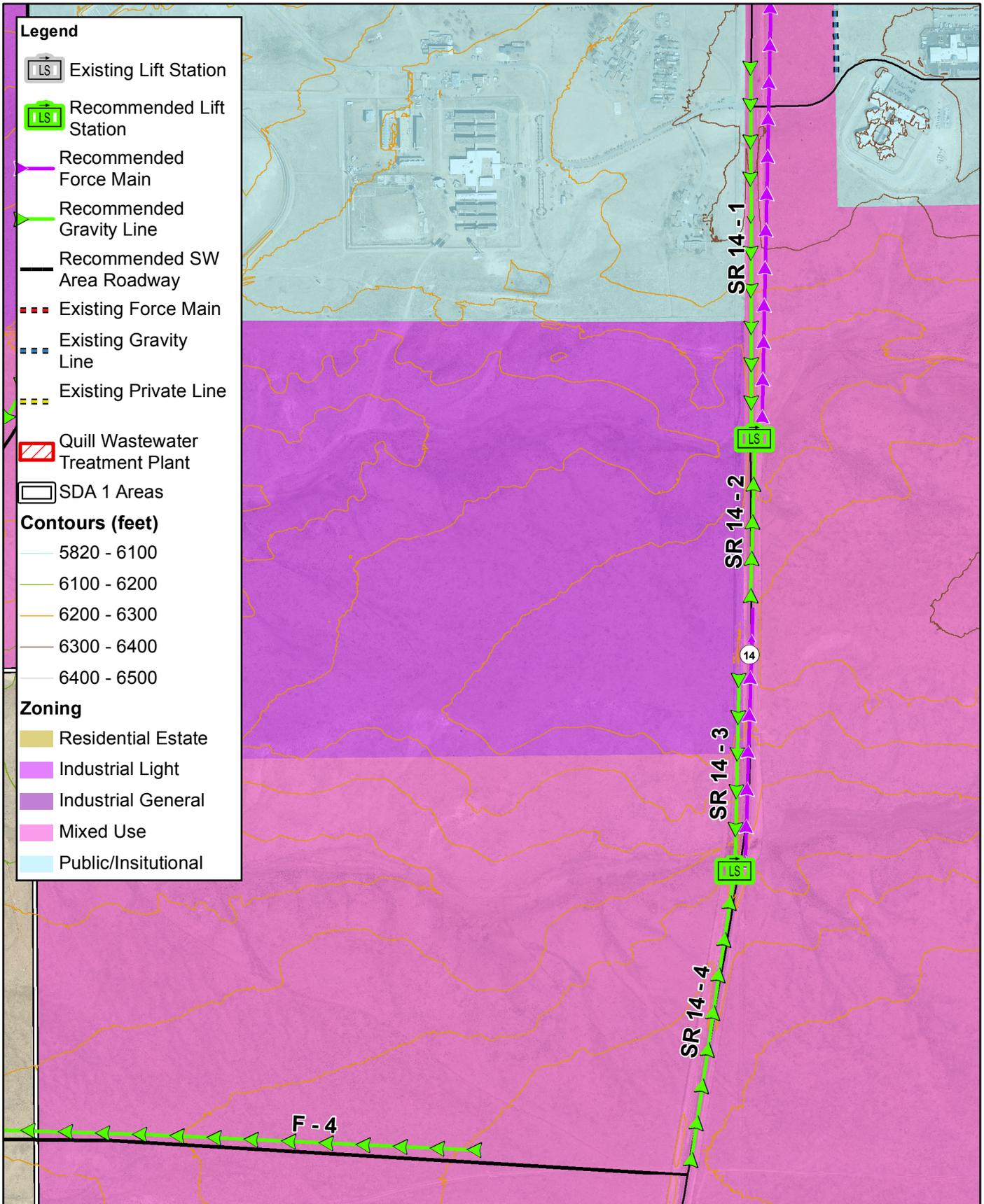
Santa Fe County
IBA
SW 3
Wastewater
Infrastructure



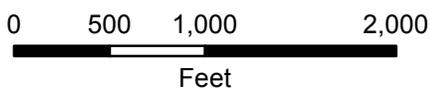
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Santa Fe County
IBA
SW 4
Wastewater
Infrastructure

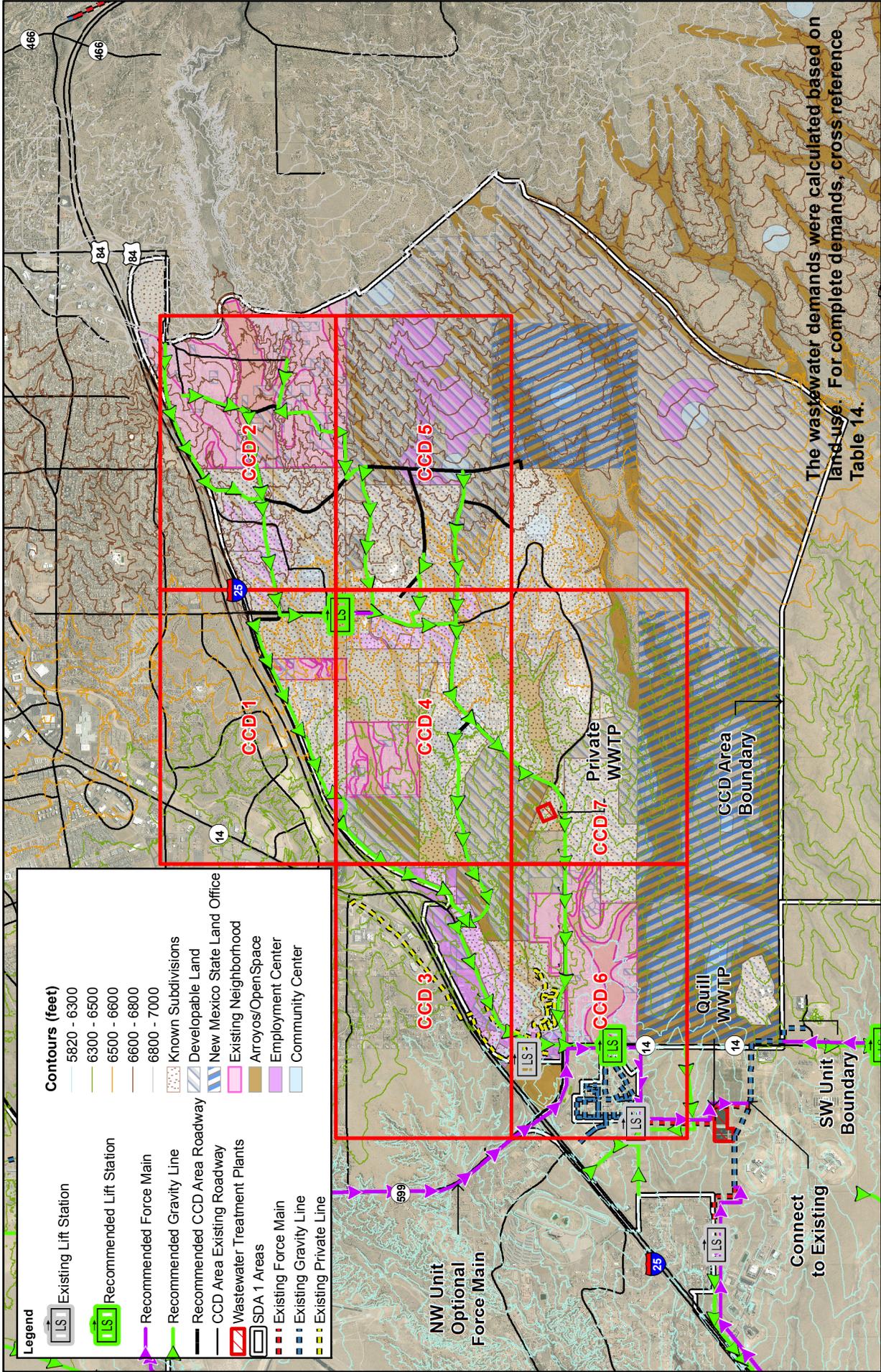


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Santa Fe County
IBA
SW 5
Wastewater
Infrastructure

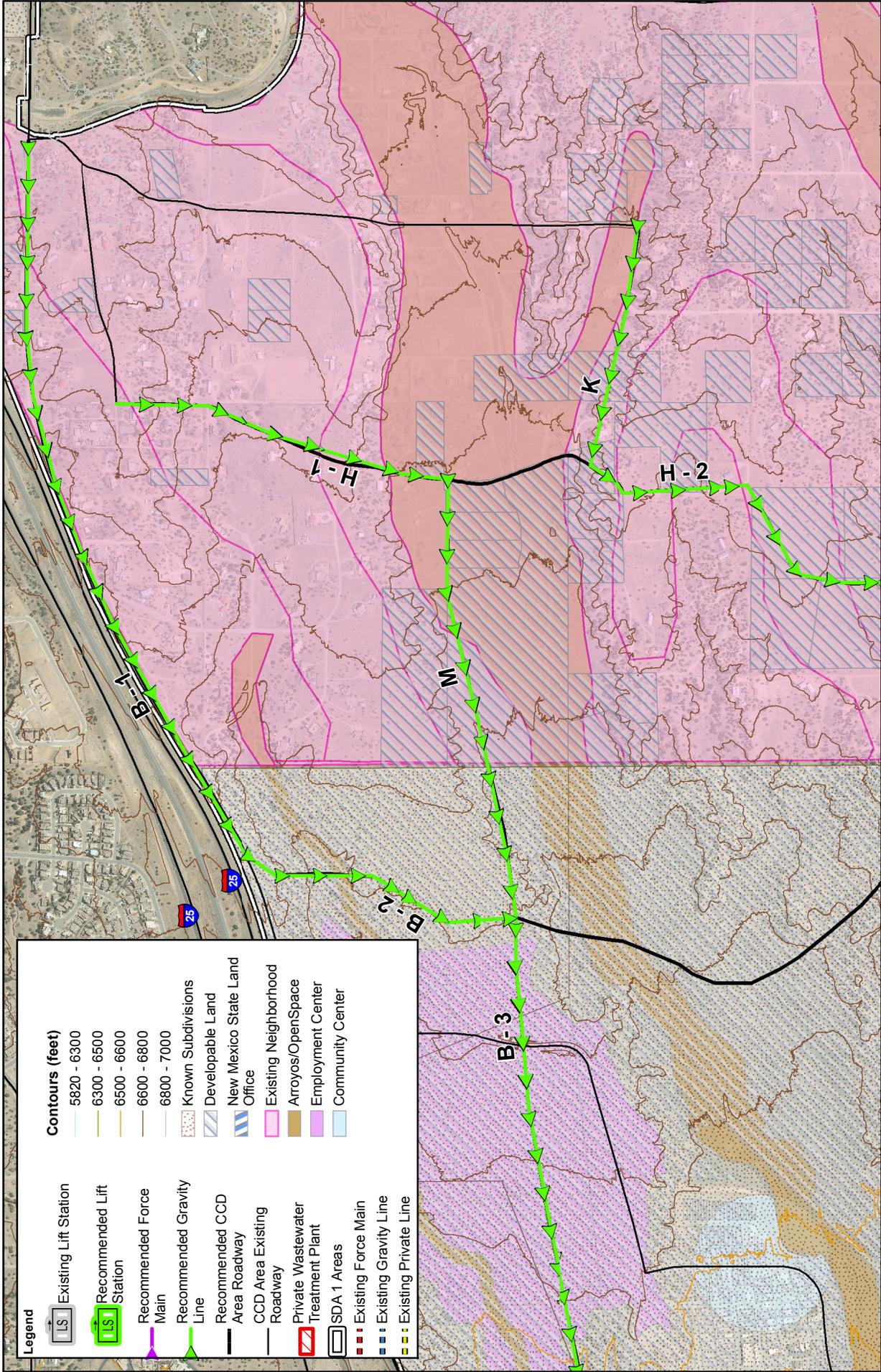
APPENDIX D



Santa Fe County
IBA
CCD SDA-1
Wastewater Infrastructure

0 5,000 10,000
 Feet

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Legend

Existing Lift Station	Contours (feet)
Recommended Lift Station	5820 - 6300
Recommended Force Main	6300 - 6500
Recommended Gravity Line	6500 - 6600
Recommended CCD Area Roadway	6600 - 6800
CCD Area Existing Roadway	6800 - 7000
Private Wastewater Treatment Plant	Known Subdivisions
SDA 1 Areas	Developable Land
Existing Force Main	New Mexico State Land
Existing Gravity Line	Office
Existing Private Line	Existing Neighborhood
	Arroyos/OpenSpace
	Employment Center
	Community Center

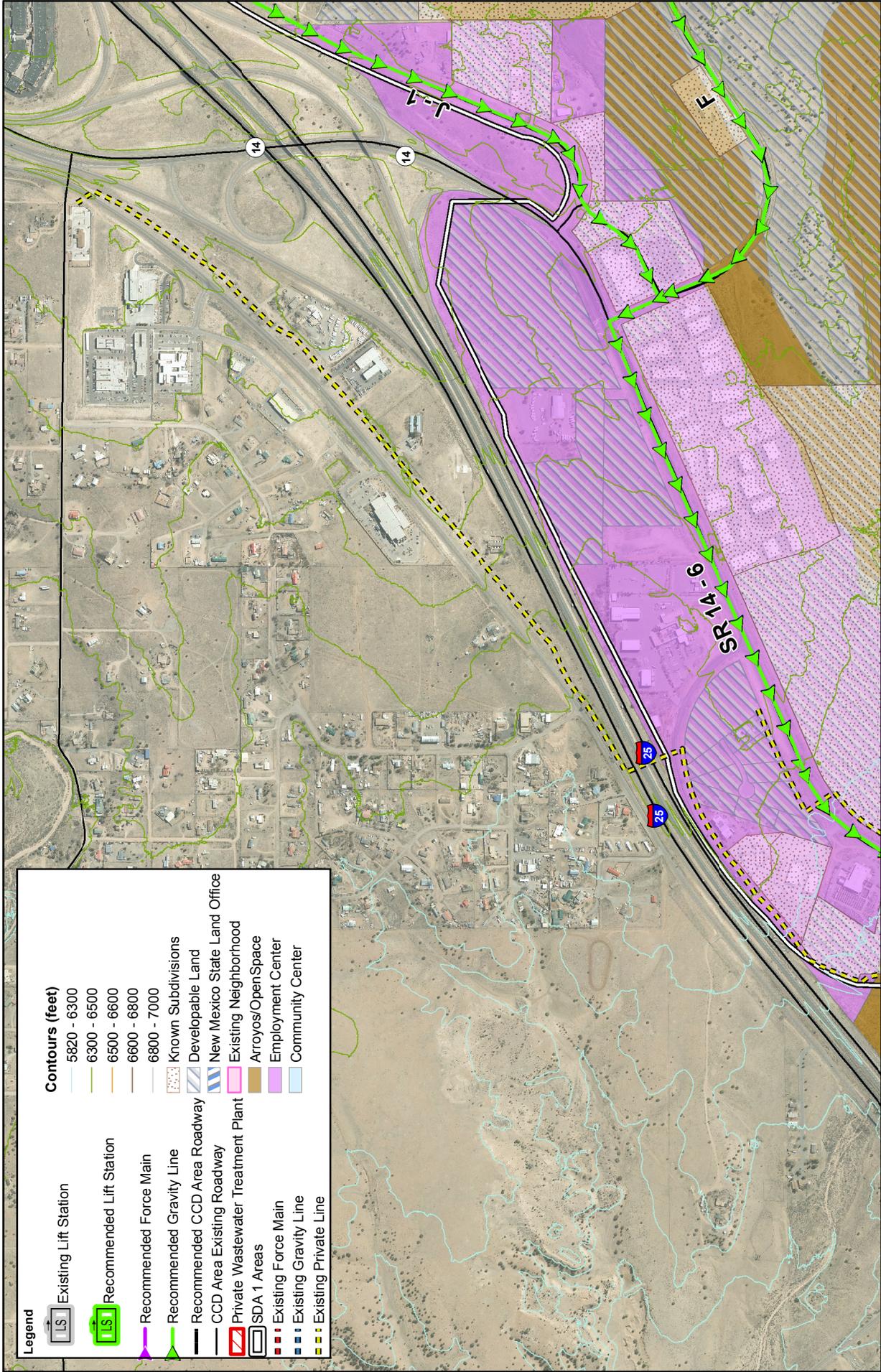
Santa Fe County
IBA
CCD 2

Wastewater Infrastructure

0 1,000 2,000 Feet

N

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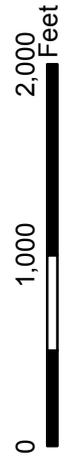


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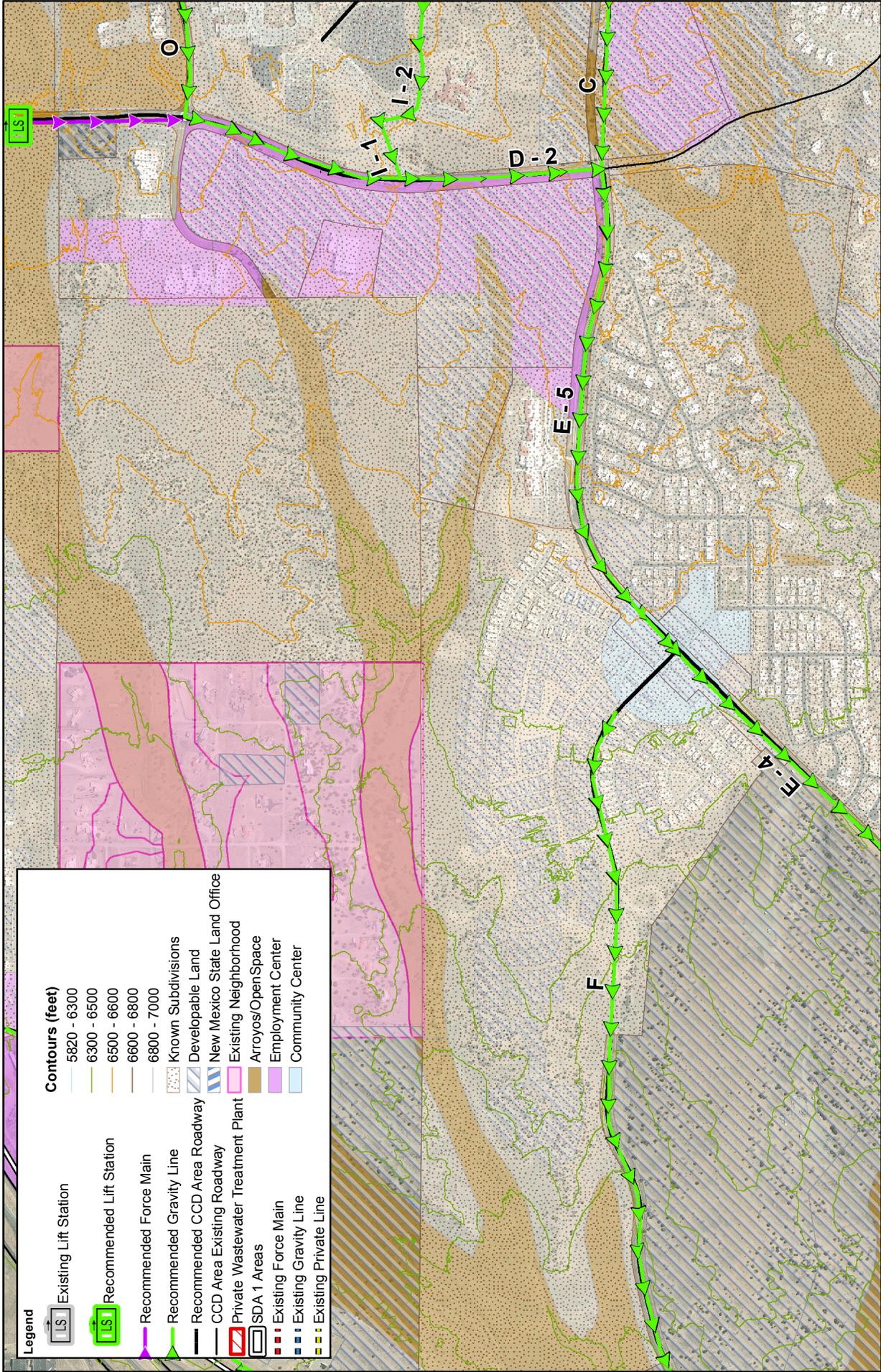
	Existing Lift Station		Recommended Lift Station
	Recommended Force Main		Recommended Gravity Line
	Recommended CCD Area Roadway		CCD Area Existing Roadway
	Private Wastewater Treatment Plant		Existing Neighborhood
	SDA 1 Areas		Arroyos/Open Space
	Existing Force Main		Employment Center
	Existing Gravity Line		Community Center
	Existing Private Line		Known Subdivisions
			Developable Land
			New Mexico State Land Office



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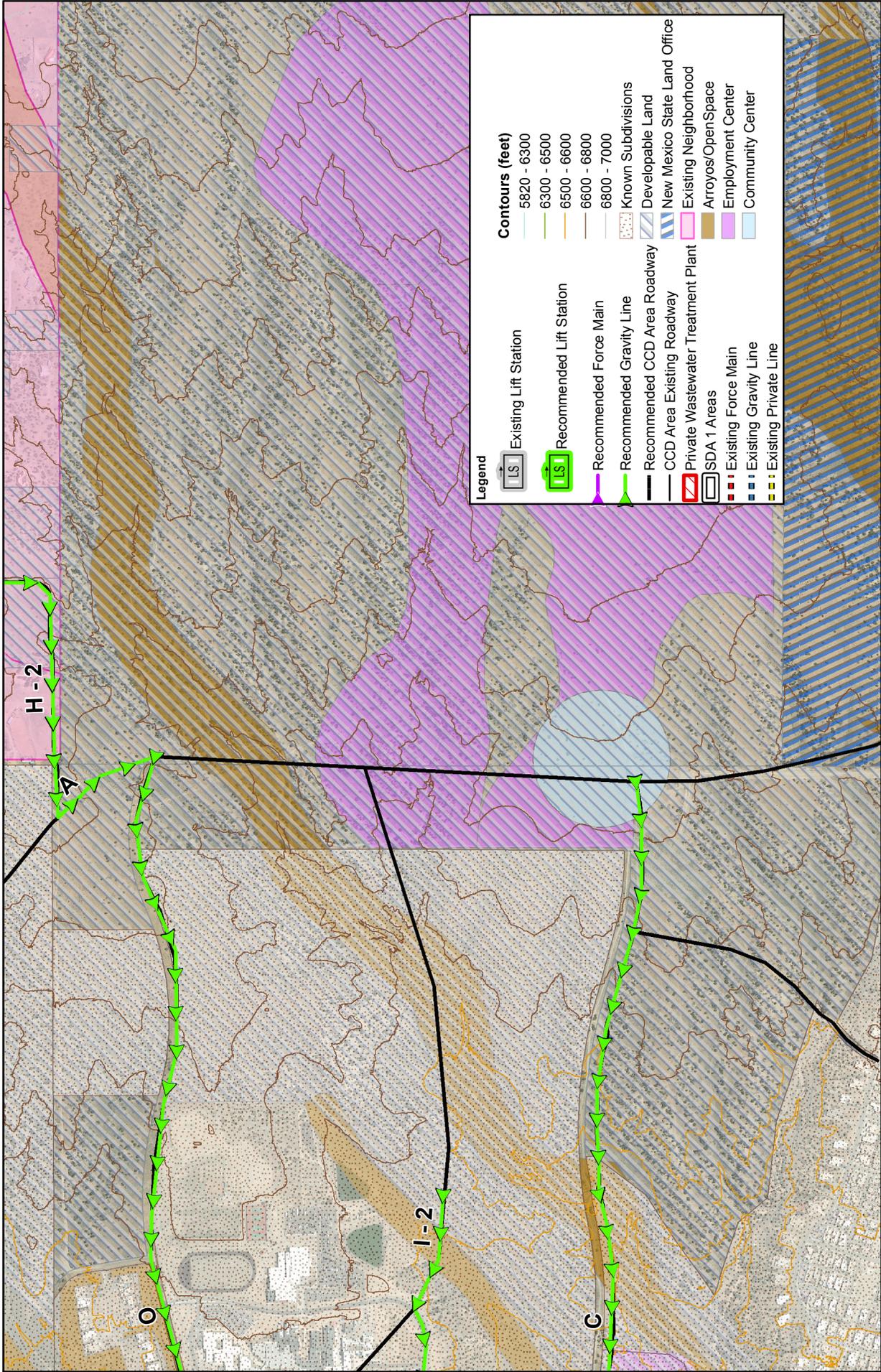
Santa Fe County
IBA
CCD 3
Wastewater Infrastructure



Santa Fe County
IBA
CCD 4
Wastewater Infrastructure

0 1,000 2,000
 Feet

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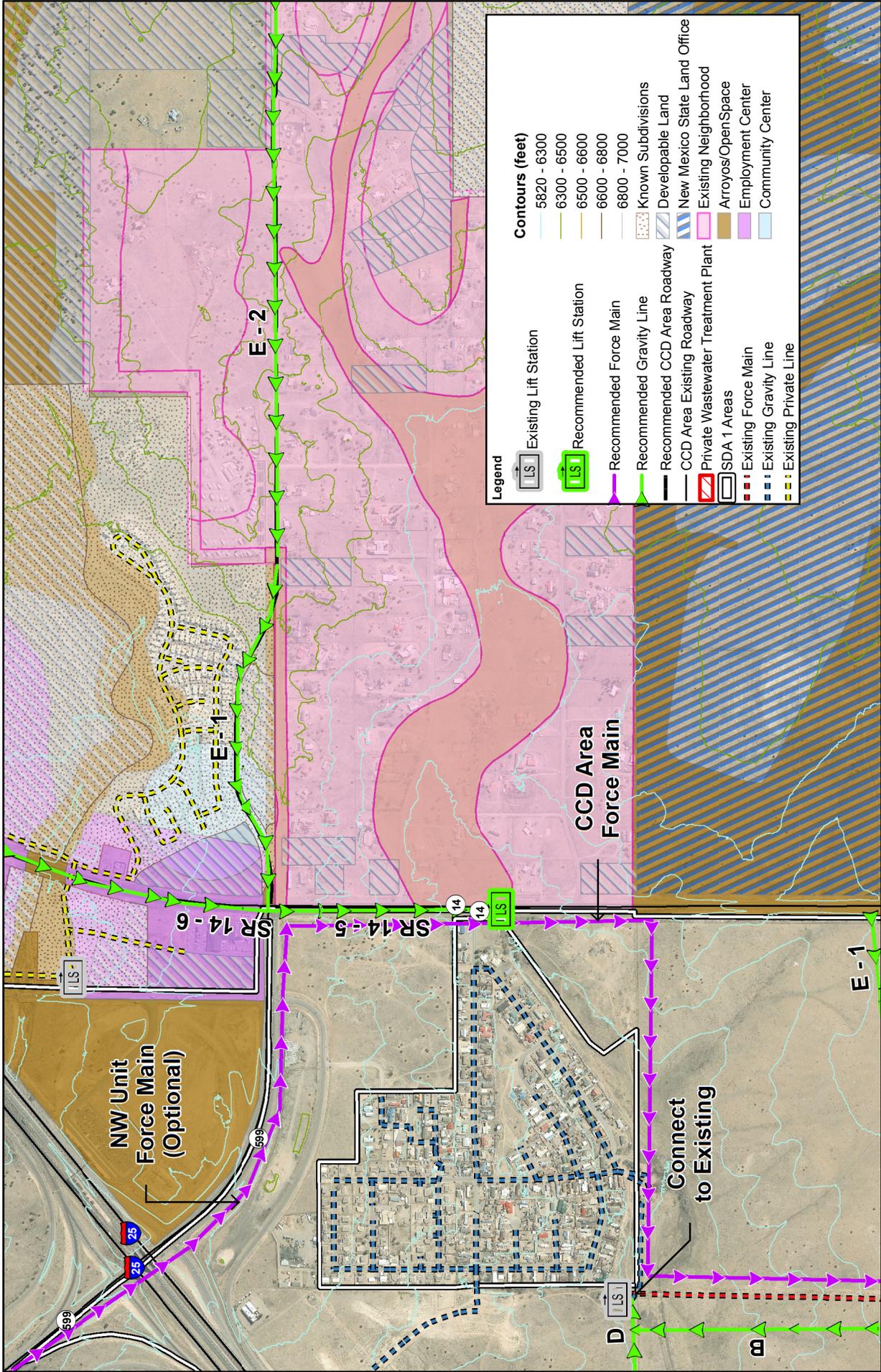
Santa Fe County
IBA
CCD 5

Wastewater Infrastructure

0 1,000 2,000 Feet

N

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Santa Fe County
IBA
CCD 6

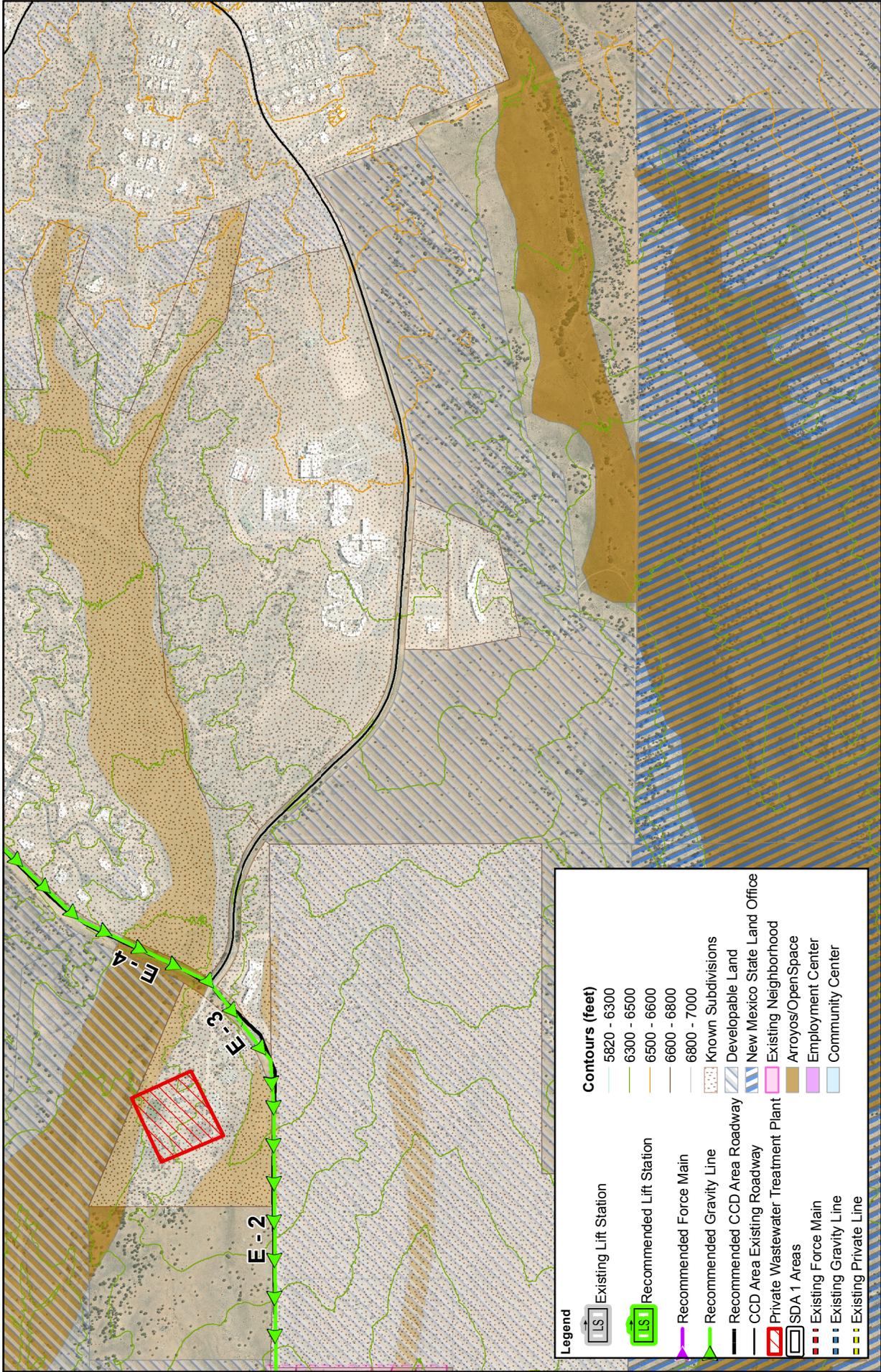
Wastewater Infrastructure

February 2017

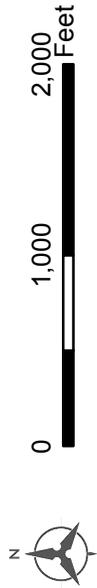
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Legend

Existing Lift Station	Contours (feet)
Recommended Lift Station	5820 - 6300
Recommended Force Main	6300 - 6500
Recommended Gravity Line	6500 - 6600
Recommended CCD Area Roadway	6600 - 6800
CCD Area Existing Roadway	6800 - 7000
Private Wastewater Treatment Plant	Known Subdivisions
SDA 1 Areas	Developable Land
Existing Force Main	New Mexico State Land Office
Existing Gravity Line	Existing Neighborhood
Existing Private Line	Arroyos/OpenSpace
	Employment Center
	Community Center



Santa Fe County
IBA
CCD 7
Wastewater Infrastructure



- Legend**
- Existing Lift Station
 - Recommended Lift Station
 - Recommended Force Main
 - Recommended Gravity Line
 - Recommended CCD Area Roadway
 - Private Wastewater Treatment Plant
 - SDA 1 Areas
 - Existing Force Main
 - Existing Gravity Line
 - Existing Private Line
 - Contours (feet) 5820 - 6300
 - 6300 - 6500
 - 6500 - 6600
 - 6600 - 6800
 - 6800 - 7000
 - Known Subdivisions
 - Developable Land
 - New Mexico State Land Office
 - Existing Neighborhood
 - Arroyos/Open Space
 - Employment Center
 - Community Center



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