2.1 STUDY AREA

The City of Ione is located in the western foothills of the Sierra Nevada Mountains in Amador County, California. The terrain in and around the City of Ione is characterized predominantly by gently rolling hills. Two state highways pass through the City of Ione, intersecting in the downtown commercial district. Highway 124 travels generally southwest to northeast through Ione, while Highway 104 travels generally southeast to northwest. The southern and more developed portion of the City is bisected east to west by Sutter Creek. Nearby communities include Clay to the west, Clements and Wallace to the south, and the Cities of Jackson, Sutter Creek, and Amador City to the east and northeast. The City of Sacramento is located approximately 40 miles to the northwest of the City of Ione. See Figure 2.1-1 (Proposed Project Location and Surrounding Vicinities).

The City of Ione's wastewater service area is divided by Sutter Creek with approximately 450 acres on either side of the creek. The service area consists of the resident population and a small number of commercial customers, but not the inmates and wards of the Mule Creek State Prison or the Preston Youth Correctional Facility. The main section of "Old" Ione is located generally east of the WWTP and south of Sutter Creek. The wastewater service area consists primarily of residential uses, as well as the main commercial area of the City, including retail shops, restaurants, and City Hall.

2.2 PHYSICAL ENVIRONMENT

TOPOGRAPHY

The City of Ione is situated on gentle slopes at the easterly end of the Ione Valley between elevations 270 and 350 feet. Sutter Creek is the principal drainage running from east to west through the valley.

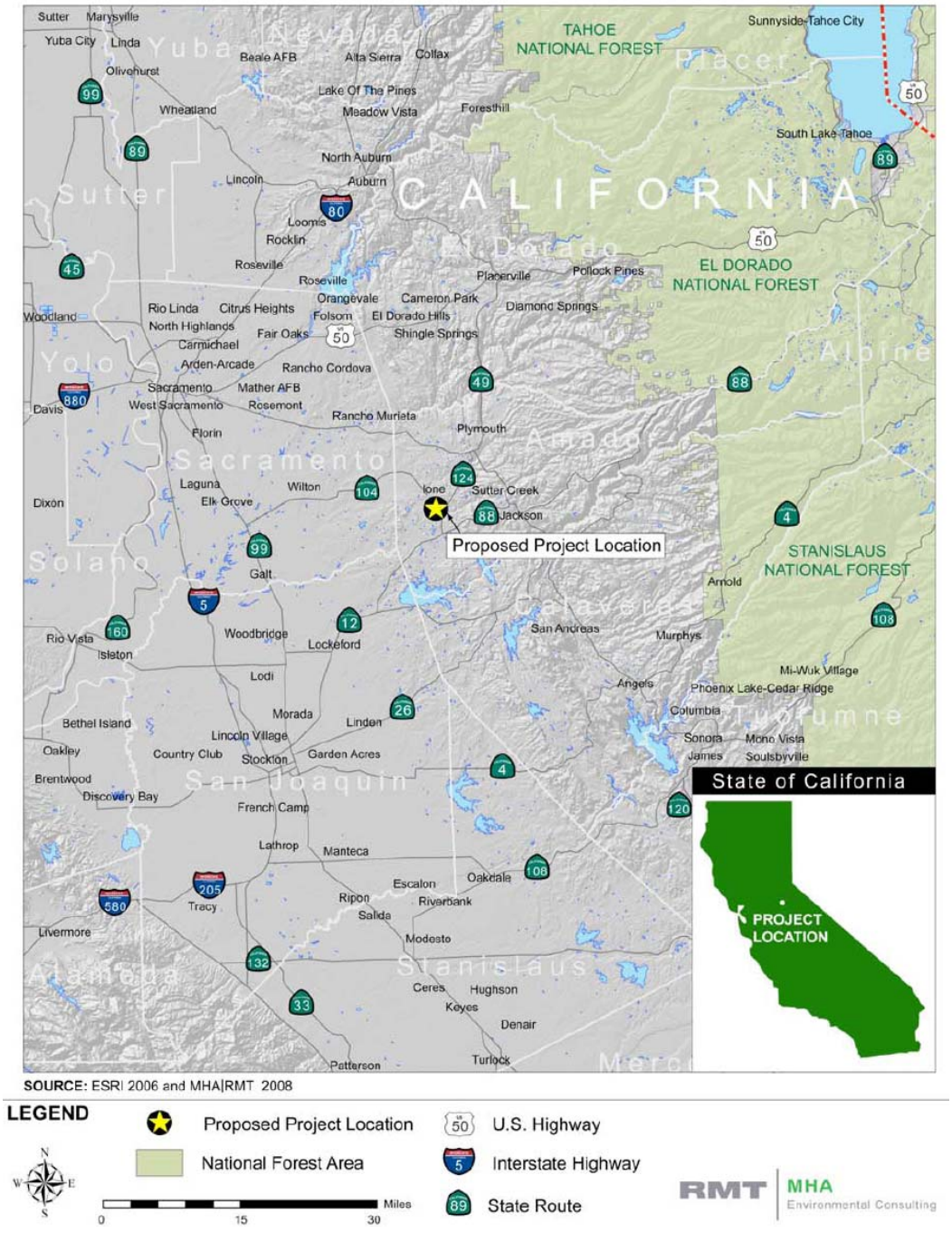
The rugged hilly land around Ione will probably preclude significant development beyond that which currently exists in the easterly and southerly portions of the current sphere of influence (SOI). Much of the currently planned and anticipated development in Ione is expected in the flatter valley bottomland west of the existing community.

CLIMATE

The climate in Ione is hot and dry in the summer and mild and wet in the winter. Average annual rainfall is approximately 22 inches, falling primarily between November and April. Prevailing winds are generally from the west.

Climate conditions are very nearly ideal for land disposal of wastewater by crop irrigation. The growing season extends from the beginning of March to the beginning of December. This led in the past to an agreement between the Amador Regional Sanitation Authority (ARSA) and the State of California for wastewater disposal by pasture crop irrigation on 237 acres of land owned by the State, but within the City limits. In the 1990s the ARSA began conveying treated secondary effluent via a series of canals and pipes through Henderson and Preston Reservoirs to these fields where the effluent was used to irrigate crops. With the development of the Castle Oaks Area this disposal option is no longer available and ARSA now has an agreement with the City to dispose of their treated secondary effluent.

FIGURE 2.1-1: PROPOSED PROJECT LOCATION AND SURROUNDING VICINITIES



SOURCE: ESRI 2006 and MHA|RMT 2008

LEGEND

Proposed Project Location
National Forest Area
U.S. Highway
Interstate Highway
State Route
Miles
0
15
30

RMT | MHA Environmental Consulting

HYDROLOGY

Stream courses through the Ione Valley run generally to the southwest from the foothills to the Central Valley. The major stream flows in the vicinity of Ione are Sutter Creek, which runs through the center of town and Mule Creek, located at the western city limits. Both flow into Dry Creek

west of the City which eventually drains into the Mokelumne River. The hilly area south of the City, but within the SOI drains westerly and directly into Dry Creek.

Most minor drainages around Ione are tributary to Sutter Creek with the exception of those emanating from the Preston Reservoir area and portions of the Castle Oaks Golf Course and Subdivision. These generally drain into Mule Creek. Both Sutter Creek and Mule Creek are intermittently dry in the summer months.

Beneficial uses of Sutter Creek immediately downstream from the City are agricultural irrigation, recreation, and aesthetic enjoyment. The Central Valley RWQCB, charged with enforcing water quality standards in the area, has placed restrictions prohibiting discharge into the creeks to preserve water quality. Additionally, the State monitors development projects through the environmental review process to eliminate the possibility of pollution due to local runoff.

The current quality of surface waters in the study area is not well documented. Tests conducted in 1984 as part of a wastewater service analysis for the Mule Creek State Prison project identified that low flow quality of Sutter Creek water west of Ione may be impacted by adjacent land uses, including cattle grazing. Analysis of water in the creek has been performed by the City and reported to the RWQCB since 1997. Prior to 2001, this analysis consisted solely of electrical conductivity (EC). The RWQCB has cited some evidence of elevated EC downstream of the secondary WWTP, however, additional sampling and analysis has been inconclusive.

GROUNDWATER

Groundwater in the Ione Valley is used for agricultural purposes and, to a much lesser extent, for domestic water supply. Previous studies have found that groundwater is typically shallow (less than 100 feet), of limited available capacity, and of marginal quality. Wastewater disposal to land has been practiced in the valley by the State (Preston Youth Correctional Facility), the City and ARSA for many years.

Deep ruts in the Sutter Creek streambed appear to intersect the groundwater table resulting in stable pools of water just below the general streambed elevation long after surface flow in the stream channel has ceased. The relatively shallow groundwater table is demonstrated by a relatively shallow pond dug into the valley floor at the southeast corner of the City WWTP site from which groundwater has historically been extracted for agricultural irrigation purposes.

Due to topography and hydrology of Sutter Creek and Ione Valley, it is expected that some Sutter Creek water infiltrates into the Ione Valley groundwater in winter/spring to recharge the groundwater removed by wells over the previous irrigation season. This infiltration phenomenon is evident at the upstream end of Ione Valley even during summer. Intermediately during the dry season there is standing water and flow in Sutter Creek. This water is absorbed by valley sediments and flows subsurface towards the outlet of Ione Valley. If wells are extracting water from the Ione Valley aquifer, then this subsurface flow replaces the net loss of water (primarily agricultural evapotranspiration) resulting from groundwater extraction.

The shallowness of groundwater in Ione Valley and its connection to Sutter Creek are important concepts in understanding groundwater movement in the vicinity of the City's WWTP (ECO:LOGIC Engineering June 2006).

GEOLOGY AND SOILS

The Ione area is divided between two geomorphic provinces, the Sierra Nevada section to the east and the Great Valley of California to the west. These features were created by a series of geologic events over millions of years. Mineral resources, the products of Ione's geologic history, have played an important role in the City's development.

Gold found in and along stream channel in the mid-1800s and copper mined from the hills east of Ione through the 1900s were the principal metallic ores of significance in the area.

Underlying the valley is the Ione formation of clay, sand and conglomerates created by erosion of materials from the Sierra Nevada Mountains and subsequent sedimentation and consolidation in the marine environment that existed millions of years ago in the Eocene geologic period. The 400 foot thick formation has been commercially mined since the mid-1800s for clay and lignite, and more recently for glass and sand.

Surface soils overlying the Ione formation consist in the hilly areas generally of shallow gravelly clay loam layers of moderate to low permeability. In the valley bottomlands, somewhat deeper sections of sandy, silt, and clay loam soils predominate and demonstrate moderate permeability.

Surface permeability and depth to the relative impervious consolidated clays are key factors influencing the potential for wastewater disposal to land.

The existing secondary WWTP is situated on quaternary alluvium of the Modesto-Riverbank formation that has been deposited on the Ione formation(?). The soils are mapped as Honcut very fine(?) sandy loam on Honcut loam over clay. The soils are not expansive.

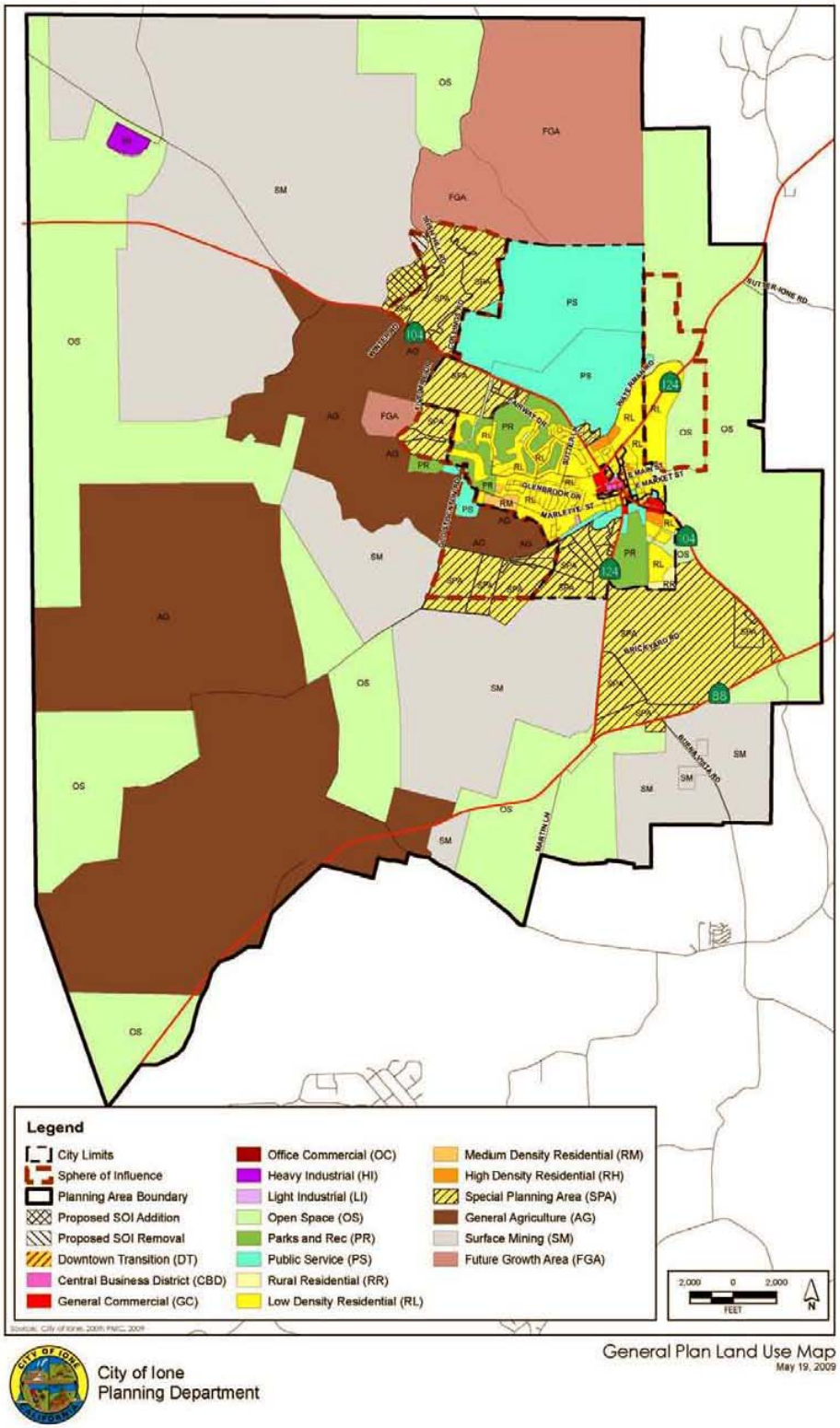
There are no faults mapped on the Alquist-Priolo Earthquake zoning maps near the site. Wallace and Kuhl reported a segment of the foothills fault system is located approximately one mile east of the site, which is capable of producing a 6.5 magnitude quake. Their further analysis indicated a 10 percent probability that peak ground acceleration (pga) of the area could exceed 0.14 times the acceleration due to gravity (0.14g) within the next 50 years. The California Geological Society reports the same probability for a pga of 0.15g on soft alluvium in the area. These values are indicative of relatively moderate to low ground shaking. Previous slope stability analysis at the site indicated factors of safety considered stable, except for the stream bank. They further concluded that failure of the stream bank would not impact the WWTP ponds (ECO:LOGIC Engineering June 2006).

2.3 LAND USE

The City of Ione's General Plan was adopted in 2009. The General Plan provides policies that guide the land use development of Ione. Figure 2.3-1 (Planning Areas and General Plan Land Use Designations) reflects the most recent General Plan land use designations and planning boundaries.

In the past eighteen years, the City has experienced increased development, evidenced by the approval and construction of the Castle Oaks Golf Subdivision and Golf Course in the 1990s. This area continues to build out by adding connections to the wastewater system. Future growths anticipated in the near term, as well as projections for the next 30 years, are included in Section 2.4 (Historical and Future Growth).

FIGURE 2.3-1: PLANNING AREAS AND GENERAL PLAN LAND USE DESIGNATIONS



The City has a central business district comprised of various retail and office uses. While no industrial uses currently exist within the city limits, two mining companies, Unimin Mine and Ione Minerals lease property for mining operations to the immediate south of the City of Ione.

2.4 HISTORICAL AND FUTURE GROWTH

The population of Ione was estimated to be 6,280 at the end of 1990, approximately 4,240 of which were confined to group quarters associated with State facilities (Mule Creek State Prison and Preston Youth Correctional Facility). As of July 1, 2003, the U.S. Census Bureau estimated the population of Ione to be 7,514, which includes the inmates at the Mule Creek State Prison and the wards at the Preston Youth Correctional Facility. Based on historical data, the population growth from 1990 to 2000 was approximately 0.45 percent. Existing commercial development is primarily located in the downtown area and consists of office and retail development totaling to approximately 110,000 square feet.

The 2009 General Plan estimates that the population in Ione will reach 17,258 by the year 2030, excluding population at State facilities. This population corresponds to roughly 7,125 single and multi-residential units. In addition, the General Plan projects a growth in commercial and industrial development. Presented in Table 2.4-1 (General Plan Development by 2030) is the growth development by 2030 as presented in the General Plan.

TABLE 2.4-1: GENERAL PLAN DEVELOPMENT BY 2030

Description	Total Development	Resident Population
Single Family Units	5,688	15,016
Multi-Family Units	1,437	2,242
Commercial, square feet	8,515,175	-
Industrial, square feet	10,468,121	-

The projection shown in the table above assumes very rapid growth especially for commercial and industrial development. This development is based upon City zoning and does not necessarily reflect the actual development that will occur in the next twenty years. As a result this Master Plan will look at a reduced rate of development based upon annual growth of 5 percent which is significantly greater than historical growth. Presented in Table 2.4-2 (Master Plan Development by 2030) are the revised growth projections based on the reduced rate of development. City intends to provide the maximum amount of flexibility in wastewater service planning and may increase or decrease the rate of development so long as the overall wastewater service is adequate.

TABLE 2.4-2: MASTER PLAN DEVELOPMENT BY 2030

Description	Total Development	Resident Population
Single Family Units	4,151	10,959
Multi-Family Units	541	844
Commercial, square feet	1,770,000	-
Industrial, square feet	1,460,000	-

STATE OF CALIFORNIA OPERATED FACILITIES

Mule Creek State Prison, Preston Youth Correctional Facility, and the CDF Forest Academy are institutions located within the City Limits of Ione, run by the State of California and served primarily by separate collection, treatment, and disposal systems. The population of these facilities is not included in the estimates for growth in this document. The long-term feasibility of combining/sharing wastewater facilities with some or all of these State-run institutions is being evaluated. With the exception of the CDF facility, the Mule Creek State Prison and Preston Youth Correctional Facility are not being considered in this Master Plan. However, nothing in this Master Plan is intended to preclude future potential agreements for the City to provide wastewater service to these and other wastewater sources in the region, consistent with state policies to encourage regionalization of wastewater treatment and disposal.