

4.6 GEOLOGY, SOILS, AND SEISMICITY

This section summarizes information on geology, seismic hazards, and soils relevant to the Proposed General Plan and Focused Growth Plan. The potential impacts of the Proposed General Plan and Focused Growth Plan with regard to these potential hazards is then evaluated.

A. Regulatory Framework

The State of California has established a variety of regulations and requirements related to seismic safety and structural integrity, including the California Building Code, the Alquist-Priolo Earthquake Fault Zoning Act and the Seismic Hazards Mapping Act.

1. California Building Code

The California Building Code (CBC), known as the California Building Standards Code, is included in Title 24 of the California Code of Regulations. The CBC incorporates the International Building Code (IBC), a model building code adopted across the United States.

The CBC has been amended and adopted as Title 15 of the Chino Municipal Code, which is the Building and Construction Code for the City of Chino and regulates all building and construction projects within the City. The CBC is updated every three years, and the current CBC is from 2007. All developments in Chino applying for a permit are subject to the 2007 Building Code as amended in Title 15 of the Chino Municipal Code until the 2010 Building Code is adopted by the City.

Through the CBC, the State provides a minimum standard for building design and construction. The CBC contains specific requirements for seismic safety, excavation, foundations, retaining walls and site demolition. It also regulates grading activities, including drainage and erosion control.¹

¹ California Building Standards Commission, 2002, *2001 California Building Standards Administrative Code California Code of Regulations, Title 24, Part 1.*

2. Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act² was passed in 1972 to mitigate the hazard of surface faulting to structures used for human occupancy. The main purpose of the Act is to prevent the construction of buildings used for human occupancy on top of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards, such as ground shaking or landslides.³

The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones or Alquist-Priolo Zones)⁴ around the surface traces of active faults, and to issue appropriate maps. The maps are then distributed to all affected cities, counties and State agencies for their use in planning and controlling new or renewed construction. Generally, construction within 50 feet of an active fault zone is prohibited. The California Geologic Survey does not include the City of Chino on its list of cities affected by Alquist-Priolo Earthquake Fault Zones.⁵

3. Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically-induced landslides.⁶ Under this Act, seismic hazard zones are to be mapped by the State Geologist to assist local governments in land use planning. The Act

² Called the *Alquist-Priolo Special Studies Zones Act* until renamed in 1993.

³ California Geological Survey, Alquist-Priolo Earthquake Fault Zones, <http://www.consrv.ca.gov/CGS/rghm/ap/>, accessed on December 9, 2009.

⁴ Earthquake Fault Zones are regulatory zones around active faults. The zones vary in width, but average about ¼-mile wide.

<http://www.consrv.ca.gov/cgs/rghm/ap/index.htm>, accessed on December 9, 2009.

⁵ California Geological Survey, Alquist-Priolo Earthquake Fault Zones, Table 4, <http://www.consrv.ca.gov/CGS/rghm/ap/affected.htm>, accessed on December 9, 2009.

⁶ California Geological Survey, Alquist-Priolo Earthquake Fault Zones, <http://www.conservation.ca.gov/CGS/rghm/ap/Pages/Index.aspx>, accessed on December 9, 2009.

states that “it is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety.”⁷ Section 2697(a) of the Act states that “cities and counties shall require, prior to the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard.” The State Geologist has mapped part of Riverside-Western San Bernardino County, but this does not include Chino.⁸ However, Chino has been mapped by the US Geological Survey (USGS), as described below.

B. Existing Conditions

This section discusses the regional and local geology and seismic activity relevant to the Chino area.

1. Seismicity

Due to Chino’s loosely compacted, silty, sandy alluvial soil and shallow groundwater, ground shaking and liquefaction present the most significant hazards during a moderate-to-significant earthquake.⁹

According to the USGS, there is one active fault in the Chino area: the Chino-Central Avenue Fault. The fault has two segments that run roughly south-east to north-west and are found on the western edge of the City and

⁷ California Public Resources Code, Division 2, Chapter 7.8, Article 7.8, Section 2691(c).

⁸ California Geological Survey-Alquist-Priolo Earthquake Fault Zones-Official Release Announcement-Download GIS Data for Riverside-Western San Bernardino County Area,
http://www.conservation.ca.gov/cgs/rghm/ap/gis_download/Pages/gis_download_wrivernside.aspx, accessed on December 9, 2009.

⁹ City of Chino, 2008, *Emergency Operations Plan*, Part 1-Basic Plan, II. Mitigation, page 15.

just to the west in the City of Chino Hills, as shown in Figure 4.6-1. This fault is a sub-surface fault that is not expected to rupture, and therefore is not mapped according to the Alquist-Priolo Act.

a. Ground Rupture

As discussed in section A.2, above, the California Geological Survey (CGS) has developed a list of cities affected by surface fault ruptures, referred to as the Alquist-Priolo Earthquake Fault Zones.¹⁰ Chino is not on the list because the CGS has determined that the fault in Chino does not present a risk of ground rupture in the event of an earthquake.

b. Ground Shaking

Chino is within a seismically active region and earthquakes have the potential to cause ground shaking of significant magnitude. The major regional faults with potential to affect Chino include the Sierra Madre, San Jacinto, and the San Andreas faults. The City of Chino is approximately 12 miles from the Sierra Madre Fault, 20 miles from the San Jacinto Fault, and 43 miles from the San Andreas Fault.

Ground shaking is the most significant source of widespread earthquake damage. The intensity of ground shaking can be several times greater on sites underlain by thick deposits of saturated sediments than on bedrock. The amount of ground shaking at a particular site depends on:

- ◆ Characteristics of the earthquake source (magnitude, location and area of causative fault surface).
- ◆ Distance from the fault.
- ◆ Amplification effects of local geologic deposit.

¹⁰ Table 4. Cities and Counties Affected by Alquist-Priolo Earthquake Fault Zones as of May 1, 1999, California Geological Survey, <http://www.conservation.ca.gov/cgs/rghm/ap/Pages/affected.aspx>, accessed on December 9, 2009.

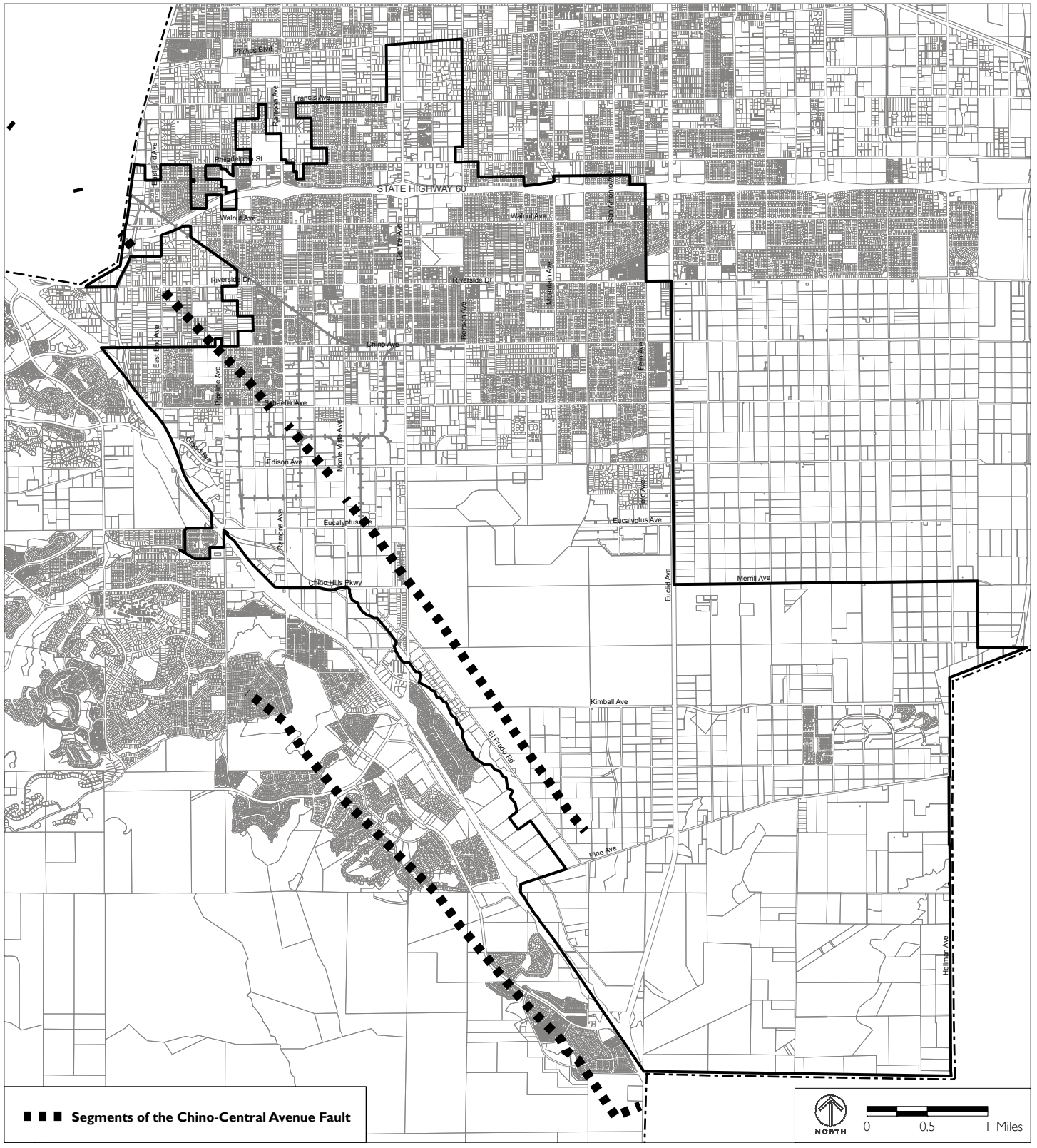


FIGURE 4.6-1
ACTIVE FAULTS

Unreinforced masonry buildings, which are built of brick, stone or concrete without structural steel reinforcements, represent a particular earthquake hazard since they can easily collapse during an earthquake. The majority of Chino's buildings are single-story wood frame homes, which are relatively earthquake resistant. The City of Chino has few remaining unreinforced masonry buildings.

c. Soil Liquefaction

There are soils susceptible to liquefaction in Chino. The danger of liquefaction is greatest in the southern portion of The Preserve, near the Prado Dam, corresponding to the reduced depth in groundwater in this area.¹¹ More site-specific assessment of liquefaction potential requires data from geotechnical borings and groundwater level monitoring.

Liquefaction occurs when the strength of saturated, loose, granular materials, such as silt, sand, or gravel, is dramatically reduced as a result of an earthquake. This earthquake-induced deformation transforms a stable material into a temporary fluid-like state in which solid particles are virtually in suspension, akin to quicksand.

Liquefaction is restricted to certain geologic and hydrologic environments, primarily areas with recently deposited sands and silts and high groundwater levels. Generally, the younger and looser the sediment, and the higher the water table, the more susceptible the soil is to liquefaction. Sediments most susceptible to liquefaction include Holocene (less than 10,000-year-old) delta, river channel, flood plain, aeolian deposits, and poorly compacted fills. Dense soils, including well-compacted fills, have low susceptibility to liquefaction.

¹¹ City of Chino, 2003, *The Preserve Chino Sphere of Influence –Subarea 2 Final Environmental Impact Report, Volume 1*, page 5.5-14.

2. Soil Characteristics

The potential for risks associated with landslides, soil erosion, soil expansion and settlement, and subsidence are determined largely by soil characteristics. The City of Chino lies in a region which is made up of alluvial valley floors, fans and terraces. The basic soil types are young alluvial deposits with good drainage and good agricultural characteristics. While the risks of soil erosion and landslides are relatively minute due to the City's flat topography, there is potential for soil expansion and settlement in Chino.

The USDA Soil Conservation Service has prepared the *Soil Survey of San Bernardino County, Southwestern Part*, a region-wide survey of soils. It identifies three Soil Associations for Chino: Hanford-Greenfield-San Emigidio Association, Grangeville-Chino-Hillmar Association and the Tujunga-Soboba Association. There are 29 individual soil types within these three soil associations. These individual soil types are shown in Figure 4.6-2 and listed in Table 4.6-1.

a. Landslide Hazards

Some of the natural causes of landslides are earthquakes, streams, and heavy rainfall. In addition, certain human activities tend to make earth materials less stable and increase the chance of ground failure. Activities contributing to instability include extensive irrigation, poor drainage or groundwater withdrawal, removal of stabilizing vegetation, and over-steepening of slopes by undercutting them or overloading them with artificial fill. These causes of ground failure, which normally produce landslides and differential settlement, are augmented during earthquakes by strong ground motion. Overall, the risk of landslides in Chino is relatively low, since the City is generally level with very few areas of steep slopes.

b. Soil Erosion

The USDA rates all soils for susceptibility to sheet and rill erosion from water as well as wind erosion. Soils are ranked on three different scales for their susceptibility to erosion. According to these indicators, the soils in Chino are moderately susceptible to wind or water erosion, but are also able to endure erosion without affecting crop production.

c. Expansive Soils

Certain types of soil are inherently expansive, meaning they can expand and contract as the water content fluctuates within the soil. This expansion and contraction, also called “shrink-swell,” can damage structures that are not appropriately engineered for this activity.

The USDA analyzes the shrink-swell potential of each soil type, and categorizes it as “Low,” “Moderate,” “High,” or “Very High.” Where the shrink-swell classification is moderate to very high, shrinking and swelling can damage buildings, roads and other structures.¹² Most of Chino’s soils have low shrink-swell potential, but areas of moderate shrink-swell potential are present in the southern portion of the City. The shrink-swell potential for Chino’s soil types is shown in Table 4.6-1, and areas in Chino with “Moderate” shrink-swell potential are mapped in Figure 4.6-3.

d. Land Surface Subsidence and Groundwater Production

One of the earliest indications that land subsidence was occurring in the Chino Basin was the appearance of ground fissures in the City of Chino. These fissures appeared as early as 1973, but an accelerated occurrence of ground fissuring ensued after 1991 and resulted in damage to existing infrastructure. The scientific studies that followed attributed the fissuring phenomenon to differential land subsidence caused by pumping of the underlying aquifer system and the consequent drainage and compaction of sediments.

In 1999, the Phase I Report of the Chino Basin Watermaster Optimum Basin Management Program (OBMP) identified pumping – induced drawdown and subsequent aquifer-system compaction as the most likely cause of the land subsidence and ground fissuring observed in Management Zone 1 (MZ1) of the Chino Groundwater Basin. Program Element 4 of the OBMP – Develop and Implement a Comprehensive Groundwater Management Plan for

¹² NSSH Part 618, Soil Properties and Qualities, Definition and Purpose (618.00),, <http://soils.usda.gov/technical/handbook/contents/part618.html#38>, accessed on December 9, 2009.

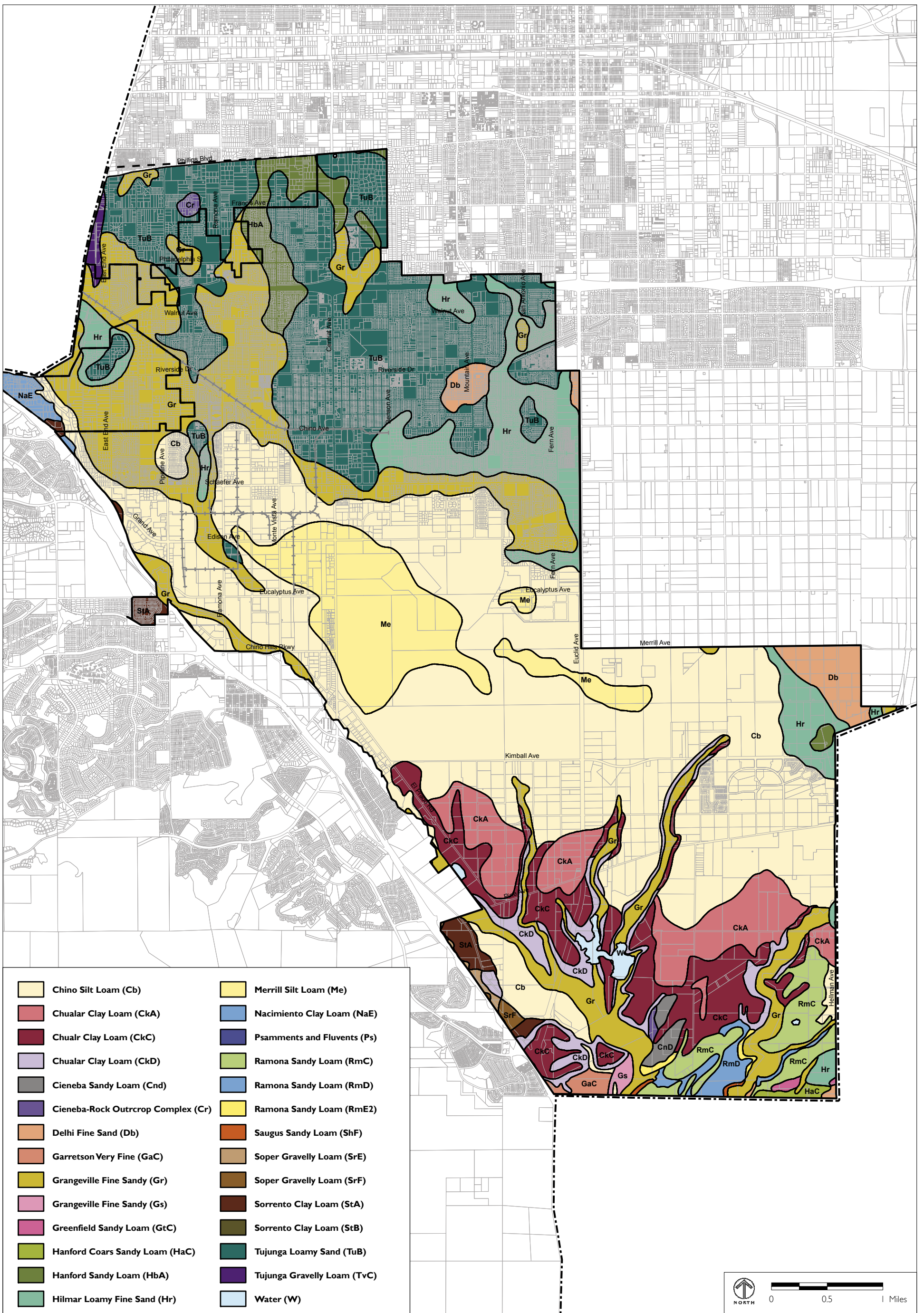
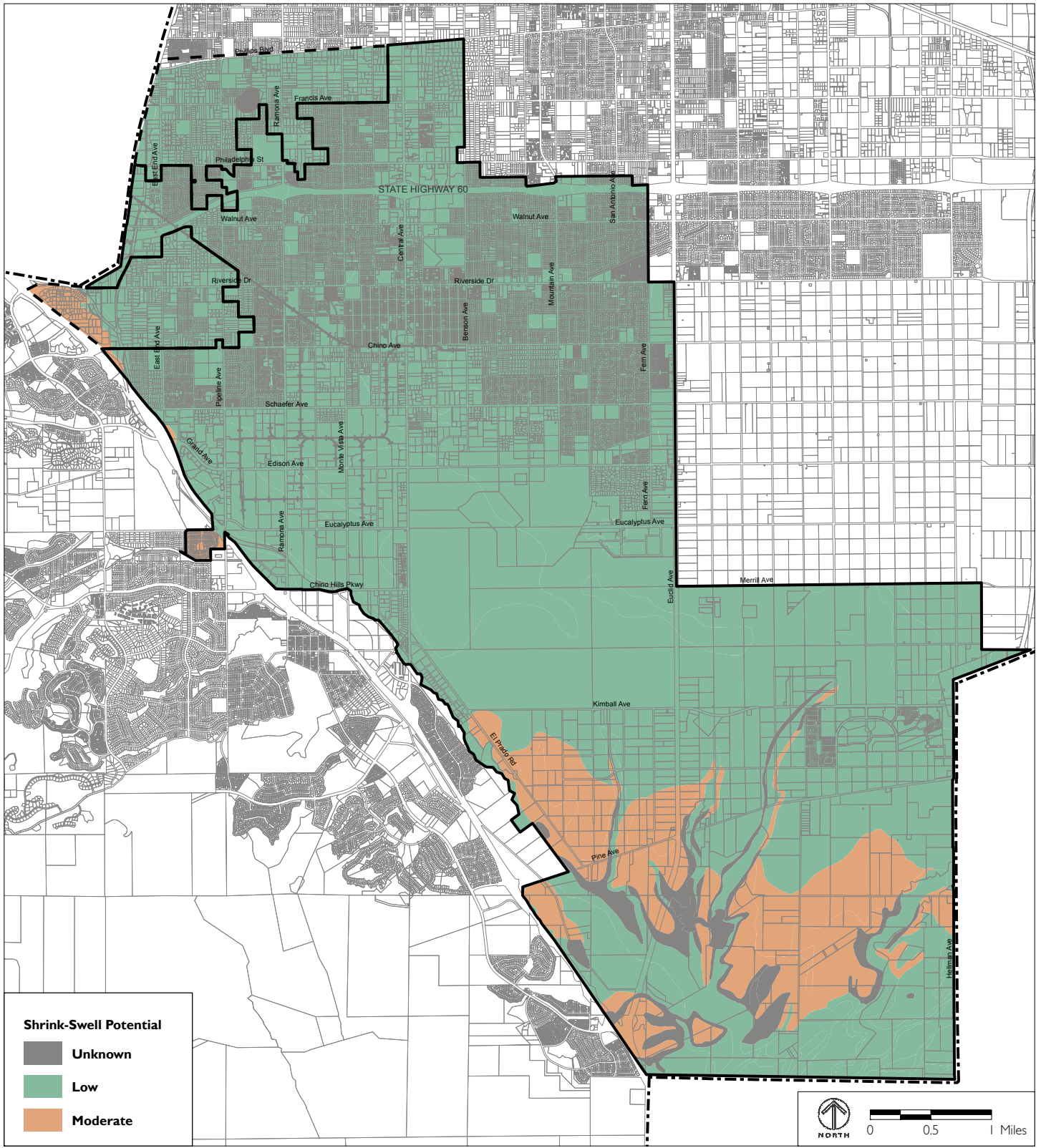


FIGURE 4.6-2
SOIL TYPES

TABLE 4.6-1 **LOCAL SOIL TYPES**

Soil Abbrev.	Soil Name	Shrink-Swell Potential
Cb	Chino Silt Loam	Low
CkA	Chualar Clay Loam, 0-2% Slopes	Moderate
CkC	Chualar Clay Loam, 2-9% Slopes	Moderate
CkD	Chualar Clay Loam, 9-15% Slopes	Unknown
CnD	Cieneba Sandy Loam, 9-15% Slopes	Unknown
Cr	Cieneba-Rock Outcrop Complex	Unknown
Db	Delhi Fine Sand	Low
GaC	Garretson Very Fine Sandy Loam, 2-9% Slopes	Low
Gr	Grangeville Fine Sandy Loam	Low
Gs	Grangeville Fine Sandy Loam, Saline-Alkali	Low
GtC	Greenfield Sandy Loam, 2-9% Slopes	Low
HaC	Hanford Coarse Sandy Loam, 2-9% Slopes	Low
HbA	Hanford Sandy Loam, 0-2% Slopes	Low
Hr	Hilmar Loamy Fine Sand	Low
Me	Merrill Silt Loam	Low
NaE	Nacimiento Clay Loam, 9-30% Slopes	Moderate
Ps	Psamments and Fluvents, Frequently Flooded	Low
RmC	Ramona Sandy Loam, 2-9% Slopes	Low
RmD	Ramona Sandy Loam, 9-15% Slopes	Low
RmE2	Ramona Sandy Loam, 15-30% Slopes, Eroded	Low
ShF	Saugus Sandy Loam, 30-50% Slopes	Low
SrE	Soper Gravelly Loam, 15-30% Slopes	Low
SrF	Soper Gravelly Loam, 30-50% Slopes	Low
StA	Sorrento Clay Loam, 0-2% Slopes	Moderate
StB	Sorrento Clay Loam, 2-5% Slopes	Moderate
TuB	Tujunga Loamy Sand, 0-5% Slopes	Low
TvC	Tujunga Gravelly Loamy Sand, 0-9% Slopes	Low

Source: USDA, 2009. *Soil Survey for San Bernardino County, Southwestern Part.*



Source: USDA, Soil Survey for San Bernardino County, Southwestern Part.

FIGURE 4.6-3
EXPANSIVE SOILS

Management Zone 1 called for the development and implementation of an interim management plan for MZ1 that would:

- ◆ Minimize subsidence and fissuring in the short-term.
- ◆ Collect information necessary to understand the extent, rate, and mechanisms of subsidence and fissuring.
- ◆ Formulate a management plan to reduce to tolerable levels or abate future subsidence and fissuring.

In 2000, the Implementation Plan in the Chino Basin Peace Agreement called for an aquifer-system and land subsidence investigation in the southwestern region of MZ1 to support the development of a management plan for MZ1. The main conclusions derived from the investigations including the following:

- ◆ Groundwater production from the deep, confined aquifer system in this area causes the greatest stress to the aquifer system. In other words, pumping of the deep aquifer system causes water level drawdowns that are much greater in magnitude and lateral extent than drawdowns caused by pumping of the shallow aquifer system.
- ◆ Water level drawdowns due to pumping of the deep aquifer system can cause inelastic (permanent) compaction of the aquifer-system sediments, which results in permanent land subsidence.
- ◆ Collected data indicates that permanent subsidence in the central region of MZ1 (north of Ayala Park) and elsewhere in the Chino Basin has occurred in the recent past.

For these reasons, the Watermaster continues to conduct aquifer-system and subsidence monitoring. Based on its analyses, the Watermaster developed a Management Plan to guide the activities of Basin water producers in MZ1. The Plan is adaptive in nature and subject to refinement in accordance with the ongoing studies of the Watermaster.

3. Septic Systems

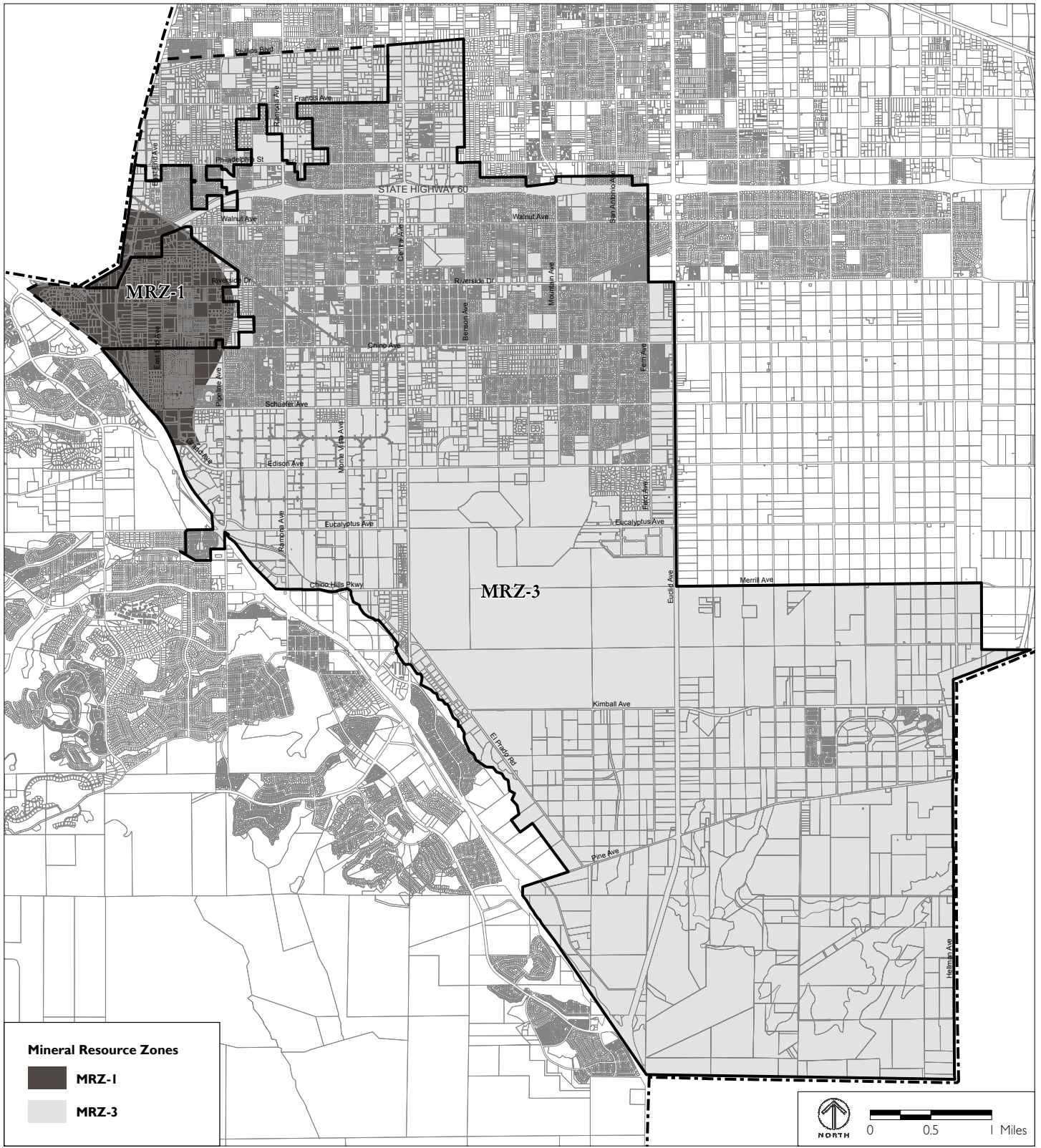
The USDA analyzes the limitations of all soil types for the installation and safety of individual septic systems. The analysis is based on the properties of the soil that affect the absorption of effluent, the construction and maintenance of the septic system and the public health considerations of building septic systems in the particular soil type. The areas that the USDA denotes as having limitations for septic tank absorption fields may not adequately filter effluent, particularly when the system is new. As a result, the ground water may become contaminated if this type of sewage disposal system is allowed.

According to the USDA's Web Soil Survey, all areas of Chino have limitations for septic tank absorption.¹³

4. Mineral Resources

The State Mining and Geology Board establishes Mineral Resource Zone designations that quantify the mineral resource potential for specific locations across California. According to these designations, Chino is located in the MRZ-1 and MRZ-3 zones, as shown in Figure 4.6-4. The MRZ-1 Mineral Resource Zone is defined as a zone where adequate information indicates that no significant mineral deposits are present or likely to be present. In the MRZ-1 Mineral Resource Zone there are no rocks suitable for commercial use, such as shale, siltstone, carbonates and chlorite-schist, and no fine-grained sedimentary deposits that are suitable for use as aggregate. The MRZ-3 Mineral Resource Zone is defined as an area where the significance of mineral deposits cannot be determined from the available data. The MRZ-3 Zone contains sand and gravel deposits, although there is insufficient data to ascertain whether these mineral deposits are significant.

¹³United States Department of Agriculture, 2008, *Custom Soil Resource Report for San Bernardino County Southwestern Part, California*.



Source: California Geological Survey, 2009.

FIGURE 4.6-4
MINERAL RESOURCE ZONES

C. Standards of Significance

The Proposed General Plan and Focused Growth Plan would create significant impacts on geology, soils, and seismicity if they would:

- ◆ Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:
 - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.
 - Strong seismic ground shaking.
 - Seismic-related ground failure, including liquefaction.
 - Landslides, mudslides or other similar hazards.
- ◆ Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
- ◆ Result in substantial soil erosion or the loss of topsoil.
- ◆ Be located on expansive soil, creating substantial risks to life or property.
- ◆ Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.
- ◆ Result in the loss of availability of a known mineral resource that would be of value to the region or the State, or the loss of a locally-important mineral resource recovery site delineated on a mineral resource plan, local general plan, specific plan or other land use plan.

D. Impact Discussion

This section provides an analysis of the potential impacts of the Proposed General Plan and Focused Growth Plan and their relationship to various

seismic and geological hazards, as well as mineral resources. The Proposed General Plan and the Focused Growth Plan propose development on the same areas and differ only in intensity of development; the two plans would have the same impact on seismic and geologic hazards. Therefore, the two plans are discussed together in this section.

1. Seismic Hazards

Increased development proposed under the Proposed General Plan and Focused Growth Plan would increase the number of people and buildings exposed to seismic hazards. The Proposed General Plan and Focused Growth Plan include a series of policies and actions that would minimize harm from geologic hazards such as earthquakes, as described in the following sections.

a. Ground Rupture

While there are two active fault zones within the City of Chino, they are not defined as Alquist-Priolo earthquake fault zones and do not present a significant hazard to development from ground rupture. Thus, the risk of ground rupture due to the potential development allowed by the Proposed General Plan and Focused Growth Plan would be *less than significant*.

b. Ground Shaking

According to Policy P1 under Objective SAF-1.1, Chino shall enforce the building codes adopted by the State of California in all new construction and renovations. Policy P2 under Objective SAF-1.1 would require that the City rely on the most up-to-date and comprehensive geologic hazard mapping available. Site-specific soil and geologic reports would be required by Policy P3. In addition, as stated above, the majority of buildings in Chino are single-story wood frame homes, which are considered earthquake resistant. There are few remaining unreinforced masonry buildings.

The City would also seek to meet Goal SAF-6, a reduction in the risk to the community from natural disasters. Objective SAF-6.1 would call upon the City to promote emergency preparedness. To further that objective, Policy P1 calls for City departments to conduct periodic trainings with staff on

emergency operations based on the Emergency Operations Plan. Similarly, Policy P2 dictates that the City shall work with other agencies and businesses within the City to assist and support their disaster preparedness efforts. Policy P3 would require the City to regularly review the adequacy of its infrastructure for emergency preparedness. Also, Policy P5 dictates that the City would also be involved with providing information to residents and businesses on emergency preparedness information, such as preparing emergency kits, developing a communications plan, implementing evacuation procedures, and updating emergency plans.

Due to compliance with the CBC and the above policies related to emergency preparation, the implementation of the Proposed General Plan and Focused Growth Plan would have a *less-than-significant impact* on ground shaking to people and structures.

c. Soil Liquefaction

Soils in Chino pose a risk of liquefaction in the event of a major earthquake. The danger of liquefaction generally increases towards the southern portion of The Preserve, near the Prado Dam, corresponding to the reduced depth in groundwater.¹⁴ According to Policy P3 under Objective SAF-1.1, the Proposed General Plan and Focused Growth Plan would require site-specific soils and/or geologic reports for development in areas where potentially serious geologic risks exist. Risks from liquefaction would be analyzed as part of the development review process and potential dangers from liquefaction would be mitigated as required by the CBC. Mitigation measures could include removal or re-compaction of liquefiable soils, in situ ground densification, ground modification and improvement, deep foundations, reinforced shallow foundations, and reinforced structures to resist deformation during liquefaction.¹⁵ With the required compliance to these procedures, the risk of liquefac-

¹⁴ City of Chino, 2003, *The Preserve Chino Sphere of Influence –Subarea 2 Final Environmental Impact Report, Volume 1*, page 5.5-14.

¹⁵ City of Chino, 2003, *The Preserve Chino Sphere of Influence –Subarea 2 Final Environmental Impact Report, Volume 1*, page 5.5-14.

tion for development allowed in the proposed General Plan would be *less than significant*.

2. Soil Conditions

a. Landslide Hazards

The risk of landslides in Chino is relatively low, since the City is generally level with very few areas of steep slopes. The areas that do have steeper slopes are located around the Prado Dam and would be designated for recreational uses in the Proposed General Plan and Focused Growth Plan. As the Proposed General Plan and Focused Growth Plan would not allow increased development in areas prone to landslides, the risk of landslides would be *less than significant*.

b. Soil Erosion

The Proposed General Plan and Focused Growth Plan would not affect the susceptibility of Chino's soils to erosion from wind or water. The soils in Chino are at a limited risk of erosion, and the Proposed General Plan and Focused Growth Plan would not alter conditions in such a way as to increase the likelihood of soil erosion.

The construction of new urban and suburban development allowed by the Proposed General Plan and Focused Growth Plan has the potential to increase the amount of impervious surfaces such as rooftops, driveways, sidewalks, and roadways, thereby increasing the amount and rate of urban storm runoff, which can increase erosion. The Standard Condition of Approval 3.10 (and Condition 3.9 for industrial and commercial objectives, and Condition 3.10 for development in The Preserve) requires that on-site landscaping and irrigation construction drawings be submitted before the issuance of a building or grading permit, assuring that adequate drainage systems would be built to address drainage, water quality and soil erosion issues. With adherence to existing Standard Conditions of Approval, the risks of soil erosion would be *less than significant*.

c. Expansive Soils

Soils in the Chino area are susceptible to expansion and compaction. The weight of new and existing structures on underlying soils can cause consolidation and long-term settlement which could lead to structural damage to buildings. Potential impacts associated with expansion and consolidation can be mitigated through standard geotechnical and soils engineering investigation and analysis. All new development in Chino must comply with Standard Condition of Approval 3.6, which requires a detailed soil report to investigate the adequacy of building engineering for the local soil conditions, including structural damage from expansive soils prior to the issuance of a building or grading permit. Furthermore, according to Policies P2 and P3 under Objective SAF-1.1, new development would be required to adequately investigate all geological hazards including current and comprehensive geological hazard mapping. In compliance with building codes adopted by the State, as required by Objective SAF-1.1, Policy P1, adequate mitigation measures would be included in all new development to reduce the risks from expansive soil to *less-than-significant* levels.

d. Land subsidence

Evidence of land subsidence in Chino suggests the possibility that soils in some parts of the City may subside in the future.¹⁶ However, the City's groundwater production activities will follow the MZ1 Management Plan developed by the Chino Basin Watermaster to reduce the potential for land subsidence. Furthermore, all new development would be required to comply with the City's standard conditions of approval, which require a detailed soil report to investigate the adequacy of building engineering for the local soil conditions, including structural damage from land subsidence, prior to the issuance of a building or grading permit. In addition, Policies P2 and P3 under Objective SAF-1.1 would require new development to adequately investigate all geological hazards including current and comprehensive geological hazard mapping. In compliance with State building codes, as required by

¹⁶ City of Chino, 2003, *The Preserve Chino Sphere of Influence-Subarea 2 Final Environmental Impact Report, Volume 1*, page 5.5-14.

Objective SAF-1.1, Policy P1, adequate mitigation measures would be included in all new development to reduce the risks of geologic and soil instability to *less-than-significant* levels.

e. Septic Systems

The Proposed General Plan and Focused Growth Plan would require all new development in the City to connect to the public wastewater collection system, as stated in Policy P2 under Objective PFS-9.1. Consequently, there would be a *less-than-significant impact* to the capability of soils to support the use of septic systems.

3. Mineral Resources

As noted above, the only potentially significant mineral resources located in Chino are aggregate materials that may be found in the MRZ-3 zone, as shown on Figure 4.6-4. There is not sufficient information available to determine whether these deposits are significant. There is a projected demand of 240 million tons of aggregate for the Claremont-Upland Production-Consumption Region until the year 2056, and the region may experience a shortage.¹⁷ An aggregate shortage would initiate economic pressure on the exploration and extraction of aggregate resources within the City of Chino.

However, the increased development allowed by the Proposed General Plan and Focused Growth Plan would primarily be on land that is currently developed. Policies in the Proposed General Plan would protect any potential mineral resources on land that is not currently developed. Policy P1 under Objective OSC-3.1 would restrict development on land with important mineral resources to ensure compatibility with mineral extraction, unless a finding of public benefit overrides that of resource extraction. This would also apply to land adjacent to lands with mineral resources. P2 under that same objective would ensure that reuse of previously mined land is possible, and P3

¹⁷ Russell V. Miller and Lawrence L. Busch, 2007, *Special Report Release, Special Report 202, Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Claremont-Upland Production-Consumption Region, Los Angeles and San Bernardino Counties, California.*

would encourage the reuse and recycling of aggregate materials to reduce demand on newly mined aggregate. Thus, the Proposed General Plan and Focused Growth Plan would have a *less-than-significant impact* on the availability of mineral resource exploration and extraction.

E. Cumulative Impacts

As development proceeds within the City of Chino and its Sphere of Influence (SOI), the number of inhabited structures subject to risks from soil and seismic dangers would increase. However, risks associated with geology, soils, and seismicity would be reduced to less-than-significant levels by adherence to building standards included in the Proposed General Plan and Focused Growth Plan and the Standard Conditions for Approval of all new construction projects. New development within the County and adjacent cities would also result in an increased exposure to risks associated with geology, soils, and seismicity. However, regional development would also be required to comply with regional, State and federal regulations addressing structural concerns. These regulations would reduce the potential for a cumulative geology, soils, and seismicity impact to a *less-than-significant* level.

F. Impacts and Mitigation Measures

Since the implementation of the Proposed General Plan and Focused Growth Plan would not result in significant impacts related to geology, soils, and seismicity, no mitigation measures are required.