Appendix A

El Rio-Del Norte Area Plan Update Background Report Technical Appendix for Water Infrastructure

This Technical Appendix was prepared with the assistance of SB1 Grant funds from the State to study constraints and potential solutions in providing water, sewer services, and dry utilities for housing. This included identifying potential infrastructure for at least 179 multifamily units located within the Area Plan as identified in the General Plan's Housing Element's Sites Inventory.

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El Rio-Del Norte Area Plan Update Background Report
Technical Appendix for Water Infrastructure

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Prepared For:

County of Ventura
Resource Management Agency Planning
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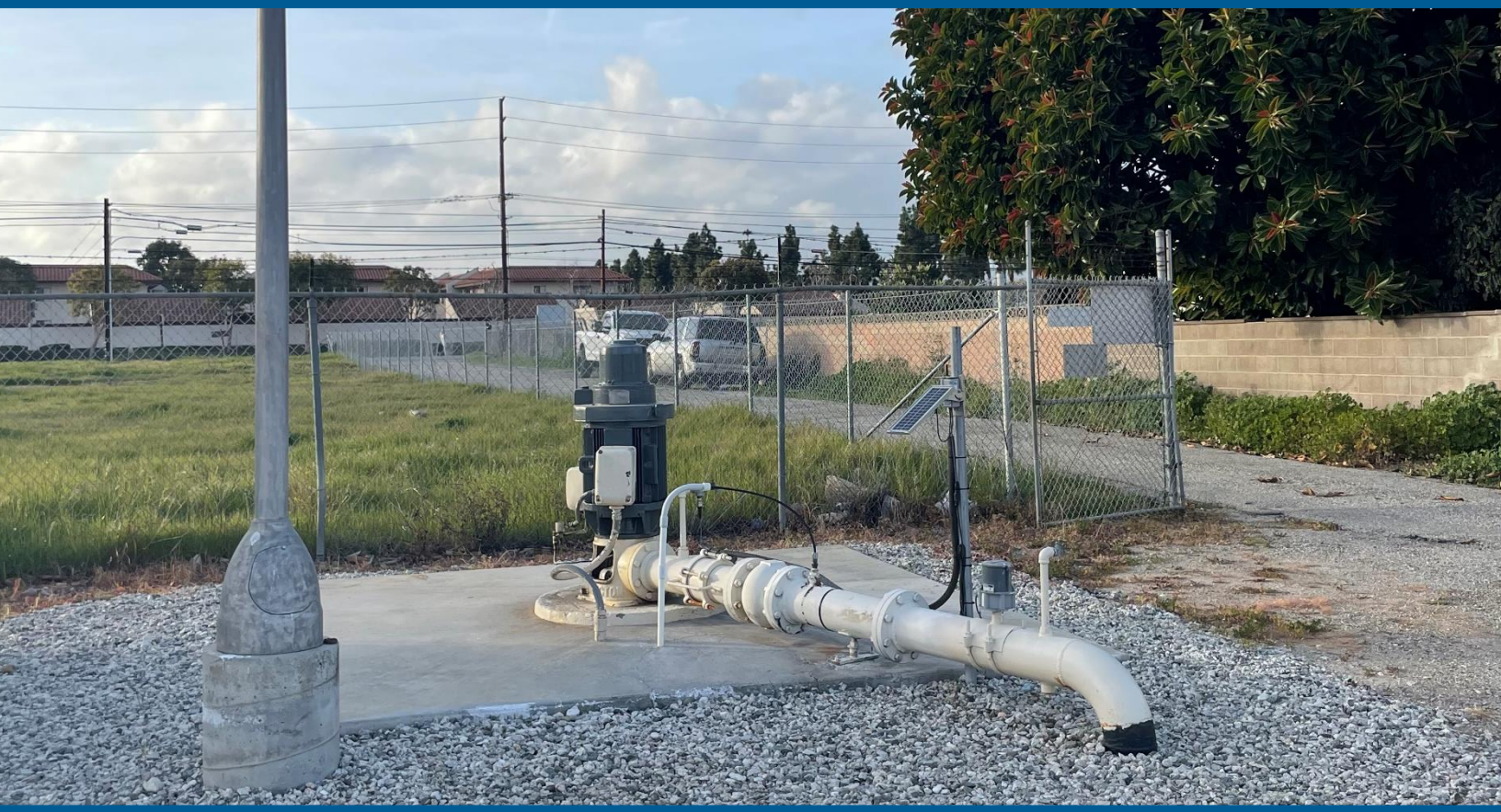
800 S Victoria Avenue L1740
Ventura, CA 93009-1740



15092 Avenue of Science, Suite 200
San Diego, CA 92128

NV5 Project No. 228124-0001933.01

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1.0 INTRODUCTION

This document serves as the Technical Appendix to the El Rio-Del Norte Area Plan Update Background Report. This document focuses on potable water demands from existing, built areas within the El Rio-Del Norte Study Area. This Technical Appendix compiles current potable water demands, sources, storage facilities, and other infrastructure, and projects potential changes to future potable water demand in existing built areas. Modifications to current land uses in developed areas may impact water demands in the El Rio-Del Norte Area. These impacts could be to both long term water supply requirements as well as to instantaneous (fire flow) or peak-hour demands. Infrastructure improvements to address current deficiencies and changes to current land use are examined herein.

The analyses and recommendations provided in this Technical Appendix aim to support the guiding principles of the Ventura County 2040 General Plan Update and the specific El Rio-Del Norte Area Plan. Water demands from existing developed areas can change due to growth scenarios including parcel build-out, land use conversion, high-density development in the High-Quality Transit Corridor, and other factors. Some of these changes and redevelopments originate from recently enacted state laws, including Senate Bill (SB) 4, SB 6, SB 9, and Assembly Bill (AB) 2011. These laws allow increases in the number of dwellings that could previously be permitted within parcels zoned for single family residences or for religious purposes. An increase in the number of dwellings would increase the demand for potable water.

1.1 BACKGROUND

Potable water supply in the El Rio-Del Norte Study Area is provided by twelve permitted public water systems that supply water directly to individual properties. Most of these systems are mutual water companies, where property owners within each water system's service area are shareholders of the respective corporation. One of the systems (Rio Plaza) is owned and operated by an investor-owned utility. There are three schools (Rio Del Valle Middle School, Rio Real School, and Rio Mesa High School) that own and operate public water systems on their respective campuses.

The twelve systems are generally not physically interconnected, and each has its own well, pipelines, storage tank(s), and pumping systems. Similarly, each water system has its own governing body and management system. This is a comparatively high number of water systems for the size of the Study Area (approximately 6,984 acres). Each system is responsible for maintaining compliance with drinking water regulations set forth by state and federal law, which is monitored and regulated by the permitting entity, the Division of Drinking Water of the State Water Resources Control Board. Additional compliance requirements are set forth by the California Secretary of State, Franchise Tax Board, and Fox Canyon Groundwater Management Agency. The Division of the State Architect requires review of improvements on the school properties. The investor-owned utility, Rio Plaza, is also regulated by the California Public Utilities Commission (CPUC).

1.2 LOCATION AND DEMOGRAPHIC

The Study Area for this Technical Appendix is bounded by California State Route 118 to the north, Beardsley Road to the east, the City of Oxnard boundaries to the south, and the Santa Clara River to the west. A Study Area map is included in Figure 1.

El Rio is a Census-Designated Place (CDP) with a population of approximately 7,037 and a median household income (MHI) of $69,665 (2022 American Community Survey 5-Year Estimates). As a comparison, the California MHI was $91,905 and the United States MHI was $75,149. In California, the El Rio CDP is categorized as a disadvantaged community by the State Water Resources Control Board due to its MHI being less than 80% of the statewide MHI.

The Nyeland Acres community is located in Census Tract 50.02 and has an MHI of $51,223 (2022 American Community Survey 5-Year Estimates). Nyeland Acres is also categorized as a severely disadvantaged community by the State Water Resources Control Board due to its MHI being less than 60% of the statewide MHI.

1.3 TOPOGRAPHY AND FLOOD ZONES

The topography of the area is planar, with surface drainage to the southwest, toward the Pacific Ocean or to the Santa Clara River. The lack of topographic relief generally precludes the installation of elevated, hillside potable water storage facilities to serve the El Rio-Del Norte Study Area. Therefore, the public water systems utilize hydropneumatic tanks to maintain pressure in their respective systems.

The Santa Clara River is the western boundary of the El Rio-Del Norte Study Area. The Federal Emergency Management Agency (FEMA) mapping of the flood zone shows potential inundation in a 100-year flood in the areas immediately adjacent to the Santa Clara River in the upper portions of the El Rio-Del Norte Study Area west of Vineyard Avenue (FEMA Map No. 06111C0910E). The southeast portions of the Study Area along Nyeland Acres and Beardsley Road are located within 100-year and 500-year flood zones (FEMA Map No. 0611C0926E). The other portions of the Study Area are not within a mapped flood zone (FEMA Map Nos. 06111C0770E and 06111C0790F).

1.4 WATER RESOURCES PRESENT

Water for potable purposes, including water sold provided the twelve permitted potable water systems in the Study Area, is sourced from groundwater wells located within each water system's service area. The water quality from these wells is normally compliant with state and federal drinking water requirements. However, nitrate can regularly approach or may exceed its maximum contaminant level (MCL) and is the most common contaminant of concern in the Study Area. Nitrate is caused by anthropogenic activities (septic tanks and agriculture) and thus impacts the Upper Aquifer System (UAS). Nitrate is a primary contaminant, meaning that the United States Environmental Protection Agency (EPA) has identified it as a drinking water contaminant that presents a risk to human health. In particular, elevated levels of nitrate can cause a condition called methemoglobinemia, which is of greatest concern in infants. Some groundwater wells in the area also contain elevated concentrations of secondary contaminants, which are not health threatening but may cause drinking water to become cloudy or clouded, or to taste or smell bad. Secondary contaminants in the area include iron, sulfate, manganese, and total dissolved solids.

The Santa Clara River watershed is the primary source of natural groundwater recharge in the area. This watershed encompasses approximately 1,200 square miles within Los Angeles and Ventura counties and extends approximately 100 miles from the San Gabriel Mountains to the Pacific Ocean. The Study Area is in the lower portion of the river's watershed.

United Water Conservation District (UWCD) owns and operates the Oxnard-Hueneme System, which is a groundwater extraction, treatment, and conveyance system for providing water to the City of Oxnard, Port Hueneme Water Agency, Rio School District schools, and several mutual water companies within El Rio and southwest of the Study Area. The service area of UWCD encompasses all of the Study Area. UWCD is State Water Project (SWP) contractor with the California Department of Water Resources. UCWD has the ability to import SWP water to the Study Area from northern California, but primarily uses groundwater extracted from its El Rio well field.

1.5 LAND USES

The land uses evaluated in this Technical Appendix are limited to the residential, commercial, and industrial zoned parcels in the Study Area. Exceptions include one agricultural parcel (APN 147-0-060-010) located in the service area of and served by Strickland Acres Mutual Water Company, which is one of the water systems in the Study Area (see Section 3.4).

The Ventura Youth Correctional Facility is located in the northeast corner of the Study Area, but closed in June 2023. Due to its closure, water demands are not included in the existing water demands and growth scenario demand calculations of this Technical Appendix. An estimation of past water demands for the facility, which is located on four parcels, is included in Section 3.4.14.

United Water Conservation District's El Rio system includes multiple groundwater wells, recharge basins, and a treatment facility located on an agricultural zoned parcel (APN 144-0-010-065) in the central portion of the Study Area. Water usage on this parcel was not analyzed in this Technical Appendix, but the water systems supplied by UWCD's Oxnard-Hueneme Pipeline are discussed in Section 3.2.1.

2.0 DRINKING WATER REGULATIONS

The California Waterworks Standards are contained in Chapter 16 of the California Code of Regulations (CCR), Title 22, Division 4. These standards stipulate the following requirements to assess adequacy of source and storage capacity for water systems:

- Per CCR, Title 22, Section 64554(a), all public water systems' source(s) must meet Maximum Day Demand (MDD) at all times.
    - When monthly data is provided, MDD is determined based on the average daily demand during the maximum month of production within the most recent ten years of operation. The number of years may be less if data is not provided or available. A peaking factor of 1.5 is multiplied to the average daily demand to determine the maximum daily demand. The peak hour demand (PHD) is determined by multiplying the average hourly flow during the MDD by a peaking factor of 1.5.
    - When annual data is provided, MDD is determined based on the year with the highest water usage during the most recently ten years of operations. The number of years may be less if data is not provided or available. A peaking factor of 2.25 is applied to the average daily demand to determine maximum daily demand. The peak

hour demand (PHD) is determined by multiplying the average hourly flow during the MDD by a peaking factor of 1.5.

- Per CCR, Title 22, Section 64554(a), systems with 1,000 or more service connections must be able to meet four hours of peak hourly demand (PHD) with its source capacity, storage capacity, and/or emergency source connections. For systems with less than 1,000 service connections, the systems must have storage capacity equal to or greater than MDD, unless it has an additional source of supply or interconnection that can meet this MDD requirement.
    - All retail public water systems in the Study Area have fewer than 1,000 service connections. If water systems in the Study Area consolidate into a larger system with 1,000 or more service connections, the regulations governing the systems' water sources and storage capacities would change.

- Per CCR, Title 22, Sections 64554(c)-(d), systems using only groundwater must have a minimum of two (2) approved sources before being granted an initial permit and must be capable of meeting MDD with the highest capacity-source offline, and the capacity of the groundwater sources is determined by summing all the sources, and if any sources influence each other when run concurrently, the capacity would be reduced.

Water systems in Ventura County are also required to demonstrate their water supply capacity via a Water Availability Letter (WAL). A WAL is required of any water system that is subject to any of the following conditions:

1. Is currently in or is proposed to be located within real property, including rights of way that is owned or controlled by the County.

2. Serves, or plans to serve, water to any land development project which is subject to any approval issued by the County.

3. Provides a fire protection function and is within the jurisdiction of the Ventura County Fire Protection District.

The preparation of a WAL is an iterative process dependent on the type of service connection, zoning, and water flows in each water system. However, WAL results are generally similar to the regulations provided in CCR Title 22.

2.1 DEFINITIONS

To further expand on the purpose and usage of the California Waterworks Standards, definitions for average daily demand, maximum day demand, and peak hour demand are included below.

Average daily demand (ADD) is the water usage expected on an "average day". For planning purposes, this represents the general daily water demands that may be expected on a year-to-year basis. Average day demand is typically used for water right allocations or annual production reporting.

Maximum day demand (MDD) is the water usage during the highest day of use within the most recent ten years of operation, excluding fire flow. Typically, a "maximum day" occurs

when outside temperatures are high, causing residents to use more water for irrigation or domestic use. A "maximum day" may also occur as a result of construction projects, waterline breaks, etc. For planning purposes, this provides a conservative measure for sizing and constructing new water sources, storage tanks, booster pumps, and waterlines. The California Waterworks Standards utilizes maximum day demand and peak hour demand to determine whether water systems meet regulations.

Peak hour demand (PHD) is the water usage during the highest hour of use during the maximum day. Since water usage varies throughout the day due to living habits, commercial and industrial schedules, and other factors, the peak hour demand measurement ensures that water source capacity and booster pumps are able to withstand the highest peak in water usage in a day.

3.0 EXISTING WATER SUPPLY

3.1 LOCAL WATER RETAILERS OVERVIEW

Several public water systems provide potable water within the El Rio-Del Norte Study Area. These systems, permitted by the State Water Resources Control Board's Division of Drinking Water, are presented in Table 2. The boundaries and existing water facilities of these water systems are depicted in Figures 1 and 2. The public water systems include several mutual water companies, a for profit water system, and schools.

The public water systems' source of water is locally extracted groundwater. Surface water is not a direct supply of water for the public water systems. Each public water system owns and operates its own system of wells, storage tanks, pipelines, and pump stations, to provide potable water to its respective service area. Most wells in the El Rio area are shallow and connect to the Upper Aquifer System (UAS), which is a shallower aquifer in the El Rio area. The UAS in the El Rio area has had a history of groundwater impairments, principally nitrate concentrations exceeding the maximum contaminant level for drinking water. Nitrates are generally caused by septic tank effluent and agricultural activities (fertilizers and animal enclosures). The public water systems in the El Rio area do not have treatment facilities for the removal of nitrate.

The current water systems in the Study Area have less than 1,000 service connections and are not required to have adequate capacity to comply with four hours of peak hour demand. However, the potential for consolidated systems in the area may result in a future consolidated system with more than 1,000 service connections.

3.2 REGIONAL WATER SUPPLY AND GROUNDWATER MANAGEMENT AGENCIES

There are several regional entities that oversee groundwater management and oversight responsibilities, provide wholesale water deliveries from greater water supply sources, or provide water to areas immediately adjacent to the Study Area. As described below, these agencies either currently have responsibilities for some or all of the Study Area or would need to expand their service areas to provide water service to the Study Area.

3.2.1 United Water Conservation District

United Water Conservation District (UWCD) is a regional water wholesaler (Public Water System No. CA5610046). UWCD owns and operates a well field and treatment facility in the El Rio area (El Rio Well Field) that supplies its Oxnard-Hueneme System (O-H System), supplying potable water to select public water systems within and southwest of El Rio. UWCD has historically, on a case-by-case basis during emergencies, supplied some local water systems water from the O-H System when nitrate concentrations in local groundwater have exceeded the maximum contaminant level. Within El Rio, the O-H Pipeline regularly supplies potable water to Rio School District (Rio Real School and Rio Del Valle Middle School) and Vineyard Avenue Estates Mutual Water Company.

UWCD's O-H System obtains its water from local groundwater, the Santa Clara River, and occasionally from the State Water Project. Wells within UWCD's El Rio Well Field extract groundwater from the Upper Aquifer System (UAS) or the Lower Aquifer System (LAS). Similar to the shallower wells that supply the public drinking water systems in El Rio, UWCD's UAS wells can also experience concentrations of nitrate that exceed the maximum contaminant level. UWCD's LAS wells have naturally occurring iron and manganese concentrations that exceed secondary maximum contaminant levels. In 2023, UWCD constructed a treatment facility to remove iron and manganese from the LAS wells. Based on the 2022 Consumer Confidence Report, all chemicals and/or constituents were below primary drinking water standards MCLs.

UWCD also owns and operates several groundwater recharge basins within and immediately northeast of the Study Area. The typical source of water for the recharge basins is surface water flows from the Santa Clara River, diverted by UWCD to the recharge basins at the Freeman Diversion Dam. Additionally, UWCD has the ability to divert water from the State Water Project (SWP) to the recharge basins. However, UWCD seldom utilizes water from the SWP, principally due to the cost of water and extensive water losses between Lake Piru and the Freeman Diversion Dam.

UWCD previously provided an emergency water connection on a temporary basis to Vineyard Avenue Acres Mutual Water Company (VAAMWC) through the 42-inch diameter Oxnard-Hueneme Pipeline (O-H Pipeline) along N. Rose Avenue. The emergency water connection was located at the intersection of N. Rose Avenue and Collins Street since the O-H Pipeline has an existing 8-inch diameter side outlet nozzle at this intersection. VAAMWC is located within the service area of UWCD but is not a user (also known as Contractor) under the Oxnard-Hueneme agreement. UWCD also provides a permanent water connection to Vineyard Avenue Estates Mutual Water Company (VAEMWC), Rio Del Valle Middle School, and Rio Real School.

UWCD staff has indicated that the UWCD system has shut down twice in the last fifteen years. The O-H Pipeline is considered an interruptible source and cannot be a water system's sole source of water. UCWD has reported its peak flow capacity of approximately 55 cubic feet per second (cfs). There are currently eight agencies that are allocated water from this pipeline. The current agencies using the O-H Pipeline and their allocations are presented in Table 1.

Table 1 – Oxnard-Hueneme Pipeline Users and Allocations

Agency	Capacity (cfs)	Capacity (MGD)	% of Total
City of Oxnard	26.75	17.29	50.47%
Port Hueneme Water Agency	22.25	14.38	41.98%
Vineyard Avenue Estates Mutual Water Company	1.35	0.87	2.55%
Rio School District	1.10	0.71	2.08%
Dempsey Road Mutual Water Company	0.85	0.55	1.60%
Cypress Mutual Water Company	0.40	0.26	0.75%
Saviers Road Mutual Water Company	0.25	0.16	0.47%
Donlon Farms	0.05	0.03	0.09%
Total	**53.00**	**34.25**	**100%**

3.2.2 Calleguas Municipal Water District

Calleguas Municipal Water District (Calleguas) is a water wholesaler (Public Water System No. CA5610050) that provides water to 19 water purveyors in Ventura County. Calleguas provides water to 93 service connections and an approximate population of 640,000. Calleguas obtains its water from Metropolitan Water District of Southern California (MWD) via the State Water Project (SWP). Limited portions of the Study Area are within the service area of Calleguas. Based on the 2022 Annual Water Quality Report, all chemicals and/or constituents were below primary and secondary drinking water standards MCLs.

Portions of the Study Area that are within Calleguas' service area are generally unimproved. Calleguas does not provide water to any of the public water systems in the Study Area. Properties and water purveyors desiring to receive water from Calleguas would need to be annexed into the service areas of both Calleguas and MWD. However, Calleguas is planning to construct a new pipeline to the City of Ventura under the State Water Interconnection Project that would run parallel to Central Avenue, approximately 2,300 feet north of Strickland Acres Mutual Water Company (SAMWC).

3.2.3 Fox Canyon Groundwater Management Agency

Fox Canyon Groundwater Management Agency was formed in 1982 to manage and preserve groundwater resources within the lands overlying the Fox Canyon Aquifer. FCGMA is the Groundwater Sustainability Agency for the groundwater basins within the Fox Canyon Aquifer. The entirety of the Study Area is within the FCGMA's boundaries.

3.2.4 City of Oxnard

In recent years, the city limits of Oxnard have expanded northeasterly along Vineyard Avenue. The City limits are also located immediately north of Highway 101. The City of Oxnard is a public water system that provides potable water services within its city limits, including areas immediately adjacent to the Study Area. The City's water system is in close proximity to neighboring water systems in the Study Area. The City does not have an interconnection with any of the public water systems in the Study Area.

3.3 WASTEWATER COLLECTION AND DISPOSAL

Ventura County Service Area No. 34 (CSA 34) provides wastewater collection services within the El Rio area. CSA 34 was formed in 2005 to address groundwater contamination within the Oxnard Forebay that resulted in pathogens and nitrogen compounds released from individual septic disposal systems. CSA 34 collects wastewater within the El Rio area and conveys it to the City of Oxnard through a pipeline network for treatment and disposal.

Ventura County Service Area No. 30 (CSA 30) provides wastewater collection services within the Nyeland Acres area. CSA 30 was formed in 1965 to provide sanitation services to the unincorporated community of Nyeland Acres, which is located north of Highway 101, generally east of Santa Clara Avenue, and immediately northeast of the City of Oxnard limits. CSA 30 collects wastewater within the Nyeland Acres area and conveys it to the City of Oxnard through a pipeline network for treatment and disposal.

The Study Area is not served by a recycled water system.

3.4 DESCRIPTION OF WATER RETAILERS WITHIN THE STUDY AREA

As previously mentioned, twelve public water systems provide potable water to the built environment of the Study Area. These systems are permitted by the State Water Resources Control Board's (SWRCB) Division of Drinking Water (DDW). Table 2 below summarizes each system's populations and number of service connections. A description of each retailer's water system, infrastructure, and water quality follows. UWCD and Calleguas are permitted public water systems, but do not directly supply water to individual properties, and are therefore intentionally omitted from Table 1.

Table 2 – Water Systems within the El Rio-Del Norte Study Area

Name	System Type[1]	Population Served	Service Connections	Water Supply[2] (gpd)	Water Storage (gal)
Beedy Water Company	Industrial	35	5	230,400	215,000
California American Water – Rio Plaza	Community	1,716	520	1,670,400	40,000
Cloverdale Mutual Water Company	Community	455	150	3,384,000	100,000
Garden Acres Mutual Water Company	Community	816	136	3,600,000	361,500
Nyeland Acres Mutual Water Company	Community	915	183	1,080,000	0
Strickland Acres Mutual Water Company	Community	429	128	864,000	54,000
Vineyard Avenue Acres Mutual Water Company	Community	1,820	364	1,152,000	0
Vineyard Avenue Estates Mutual Water Company	Community	1,200	342	1,800,000	160,000
Vineyard Mutual Water Company	Industrial	240	56	2,232,000	650,000
Rio School District – Rio Del Valle School	School	820	1	7,200	0
Oxnard Union High School District - Rio Mesa High School	School	550	1	1,872,000	250,000
Rio School District – Rio Real School	School	2,600	13	5,760	0

Notes:
1. System type as described in this table does not represent the official water system classification as described in Section 3.4.1. Instead, it presents the general population served by the system as of September 2024.
2. The water supply approximated here is a combination of the system's groundwater wells and interconnections (if any).

3.4.1 Definitions

This section expands on the definitions of several water system characteristics including federal and state classification, type of service connections, and facilities.

3.4.1.1 Federal and State Classification

Water systems are classified according to rules developed by the U.S. Environmental Protection Agency (EPA) and state rules. Systems are typically differentiated based on the population they serve, the number of service connections they serve, and the typical activity conducted within their service areas. A public water system can be classified as the following:

Community water systems are classified as those who service at least 15 service connections used by year-round residents or regularly serves 25 year-round residents.

Non-Transient Non-Community water systems are classified as those who serve at least the same 25 non-residential individuals during six (6) months of the year.

Transient Non-Community water systems are classified as those who regularly serve at least 24 non-residential individuals during 60 or more days per year.

State small systems represent a minimal quantity of the water demands in the Study Area. State small water systems are classified as those who serve at least five (5) and up to 14 service connections to fewer than 25 people on a regular basis. State small systems and private wells are permitted by the Ventura County Environmental Health Division and not regulated by the SWRCB. Water demands from state small systems or private wells were not evaluated in this Technical Appendix due to the lack of public information identifying the location, population, and water usage of state small systems or private wells. A majority of the development potential in the Study Area is expected for residential, commercial, and industrial zoned parcels, for which a majority are served by public water systems.

3.4.1.2 Water Service Connections

Water service connections are the points of connection between a customer's piping or constructed conveyance and the water system's meter, service pipe, or constructed conveyance. Service connections are classified as one of the following: agricultural, commercial, industrial, power production, residential, or combined.

The water systems in the Study Area have agricultural, commercial, industrial, and/or residential service connections. Approximately 90% of the service connections in the Study Area are residential. Many of the water systems serve a primarily residential customer base with a few commercial and/or industrial service connections. A few water systems, such as Vineyard Mutual Water Company and the schools in the area, serve primarily commercial or industrial service connections.

3.4.1.3 Water System Facilities

Water system facilities are the system's existing or proposed water infrastructure, which may include groundwater wells, storage tanks, hydropneumatic tanks, booster pumps, disinfection systems, treatment systems, distribution and transmission pipelines, and interconnection pipelines.

The supply capacity of a system's sources (e.g. wells, interconnections) is typically determined using a measurement of gallons per minute (gpm) or gallons per day (gpd).

The Study Area is relatively flat and elevations range between approximately 70 and 130 feet above mean sea level. As a result, a majority of water systems in the area rely on hydropneumatic tanks to pressurize the water in their system. The capability of a system to supply water from its source may also be limited by the sources' water quality, the pumping capability of the pump/motor in the wells and/or of the booster pump(s), the operation of the hydropneumatic tank, and other factors. A groundwater well may be rendered inactive or offline due to a power outage, water quality exceeding maximum contaminant levels (MCLs), pump/motor failures, and other factors.

The storage capacity of a system is measured by the volume (gallons) of its storage tanks. The volume of a system's hydropneumatic tank is not included in its storage capacity as hydropneumatic tanks provide minimal storage and are not intended for storage use.

3.4.2 Beedy Water Company

The Beedy Water Company (BWC) service area is located in the northwest portion of the Study Area. BWC is classified as a Non-Transient Non-Community Water System (Public Water System No.

CA5602133). BWC serves five commercial service connections with a non-transient population of 35. The BWC potable water system is composed of the following:

- One active well with a pumping capacity of 160 gallons per minute (gpm).
- One standby well with a pumping capacity of 200 gpm.
- Chlorine disinfection system at each well.
- One 100-gallon hydropneumatic tank.
- Distribution system consisting of 2-inch and 4-inch steel and cast-iron pipes.
- One pressure zone maintained between 40 and 60 psi.

Per its 2022 Sanitary Survey, BWC has an average day demand (ADD) of 854 gallons per day (gpd) and a maximum day demand (MDD) of 20,205 gpd. BWC's sole active well is able to supply the MDD, but

Multiple storage tanks were constructed within BWC's service area for fire protection of the Alisa and Manatee Substations and domestic use. These tanks are to be owned by BWC following construction efforts for the substation and total approximately 215,000 gallons (two 90,000-gallon tanks and one 35,000-gallon tank). With the addition of these tanks, BWC is able to meet its MDD of 20,205 gpd and fire flow requirements.

Per BWC's 2022 Sanitary Survey, BWC has not exceeded primary drinking water standards, but has exceeded the secondary drinking water standard MCLs for iron, sulfate, and total dissolved solids.

3.4.3 California American Water – Rio Plaza

The California American Water Company – Rio Plaza (Cal-Am) service area is located in the southwest portion of the Study Area. The investor-owned water system was previously owned by Rio Plaza Water Company and was acquired by California American Water, a private entity, on June 4, 2019. Cal-Am is classified as a Community Water System (Public Water System No. CA5610010) and serves 512 residential service connections and 7 commercial service connections. The Cal-Am potable water system is composed of the following:

- Two active groundwater wells with pumping capacities of 730 and 430 gpm.
- Two bolted steel storage tanks, each with a capacity of 20,000 gallons.
- One booster pump station that contains two 40-horsepower (hp) pumps, with capacities of 958 and 1,063 gpm.
- Two 10,000-gallon hydropneumatic tanks.
- Chlorine disinfection system.
- Distribution system consisting of 6-inch to 10-inch diameter polyvinyl chloride (PVC) pipe.
- One pressure zone maintained between 40 and 65 psi.

Per its 2022 Sanitary Survey, Cal-Am has an ADD of 217,058 gpd and an MDD of 379,339 gpd. Cal-Am is able to supply its MDD with its two wells but does not have adequate storage capacity to meet its MDD and fire flow requirements. As of September 2021, Cal-Am was pursuing a connection with UWCD's O-H System for an emergency supply of water (September 8, 2021 UWCD Board Meeting Agenda, Item 4.3).

Per Cal-Am's 2022 Consumer Confidence Report, all chemicals and/or constituents were below primary drinking water standards MCLs.

3.4.4 Cloverdale Mutual Water Company

The CMWC service area is located in the south portion of the Study Area. CMWC is classified as a Community Water System (Public Water System No. CA5610068) and serves 134 residential service connections and 13 commercial service connections. The CMWC service area includes four sites identified in the County's 2021-2029 Housing Elements for high density affordable housing (APNs 145-0-180-04, 145-0-180-05, 145-0-180-06, and 145-0-190-39). The CMWC potable water system is composed of the following:

- Three active groundwater wells with pumping capacities of 500, 750, and 1,100 gpm.
- One bolted steel storage tank with a capacity of 100,000 gallons.
- Booster pump station.
- Two 3,000-gallon hydropneumatic tanks.
- Chlorine disinfection system.
- Distribution system consisting of 8-inch to 10-inch diameter asbestos cement (AC) pipe and PVC pipe.
- One pressure zone maintained between 40 and 60 psi.

Per its 2023 Sanitary Survey, CMWC has an ADD of 98,823 gpd and an MDD of 336,000 gpd. CMWC is able to supply its MDD with its three wells but does not have adequate storage capacity to meet its MDD and fire flow requirements.

In early 2024, CMWC was considering increasing its storage capacity by constructing taller tanks. CMWC is planning to purchase a lot to install either one new 353,000-gallon tank or two new 100,000-gallon storage tanks. There is minimal space available within CMWC's service area to construct larger or additional storage tanks. These tanks would need land use permitting (e.g. conditional use permit) from Ventura County due to the proposed height. With the new tank addition(s), CMWC would be able to supply its MDD, but would not be able to supply the combined MDD and fire flow requirements.

Per CMWC's 2021 Consumer Confidence Report, all chemicals and/or constituents were below primary drinking water standards MCL.

CMWC participated in extensive consolidation discussions with VAAMWC in 2020 but withdrew from the consolidation effort in 2021.

3.4.5 Garden Acres Mutual Water Company

The Garden Acres Mutual Water Company (GAMWC) service area is located in the southeast portion of the Study Area. The Nyeland Acres Mutual Water Company (NAMWC) service area is located west of and adjacent to GAMWC. GAMWC is a Community Water System (Public Water System No. CA5602108) and serves 124 residential service connections and 16 commercial service connections. The GAMWC potable water system is composed of the following:

- One active groundwater well with a pumping capacity of 1,500 gpm.

- One emergency interconnection with NAMWC with a capacity of 1,000 gpm.
- Two storage tanks each with a capacity of 120,000 gallons.
- One new storage tank with a capacity of 121,500 gallons that is not yet operational (as of August 2024).
- Two booster pump stations. Station 1 contains five 390-gpm pumps and one 200-gpm pump. Station 2 has an unknown capacity.
- One 2,000-gallon hydropneumatic tank.
- Chlorine disinfection system.
- Distribution system piping.

Per its 2024 Sanitary Survey, GAMWC has an ADD of 87,111 gpd and an MDD of 396,765 gpd. GAMWC is able to supply its MDD with its well and interconnection with NAMWC. GAMWC constructed an additional 121,500-gallon storage tank in 2024, which was not yet operational when the Sanitary Survey was conducted. GAMWC does not have enough storage to meet its MDD but has an emergency interconnection with NAMWC that can meet the MDD requirement. GAMWC's storage tanks are not able to supply the combined MDD and fire flow requirements.

Per GAMWC's 2022 Consumer Confidence Report, all chemicals and/or constituents were below primary drinking water standards MCLs.

3.4.6 Nyeland Acres Mutual Water Company

The NAMWC service area is located in the southeast portion of the Study Area. The GAMWC service area is located to the east of and adjacent to NAMWC. NAMWC is a Community Water System (Public Water System No. CA5602111) and serves 175 residential service connections and 8 commercial service connections. The NAMWC potable water system is composed of the following:

- One active groundwater well with a pumping capacity of 750 gpm.
- One emergency interconnection with GAMWC with a capacity of 1,500 gpm.
- Two 10,000-gallon hydropneumatic pressure tanks.
- Chlorine disinfection system.
- Distribution system piping consisting of 4-inch to 6-inch diameter PVC pipe and 4-inch to 5-inch diameter steel pipe.
- One pressure zone maintained between 45 and 60 psi.

Based on its 2022 Sanitary Survey, NAMWC has an ADD of 121,950 gpd and an MDD of 259,532 gpd. NAMWC is able to supply its MDD with its well and interconnection with GAMWC. NAMWC does not have any storage capacity but has an emergency interconnection with GAMWC that can meet the MDD requirement. During a power outage in 2018, NAMWC received water from GAMWC through this connection.

Per NAMWC's 2022 Consumer Confidence Report, all chemicals and/or constituents were below primary drinking water standards MCLs.

3.4.7 Strickland Acres Mutual Water Company

The Strickland Acres Mutual Water Company (SAMWC) service area is located in the northwest portion of the Study Area. SAMWC is a Community Water System (Public Water System No. CA5602117) and serves 125 residential service connections, 2 commercial service connections, and 1 agricultural service connection. The SAMWC potable water system is composed of the following:

- Two active groundwater wells with a pumping capacity of 300 gpm.
- Two welded steel storage tanks, each with a capacity of 27,000 gallons.
- One booster pump station that contains two 15-hp pumps.
- Two hydropneumatic tanks with a capacity of 11,000 gallons and 5,000 gallons respectively.
- Chlorine disinfection system.
- Distribution system consisting of 4-inch to 6-inch diameter AC pipe.
- One pressure zone maintained between 45 and 55 psi.

Per its 2023 Sanitary Survey, SAMWC has an ADD of 93,508 gpd and an MDD of 250,560 gpd. SAMWC is able to supply its MDD with its two wells, but does not have adequate storage capacity to meet its MDD. In 2021, SAMWC was noted to have experienced a power outage, resulting in a water outage.

Per SAMWC's 2021 Consumer Confidence Report, all chemicals and/or constituents were below primary drinking water standards MCLs. Iron, manganese, sulfate, total dissolved solids, and turbidity exceeded the secondary drinking water standard MCL.

3.4.8 Vineyard Avenue Acres Mutual Water Company

The VAAMWC service area is located in the southwest portion of the Study Area. VAAMWC is a Community Water System (Public Water System No. CA5610029) and serves 308 residential service connections and 28 commercial service connections. The VAAMWC potable water system is composed of the following:

- Two groundwater wells with a pumping capacity of 400 gpm each.
- Two 10,000-gallon pressure tanks.
- Chlorine disinfection system.
- Distribution system consisting of 8-inch diameter asbestos cement pipe.
- One pressure zone maintained between 40 and 60 psi.

Per its 2022 Sanitary Survey, VAAMWC has an ADD of 186,400 gpd and an MDD of 493,920 gpd. VAAMWC is able to supply its MDD with its wells but does not have any storage to meet its MDD. In 2019, VAAMWC experienced a water supply shortage due to its wells being shut down for exceeding the nitrate MCL. VAAMWC installed a temporary interconnection to purchase water from UWCD. This interconnection was later removed and no longer exists.

VAAMWC's wells have repeated drinking water violations related to the nitrate MCL. VAAMWC also has historically exceeded the secondary drinking water MCLs for iron and total dissolved solids.

3.4.9 Vineyard Avenue Estates Mutual Water Company

The VAEMWC service area is located in the southwest portion of the Study Area. VAEMWC is a Community Water System (Public Water System No. CA5610056) and serves 341 residential service connections and 1 commercial service connection. The VAEMWC potable water system is composed of the following:

- 4-inch connection with UWCD's O-H Pipeline near Corsicana Drive that can supply approximately 600 gpm.
- One active groundwater well with a pumping capacity of 650 gpm (Well No. 2).
- One standby groundwater well with a pumping capacity of 700 gpm (Well No. 1).
- Two steel storage tanks with a capacity of 80,000 gallons each.
- One booster pump station that contains two 20-hp pumps.
- Two pressure tanks each with a capacity of 10,000 gallons.
- Chlorine disinfection system.
- Distribution system consisting of 4-inch to 10-inch diameter PVC pipe.
- One pressure zone maintained between 42 and 58 psi.

Per its 2022 Sanitary Survey, VAEMWC has an ADD of 170,619 gpd and an MDD of 444,095 gpd. VAEMWC's well pumps are not in working order and need to be repaired or replaced. VAEMWC is able to supply its MDD from its connection with UWCD. However, UWCD is considered an interruptible and supplemental source and cannot be a system's sole source of water.

According to SDWIS, VAEMWC's active well, Well No. 1, has not been sampled for primary contaminants since 2021, when its nitrate levels exceeded the MCL. Nitrate levels at Well No. 2 were sampled in 2023 and found to be below the MCL. The most recent sampling results indicate that VAEMWC's two groundwater wells have also historically exceeded the primary MCL for selenium and secondary MCLs for sulfate, total dissolved solids, and specific conductance.

Previously, the well water was blended with water from UWCD to achieve blended nitrate concentrations below the MCL before being distributed to customers. The emergency UWCD connection can supply VAEMWC approximately 600 gpm of water. In 2018, the nitrate levels at Well Nos. 1 and 2 were considered too high for adequate blending with water from UWCD. In 2023, Well No. 1 was on standby status and the nitrate concentration at Well No. 2 was two times the MCL in 2021. It is unknown whether VAEMWC's Well No. 2 blended with water from UWCD in the past.

3.4.10 Vineyard Mutual Water Company

The Vineyard Mutual Water Company (VMWC) service area is located in the central west portion of the Study Area. VMWC is classified as a Non-Transient Non-Community Water System (Public Water System No. CA5602120) and serves 5 commercial service connections and 52 industrial service connections. The majority of its customers are classified as industrial users, including the County's Juvenile Justice Facility. The VMWC potable water system is composed of the following:

- Two active groundwater wells with pumping capacities of 1,050 gpm and 500 gpm.
- One booster pump station that contains five 30-hp pumps.

- Three steel storage tanks: two with a storage capacity of 250,000 gallons and one with a storage capacity of 150,000 gallons.
- One steel pressure tank with a capacity of 5,000 gallons.
- Chlorine disinfection system.
- Distribution system consisting of 8-inch to 12-inch diameter asbestos cement and 12-inch C900 PVC pipelines.
- One pressure zone maintained between 65 and 75 psi.

Per its 2021 Sanitary Survey, VMWC has an ADD of 64,017 gpd and an MDD of 281,598 gpd. VMWC is able to supply its MDD with its two wells and three storage tanks.

Per VMWC's 2021 Consumer Confidence Report, all primary chemicals and/or constituents were below drinking water standards MCLs. However, sulfate, iron, and total dissolved solids exceeded the secondary drinking water standard MCL.

3.4.11 Rio School District – Rio Del Valle Middle School

The Rio Del Valle Middle School (Rio Del Valle) is located in the central portion of the Study Area. Rio Del Valle is a Non-Transient Non-Community Water System (Public Water System No. CA5602406) that serves two commercial service connections and an approximate population of 820. The service area of Rio Del Valle encompasses the middle school.

Per its 2020 Sanitary Survey, Rio Del Valle has a connection to UWCD. The capacity of the connection to UWCD is unknown, but Rio Del Valle has an ADD of 2,484 gpd and an MDD of 5,638 gpd that can be met by the connection. However, UWCD is considered an interruptible and supplemental source and cannot be a system's sole source of water. Rio Del Valle does not have a source of water other than UWCD. A separate storage tank is used by Rio Del Valle for the irrigation system and is not connected to the potable water system.

Per Rio Del Valle's 2022 Consumer Confidence Report, copper was detected in several samples. However, levels were beneath the action level.

3.4.12 Oxnard Union High School District – Rio Mesa High School

The Rio Mesa High School (RMHS) is located in the central north portion of the Study Area. RMHS is a part of the Oxnard Union High School District (OUHSD) and is classified as a Non-Transient Non-Community Water System (Public Water System No. CA5602407) that serves 13 service connections and an approximate population of 2,600. RMHS's facilities provide water for both potable and non-potable uses. RMHS water system is composed of the following:

- Two active wells with pumping capacities of 650 gpm each.
- Chlorine disinfection system for the wells.
- Two 125,000-gallon storage tanks.
- Distribution system.
- One pressure zone.

Per its 2023 Sanitary Survey, RMHS has an ADD of 51,840 gpd and an MDD of 293,760 gpd. RHMS is able to supply its MDD with its two wells, but does not have adequate storage capacity to supply its MDD. RMHS has expressed that the system is not capable to meeting all fire flow requirements.

Per RMHS's 2022 Consumer Confidence Report, RHMS's wells have exceeded the gross alpha primary drinking water standard MCL and the specific conductance, sulfate, and total dissolved solids secondary MCLs.

3.4.13 Rio School District – Rio Real School

The Rio Real School (Rio Real) is located in the central south portion of the Study Area. Rio Real is a Non-Transient Non-Community Water System (Public Water System No. CA5602408) that serves two commercial service connections and an approximate population of 550. The service area of Rio Real encompasses the elementary school.

Per its 2020 Sanitary Survey, Rio Real has a connection to UWCD. The capacity of the connection to UWCD is unknown, but Rio Real has an ADD of 2,259 gpd and an MDD of 6,034 gpd that can be met by the connection. However, UWCD is considered an interruptible and supplemental source and cannot be a system's sole source of water. Rio Real does not have a source of water other than UWCD.

Per Rio Real's 2022 Consumer Confidence Report, lead and copper were detected in several samples. However, levels were underneath the action level.

3.4.14 Other Water Users

There are a number of private wells utilized by the agricultural and industrial parcel owners in the El Rio-Del Norte Study Area. Private well pumping data was not made available for this Technical Appendix. However, data on the private wells and groundwater levels in the area may be measured by the Fox Canyon Groundwater Management Agency, United Water Conservation District, and other entities.

The Ventura Youth Correctional Facility is located on four parcels in the northeast portion of the Study Area. These four parcels are zoned as state or federal facility (institutional) parcels (APNs 147-0-050-205, -445, -455, and -465). Due to the closing of the facility in June 2023, its water demands are not included in the existing water demand and growth scenario demand calculations. The California Fire Department of Forestry and Fire Protection (Cal Fire) and California Conservation Corps still operate at the facility and constitute a minimal portion of the water demands in the Study Area. The future uses of these parcels are unknown. However, an estimation of past water demands is included below in Table 3.

Table 3 – Calculation of Past Water Demands at Ventura County Correctional Facility

Maximum Number of Inmates	Maximum Number of Employees	Expected Total Flow (gpd)	Average Flow (gpd per person)
420	400	86,400	105

Six (6) industrial zoned parcels to the south of Vineyard Mutual Water Company and to the north of Beedy Water Company are included in the baseline and growth scenario water demand calculations

described in Sections 4.0 and 5.0. These parcels include Ventura Oil Company, a gas station; Angelus Block, a concrete manufacturer; and crop packaging and storage facilities. Water demands for these parcels were not provided for this Technical Appendix. Water demands from Vineyard Mutual Water Company were used as a conservative estimate of the water demands at these industrial zoned parcels.

4.0 BASELINE WATER DEMAND

This Technical Appendix was developed to support the guiding principles of the Ventura County 2040 General Plan Update, which establishes that water resources should be developed and managed in a manner that addresses current demand without compromising the ability to meet future demand. Sections 4.0 and 5.0 support this guiding principle by evaluating the existing water demands and potential future demands resulting from development in the Study Area. Proposed infrastructure improvements to supply these demands are discussed in Section 6.0.

In order to establish an understanding of the existing water demands in the Study Area, a baseline assessment was conducted for the existing water usage in the residential, commercial, and industrial zoned parcels. Other zonings were not included in this analysis, except for one agricultural parcel that is located within the Strickland Acres Mutual Water Company service area.

4.1 WATER DEMANDS

Outside of the existing water systems, there are approximately five industrially zoned parcels that are located outside of the existing public water systems. These systems are supplied by private wells and data on these wells was not made available for this Technical Appendix. As a result, water demand data from Vineyard Mutual Water Company, which is primarily composed of industrial uses, was extrapolated to these parcels as an estimate of their existing water demand.

The baseline water demands of the existing systems are summarized in Table 4 below. A figure summarizing the infrastructure opportunities and constraints under the baseline (e.g. existing) water demands is included in Figure 3. Average water demands and maximum day demands are taken from data provided by SWRCB in their Sanitary Surveys.

Table 4 – Baseline Water Demands per Water System

Name	Water Supply[1] (gpd)	Water Storage (gal)	Average Water Demand (gpd)	Maximum Day Water Demand (gpd)
Beedy Water Company	230,400*	215,000	854	20,205
California American Water – Rio Plaza	1,670,400	40,000*	217,058	370,339
Cloverdale Mutual Water Company	3,384,000	100,000*	98,823	336,000
Garden Acres Mutual Water Company	3,600,000	361,500*	87,771	396,795
Nyeland Acres Mutual Water Company	1,080,000	0*	121,950	259,532
Strickland Acres Mutual Water Company	864,000	54,000*	93,508	250,560
Vineyard Avenue Acres Mutual Water Company	1,152,000	0*	186,400	493,920
Vineyard Avenue Estates Mutual Water Company	1,800,000*	160,000*	170,619	444,095
Vineyard Mutual Water Company	2,232,000	650,000	64,017	281,598
Rio School District – Rio Del Valle School	7,200*	0*	2,484	5,638
Oxnard Union High School District – Rio Mesa High School	1,872,000	250,000*	51,840	293,760
Rio School District – Rio Real School	6,034*	0*	2,259	6,034
Industrial parcels outside of existing water systems	Unknown	Unknown	4,775	24,700

Notes:
1. The water supply approximated here is a combination of the system's groundwater wells and interconnections (if any).
2. The red asterisk (*) denotes a system that does not currently have enough supply or storage to meet maximum day demand (MDD).
3. The blue asterisk (*) denotes a system with one active source that may be rendered offline or one interconnection that is interruptible.

4.2 FIRE FLOW DEMANDS

Providing adequate fire flow is a requirement of the State Water Resources Control Board and of Ventura County for public water systems. The largest fire flow demands in the Study Area are the Ventura County Juvenile Justice Facility and Rio Mesa High School, each of which has an expected minimum flow rate of 2,500 gpm. Fire flows for the Juvenile Justice Facility are adequately met by its public water system, Vineyard Mutual Water Company. Other large fire flow demands would be for two other schools in the area: Rio Real School and Rio Del Valle Middle School. The three schools do not have adequate supply or storage to meet expected fire flow requirements.

Existing fire flow demands in most of the rest of the Study Area are considerably less. The minimum fire flow for single-family residential areas is 1,000 gpm, approximately one-third of the fire flow required for the Ventura County Juvenile Justice Facility. A summary of minimum fire flows required in the Ventura County Waterworks Manual (2nd Edition, Section 2.3.3) are included in Table 5 below.

Table 5 – Minimum Fire Flow Demands

Type of Building/Area	Minimum Fire Flow Required (gpm)	Duration of Fire Flow Required (hours)	Minimum Storage Volume Required to Provide Fire Flow
Residential	1,000	2	120,000
Commercial	1,250	2	150,000
Industrial	1,500	2	180,000
Trailer Parks	500	2	60,000
Isolated Residential[1]	500	2	60,000

Notes:
1. Isolated residential refers to single-family dwelling on a parcel of land of 5 acres or more in size where no building is closer than 100 feet to the nearest building on any adjacent parcel.

Table 5 describes the minimum fire storage volume required for most areas in the Study Area. The Ventura County Juvenile Justice Facility has fire flow requirements that exceed these values. Table B105.1 in Appendix A of the Ventura County Waterworks Manual includes the fire flow required for various types of construction (according to the California Building Code) depending on the size of each specific building. For planning purposes within this Technical Appendix, only the minimum fire storage volume or known fire flow requirements for the existing water systems are accounted for.

Residential areas include lots with up to two acres of isolated commercial use when included in a predominantly residential area. This may apply for water systems in the area with primarily residential and isolated commercial use near Vineyard Avenue or Ventura Boulevard. However, a conservative approach is taken for this Technical Appendix in which any system with a commercial or industrial service connection is expected to need to provide the respective fire flow.

The fire flow requirements for Rio Mesa High School, Rio Del Valle Middle School, and Rio Real School were not provided for this Technical Appendix. However, it is expected that these schools require a similar fire flow to the Ventura County Juvenile Justice Facility at Vineyard Mutual Water Company, which has a fire flow requirement of 2,500 gpm for 2 hours.

Table 6 shows a summary of the water systems' capability to meet fire flow requirements. For most systems, the inability to meet fire flow requirements is due to lack of storage volume. For Rio Real School and Rio Del Valle Middle School, the interruptible nature of the O-H System is the primary cause of not meeting fire flow requirements. These two schools use approximately 2,500 gallons per day from the O-H System, which is lower than the expected fire flow requirement. The capability of the O-H System to supply fire flow demands to each school is unknown.

Table 6 – Fire Flow Demands per Water System

Name	Water Storage (gal)	Fire Flow Demands[2] (gal)	Combined Maximum Day Water and Fire Flow Demands[3] (gal)
Beedy Water Company	215,000	150,000	170,205
California American Water – Rio Plaza	40,000	150,000*	520,339*
Cloverdale Mutual Water Company	100,000	150,000*	486,000*
Garden Acres Mutual Water Company	361,500	150,000	546,795*
Nyeland Acres Mutual Water Company	0	150,000*	409,532*
Strickland Acres Mutual Water Company	54,000	180,000*	430,560*
Vineyard Avenue Acres Mutual Water Company	0	150,000*	643,920*
Vineyard Avenue Estates Mutual Water Company	160,000	150,000	594,095*
Vineyard Mutual Water Company	650,000	300,000	581,598
Rio School District – Rio Del Valle School	0	300,000*	305,638*
Oxnard Union High School District – Rio Mesa High School	250,000	300,000*	593,760*
Rio School District – Rio Real School	0	300,000*	306,034*

Notes:
1. The water supply approximated here is a combination of the system's groundwater wells and interconnections (if any).
2. The red asterisk (*) in this column denotes a system that does not currently have enough storage to meet fire flow demands only. Fire flow demands are shown as the required fire flow (gpm) multiplied by the required hours of flow (2 hours).
3. The purple asterisk (*) in this column denotes a system that does not currently have enough storage to meet the combined maximum day and fire flow demands.

5.0 WATER DEMAND GROWTH SCENARIOS

One of the constraining factors for infrastructure that impact development in the Study Area are domestic water demands. A preliminary analysis estimates that approximately 6,880 parcels are impacted by the lack of a Water Availability Letter, which must be received and accepted by the County. Water systems must have a County-accepted Water Availability Letter prior to issuing any additional "will serve" letters for the development of additional service connections.

In order to determine the water demands that would result from potential growth scenarios and the water infrastructure necessary to allow for future population growth and development in the Study Area, multiple growth scenarios were analyzed. These growth scenarios are described in the following sections.

5.1 GROWTH SCENARIO 1

Growth Scenario 1 (G1) accounts for existing development potential according to current zoning regulations regarding Accessory Dwelling Units (ADUs) and state law SB 9 lot divisions, which are only allowed in parcels zoned R1.

Ventura County has three standardized floorplans for the construction of new ADUs, which include designs for 700-, 900-, and 1,188-square feet (sq ft) ADUs. Using existing building footprint data from the County's Geographic Information System (GIS), residential zoned parcels in the Study Area were evaluated for available square footage. The available square footage was calculated using the total parcel size, existing building square footage, and remaining square footage under an assumption of 80% parcel build-out. The remaining square footage represents the available area for the construction of one or more ADUs.

One parcel (APN 145-020-138) has less than 700 square feet of available square footage available and would not be able to construct the smallest floorplan under the County's standardized ADU floorplans. Thereby, additional water demands were not assigned to the parcel. No other parcels were less than 900 sq ft.

Specifically, there are four RHD zoned parcels located within Cloverdale Mutual Water Company's service area that are considered underutilized according to the County's 2021-2029 Housing Element (October 2021). These parcels are located along Cortez Street (APNs 145-0-180-04, -05, -06, and 145-0-190-39). The first three parcels contain several agriculture-related greenhouse structures and existing single-family dwellings. The last parcel is essentially vacant. Although these four parcels are only evaluated for the addition of one ADU under G1, the first three parcels are also located within the High-Quality Transit Corridor, which may allow for increased density and/or modified development standards (see analyses in Section 5.5).

Water demands were assigned per parcel based on the expected household size of two categories of ADUs, the 900-sq ft and 1,188-sq ft ADU. The 900-sq foot ADU was assumed to house an average of 2 persons per ADU at 61 gpd of water usage per person. The 1,188-sq ft ADU was assumed to house an average of 3 persons per ADU at 85 gpd of water usage per person, due to the expected higher quantity of appliances in the larger ADU. A peaking factor of 2.25 is applied for maximum day water demands assigned to these parcels.

5.1.1 Growth Scenario 1.1

Growth Scenario 1.1 (G1.1) evaluates the additional water demands resulting from the construction of one (1) ADU constructed on half of the residential zoned parcels in the Study Area. Residential zoned parcels include parcels zoned R1, R2, RES, RPD, R/MU, RA, RE, and RO. Residential zoned parcels are located throughout the Study Area, primarily concentrated in the south portions of the Study Area bordering the City of Oxnard.

Half (50%) of the residential zoned parcels were assigned the additional water demand for either the 900-sq ft ADU (25%) or the 1,188-sq ft ADU (25%). The total additional water demand in the Study Area that results from half of the residential zoned parcels constructing one ADU is approximately 150,000 gallons per day (gpd) for an average day and approximately 336,000 gpd for a maximum day.

5.1.2 Growth Scenario 1.2

Growth Scenario 1.2 (G1.2) evaluates the additional water demands that would result from the construction of a maximum of four (4) units at 10% of R1 zoned parcels. There are 605 R1 zoned parcels in the Study Area. These are located within the Strickland Acres Mutual Water Company and California American Water Company service areas.

This growth scenario is intended as an addition to Growth Scenario 1.1 and these scenarios are not mutually exclusive. Therefore, the remaining parcel square footage was calculated following the evaluation of additional ADUs under G1.1. Using the remaining parcel square footage, the total number of additional large (1,188-sq ft) and additional small (900-sq ft) ADUs that can be built on a parcel were calculated, up to a total of four units on the parcel. It is assumed that the maximum number of large (1,188-sq ft) ADUs would be constructed first.

A tenth (10%) of the R1 zoned parcels were assigned the additional water demands depending on the ADU size(s) that could be constructed on each parcel. The total additional water demand in the Study Area that results from a tenth of the R1 zoned parcels constructing additional units, up to a maximum of four total units (i.e. dwellings) on the parcel, is approximately 30,000 gallons per day (gpd) for an average day and approximately 66,000 gpd for a maximum day. Combined with G1.1, the total additional water demands in the Study Area would be approximately 180,000 gallons per day (gpd) for an average day and approximately 402,000 gpd for a maximum day.

5.2 GROWTH SCENARIO 2

Growth Scenario 2 (G2) accounts for the construction of additional residential units subject to state law SB 4 at religious institution sites. There are 18 religious institution sites in the Study Area. These sites are spread throughout the Study Area.

It is assumed that residential units similar to ADUs would be constructed at these sites with an average household size of 2.75 persons per dwelling at 61 gpd of water usage per person. Using existing building footprint data from the County's GIS, applicable parcels were evaluated for their available (i.e. empty) square footage. Additional water demands were assigned per acre on the available square footage.

5.2.1 Growth Scenario 2.1

Growth Scenario 2.1 (G2.1) evaluates the additional water demands resulting from a residential density of four (4) units per acre with a 100% parcel build-out at religious institution sites. The additional water demand in the Study Area that results from G2.1 is approximately 17,000 gpd for an average day and approximately 38,000 gpd for a maximum day.

5.2.2 Growth Scenario 2.2

Growth Scenario 2.2 (G2.2) evaluates the additional water demands resulting from a residential density of three (3) units per acre for an 80% parcel build-out at religious institution sites. The additional water demand in the Study Area that results from G2.2 is approximately 12,000 gpd for an average day and approximately 27,000 gpd for a maximum day.

5.2.3 Growth Scenario 2.3

Growth Scenario 2.3 (G2.3) evaluates the additional water demands resulting from a residential density of five (5) units per acre using a 50% density bonus on an 80% parcel build-out at religious institution sites. The additional water demand in the Study Area that results from G2.1 is approximately 21,000 gpd for an average day and approximately 47,000 gpd for a maximum day.

5.3 GROWTH SCENARIO 3

Growth Scenario 3 (G3) accounts for the potential land use conversion in commercial zones to residential uses subject to SB 6 and AB 2011.

Water demands for G3 were assigned using an estimated current average day and maximum day water demand per dwelling unit depending on whether the parcel is located in the El Rio or Nyeland Acres community. The El Rio community has an average household size of 3.77 persons and is categorized as a disadvantaged community. The Nyeland Acres community has an average household size of 3.99 and is categorized as a severely disadvantaged community (see Section 1.2). It is assumed that each dwelling unit is one household. The assigned water demands are specified in Attachment 3.

Using existing building footprint data from the County's GIS, applicable parcels were evaluated for their available (i.e. empty) square footage. Additional water demands were assigned per acre on the available square footage.

5.3.1 Growth Scenarios 3.1 and 3.2

Growth Scenario 3.1 (G3.1) evaluates commercial parcels that are located outside of the High-Quality Transit Corridor (HQTC), while Growth Scenario 3.2 (G3.2) evaluates commercial parcels that are located within the HQTC.

The HQTC is a transit corridor identified by the Southern California Association of Governments (SCAG) with a service frequency of 15 minutes or less during peak morning and evening hours. The HQTC in the Study Area is located near the intersection of Vineyard Avenue and U.S. Highway 101. There are 44 commercial zoned parcels in the Study Area that are outside the HQTC and 2 commercial zoned parcels in the Study Area that are within the HQTC. For the benefit of the community, higher density housing is planned for these transit-rich areas. Multiple state bills allow for increased density and/or modified development standards for projects located within a designated HQTC (AB 2097 [2021-22], SB 35 [2017-2018).

5.3.1.1 Growth Scenario 3.1a

Growth Scenario 3.1a (G3.1a) evaluates the additional water demands resulting from an average residential density of 20 dwelling units per acre with a 100% parcel build-out at commercial zoned parcels outside of the HQTC. The additional water demand in the Study Area that results from G3.1a is approximately 102,000 gpd for an average day and approximately 229,000 gpd for a maximum day.

5.3.1.2 Growth Scenario 3.1b

Growth Scenario 3.1b (G3.1b) evaluates the additional water demands resulting from an average residential density of 16 dwelling units per acre for an 80% parcel build-out at commercial zoned parcels outside of the HQTC. The additional water demand in the Study Area that results from G3.1b is approximately 81,000 gpd for an average day and approximately 182,000 gpd for a maximum day.

5.3.1.3 Growth Scenario 3.1c

Growth Scenario 3.1c (G3.1c) evaluates the additional water demands resulting from an average residential density of 24 dwelling units per acre using a 50% density bonus on an 80% parcel build-out at commercial zoned parcels outside of the HQTC. The additional water demand in the Study Area that results from G3.1c is approximately 124,000 gpd for an average day and approximately 279,000 gpd for a maximum day.

5.3.1.4 Growth Scenario 3.2a

Growth Scenario 3.2a (G3.2a) evaluates the additional water demands resulting from an average residential density of 80 dwelling units per acre with a 100% parcel build-out at commercial zoned parcels within the HQTC. The additional water demand in the Study Area that results from G3.2a is approximately 4,300 gpd for an average day and approximately 10,000 gpd for a maximum day.

5.3.1.5 Growth Scenario 3.2b

Growth Scenario 3.2b (G3.2b) evaluates the additional water demands resulting from an average residential density of 16 dwelling units per acre for an 80% parcel build-out at commercial zoned parcels within the HQTC. The additional water demand in the Study Area that results from G3.2b is approximately 3,400 gpd for an average day and approximately 7,600 gpd for a maximum day.

5.3.1.6 Growth Scenario 3.2c

Growth Scenario 3.2c (G3.2c) evaluates the additional water demands resulting from an average residential density of 24 dwelling units per acre using a 50% density bonus on an 80% parcel build-out at commercial zoned parcels within the HQTC. The additional water demand in the Study Area that results from G3.2c is approximately 5,600 gpd for an average day and approximately 12,500 gpd for a maximum day.

5.4 GROWTH SCENARIO 4

Growth Scenario 4 (G4) accounts for built-out commercial and industrial zones in the Study Area. Commercial zones are assumed to be built out to a 60% lot coverage with an average vacancy rate of 17.7%. Industrial zones are assumed to be built out to a 50% lot coverage with an average vacancy rate of 2%.

5.4.1 Growth Scenario 4.1

Growth Scenario 4.1 (G4.1) evaluates built-out commercial zoned parcels. There are 46 commercial zoned parcels in the Study Area.

Assigned additional water demands were split into five categories depending on the current use: market/store, restaurant, automobile service station, residential, office, storage, miscellaneous, and empty. Water demands per acre were estimated using expected commercial, employee, and customer uses (e.g. restroom use). The assumptions for each category used under G3 are documented in Attachment 3.

The additional water demand in the Study Area that results from G4.1 is approximately 48,000 gpd for an average day and approximately 108,000 gpd for a maximum day.

5.4.2 Growth Scenario 4.2

Growth Scenario 4.2 (G4.2) evaluates built-out industrial zoned parcels. There are 90 industrial zoned parcels in the Study Area, including the Ventura County Juvenile Justice Facility.

Assigned additional water demands are assumed to be similar to Vineyard MWC's water usage. VMWC is primarily composed of industrial users, except for the Ventura County Juvenile Justice Facility. Although this may increase the reported water usage in VMWC, using VMWC provides a conservative estimate of industrial water demands due to the high variability of industrial water usage. Demands for G4.2 were estimated per acre based on the acreage within the VMWC service area (approximately 118 acres).

The additional water demand in the Study Area that results from G4.2 is approximately 65,000 gpd for an average day and approximately 287,000 gpd for a maximum day.

5.5 GROWTH SCENARIO 5

Growth Scenario 5 (G5) accounts for potential land use density increases at residential zoned properties located within the High-Quality Transit Corridor (HQTC).

The HQTC is a transit corridor identified by the Southern California Association of Governments (SCAG) with a service frequency of 15 minutes or less during peak morning and evening hours. The HQTC in the Study Area is located near the intersection of Vineyard Avenue and U.S. Highway 101. There are 57 residential zoned parcels located within the HQTC in the Study Area. For the benefit of the community, higher density housing is planned for these transit-rich areas. Multiple state bills allow for increased density and/or modified development standards for projects located within a designated HQTC (AB 2097 [2021-22], SB 35 [2017-2018).

Specifically, there are three Residential High Density (RHD) zoned parcels located within Cloverdale Mutual Water Company's service area and within the HQTC that are considered underutilized according to the County's 2021-2029 Housing Element (October 2021). These parcels are located along Cortez Street (APNs 145-0-180-04, -05, -06) and contain several agriculture-related greenhouse structures and existing single-family dwellings. The property owners have expressed interest in development of the sites. These sites are also within the City of Oxnard's sphere of

influence. The additional water demands for these three RHD zoned parcels resulting from this growth scenario (G5) are described in the subsections below.

Using existing building footprint data from the County's GIS, applicable parcels were evaluated for their available (i.e. empty) square footage. Additional water demands were assigned per dwelling unit per acre on the available square footage. Water demands for G5 were assigned using the current average day and maximum day water demand data per service connection for the water system on which the residential zoned parcel is located. These water systems are Vineyard Avenue Acres MWC and Cloverdale Mutual Water Company. Each additional dwelling unit evaluated under G5 is analyzed as equivalent to one (1) service connection. The assigned water demands are specified in Attachment 3.

5.5.1 Growth Scenario 5.1

Growth Scenario 5.1 (G5.1) evaluates the additional water demands resulting from an average residential density of 20 dwelling units per acre with a 100% parcel build-out at residential zoned parcels within the HQTC. Under G5.1, an additional 643 dwelling units are added to the Study Area.

The additional water demand in the Study Area that results from G5.1 is approximately 428,000 gpd for an average day and approximately 1,440,000 gpd for a maximum day.

Specifically for the three RHD zoned parcels, the additional water demand that results from G5.1 is approximately 93,000 gpd for an average day and approximately 318,000 gpd for a maximum day.

5.5.2 Growth Scenario 5.2

Growth Scenario 5.2 (G5.2) evaluates the additional water demands resulting from an average residential density of 16 dwelling units per acre for an 80% parcel build-out at residential zoned parcels within the HQTC. Under G5.2, an additional 508 dwelling units are added to the Study Area.

The additional water demand in the Study Area that results from G5.2 is approximately 338,000 gpd for an average day and approximately 1,138,000 gpd for a maximum day.

Specifically for the three RHD zoned parcels, the additional water demand that results from G5.2 is approximately 75,000 gpd for an average day and approximately 254,000 gpd for a maximum day.

5.5.3 Growth Scenario 5.3

Growth Scenario 5.3 (G5.3) evaluates the additional water demands resulting from an average residential density of 24 dwelling units per acre using a 50% density bonus on an 80% parcel build-out at residential zoned parcels within the HQTC. Under G5.3, an additional 780 dwelling units are added to the Study Area.

The additional water demand in the Study Area that results from G5.3 is approximately 519,000 gpd for an average day and approximately 1,748,000 gpd for a maximum day.

Specifically for the three RHD zoned parcels, the additional water demand that results from G5.3 is approximately 112,000 gpd for an average day and approximately 382,000 gpd for a maximum day.

6.0 PROPOSED IMPROVEMENTS

Improvements to the potable water systems' infrastructure in the El Rio-Del Norte Study Area could be driven by existing system deficiencies, growth within the Study Area, and consolidations of water systems. Impacts to infrastructure from these drivers of infrastructure improvements are described below.

Based on the baseline water demands and water demands that may result from the growth scenarios described in the previous sections, water infrastructure improvements are proposed for individual water systems and for portions of the Study Area that may be consolidated into larger and combined water systems in the future.

The twelve public water systems in the study area are generally in close proximity to each other. Consolidating two or more public water systems into a single public water system could address infrastructure deficiencies, water supply reliability, and governance vulnerabilities experienced by individual water systems.

6.1 IMPROVEMENTS TO MEET BASELINE WATER DEMANDS

6.1.1 Water System Consolidation

Consolidation involves the joining of two or more water systems, typically for the purposes of increasing systems' organization, connectivity, and water supply resiliency, reliability, and sustainability.

The State Water Resources Control Board encourages exploring consolidation of water systems as a possible solution to water supply, water quality, infrastructure, management challenges that small water systems may face. Consolidation feasibility is generally high in the Study Area due to the proximity of systems to each other, and the Area's economically disadvantaged status, as measured by the Median Household Income.

As shown in Figure 1, most of the public water systems are located adjacent or in close proximity to one or more other systems, which would facilitate consolidations of water systems. Along Vineyard Avenue, seven of the water systems abut Vineyard Avenue, and several are separate by one or two city blocks. Rio Mesa High School, Rio Real and Real Del Valle schools are located in close proximity to other water systems in the El Rio area.

Nyeland Acres and Garden Acres are located adjacent to each other and utilize an interconnection during emergency periods. However, these two systems are located a greater distance away from the other small water systems in the Study Area. Nyeland Acres and Garden Acres are located in close proximity to the City of Oxnard's water system. However, neither of the two water systems are located within the city limits. The two systems are within the sphere of influence of the city.

Water system consolidation can have several advantages, including the following:

Storage Volume Efficiency – Each of the water systems in the Study Area has a relatively small water customer base, and most customers are residential or otherwise utilize water for domestic purposes

(i.e. schools and Juvenile Justice Facility). In general, small water systems are required to have a storage volume of no less than the system's Maximum Day Demand plus the fire flow demand. With relatively small customer bases, fire flow storage requirements can be considerably larger than domestic/residential demands. As each water system is required to have adequate fire storage capacity on-site, the aggregate fire storage volume for individual systems would be significantly greater than if systems were physically consolidated and shared water storage facilities. As the required fire storage volume is driven by only the single greatest design fire event (i.e. at the Juvenile Justice Facility or Rio Mesa High School), the storage volume requirement could be more readily met if one storage site were utilized for storage, and a distribution pipeline network extended among the water systems. This would reduce the number of sites required for fire flow volume to one site, with considerably fewer storage tanks and smaller volume than the aggregate storage requirement if each system had the storage requirement.

Due to the limited topographic relief in and surrounding the Study Area, water storage tanks, including for fire, in the El Rio area are placed at the same elevation as the service area the tanks support. Therefore, for potable and fire flow demands, this water needs to be pumped. Without consolidation, each water system would need to have its own pump station. Electrical infrastructure and electrical generators would also need to be able to provide power at each pump station site. Consolidation would also reduce the number of required pump stations and backup generators and reduce electrical grid infrastructure needs.

System Redundancy – Small water systems that rely exclusively on groundwater wells are required to have backup supply sources equal the system's highest producing well, and be able to meet Maximum Day Demand with the largest producing well offline. Therefore, each of these water systems are required to have at least one redundant water supply well. For each system that is consolidated into another water system, the required number of redundant wells is reduced by at least one. This reduces operations and maintenance costs associated with wells.

In addition, following system consolidation, the number of wells contributing to meet the combined system's water demand will increase. Therefore, if any well were to be rendered offline, the impact to the system would reduce, as there would be a greater number of wells available to supply the consolidated system.

Governance Sustainability – Small, not-for-profit water systems can have a limited customer base, from which the system's governing board would be comprised. Small water systems in general can find it difficult to maintain corporate compliance (e.g. quorum at board meetings, filling corporate officer positions). The governing boards of schools in the area are associated with school district boundaries that are considerably larger than the boundaries of the systems in the El Rio area and therefore tend to not encounter the same governing body limitations.

Eligibility for Project Funding – Current funding opportunities from the State Water Resources Control Board place priority on improvement projects involving consolidation. In addition, systems participating in consolidation that improve its own system to allow consolidation of another system can receive incentive funding for other improvements to its system.

Water system consolidation improvements proposed under this section are for the future consideration of the County and stakeholders in the Study Area. Water systems who have formally expressed interest in participating in an ongoing consolidation system planning effort in the El Rio

area are discussed in Section 6.1.1.1. Other systems in the Study Area should examine consolidation to gauge if a system could benefit from some of all of the advantages discussed above.

6.1.1.1 Proposed Water System Consolidation

Five public water systems within the Study Area are currently engaged in a planning effort to explore and potentially implement a consolidation of their water systems into a single public water system. The title of this planning project is the El Rio Consolidation Project – CSA 34.

Vineyard Avenue Acres Mutual Water Company, Strickland Acres Mutual Water Company, Vineyard Mutual Water Company, Beedy Water Company, and Rio Mesa High School formally expressed their interest in exploring the consolidation into a single water system that would provide potable water to the existing service areas of the five systems. Multiple project components that have been evaluated within a consolidation feasibility study are included on Figure 4. An emergency interconnection between the consolidated water system and Cloverdale Mutual Water Company is contemplated as a component of the proposed consolidation project. However, Cloverdale Mutual Water Company is currently not included as a participant in the water system consolidation.

The Ventura County Board of Supervisors allocated funds for County staff to participate in the feasibility of a consolidation (Item 46 of the February 28, 2023 agenda). The State Water Resources Control Board (SWRCB) provided funding for the initial study of the feasibility of consolidating multiple water systems in the area. The SWRCB is anticipated to continue funding the environmental documentation and engineering design for the proposed consolidation. Ventura County Public Works Agency is anticipated to become the owner and operator of the consolidated water system. Following the consolidation of the systems, the five participating water systems would relinquish their water supply permits to the State Water Resources Control Board. Customers currently served by their respective public water system would be supplied water from the newly formed and permitted public water system. The five public water systems would thereby be relieved of their ownership, maintenance, and compliance duties, which would be transferred to Ventura County.

The proposed water system consolidation would address storage and fire suppression deficiencies in some of the participating systems. Strickland Acres Mutual Water Company (SAMWC) does not have adequate storage volume. Vineyard Avenue Acres Mutual Water Company (VAAMWC) does not have any storage or adequate fire suppression. The customers of these systems would have adequate storage and fire flow following completion of consolidation.

The project is currently in the planning stages. Analyses of the condition of existing water system infrastructure in the area is being conducted to determine the final project to be constructed for the proposed consolidation. These analyses include well interior investigations, distribution system leak detections, storage tank inspections, land surveying efforts, and supply capacity studies.

Water Supply Sources for Proposed Consolidated Water System

While currently in its planning stages, the consolidated water system would have two sources of water supply: local wells owned and operated by the consolidating entity (Ventura County) and United Water Conservation District (UWCD). A proposed improvement would be to connect to UWCD's treated water supply at its El Rio well field. Select existing wells currently owned by the participating water systems would be retained as backup sources of water. The other wells owned by the

participating water systems would be destroyed. UWCD's water supply (wells) and treatment system would be evaluated to determine if and how to expand the extraction and treatment capacity of its El Rio well field system to supply water to the consolidated water system. None of the participating water systems currently has an allocation of water from UWCD's O-H System.

Water rights currently owned by the participating water systems would be transferred to Ventura County at the time of consolidation. Ventura County, in turn, would transfer water rights for groundwater extraction to UWCD, tantamount to the annual volume of water purchased by the County from UWCD.

Water systems must obtain an agreement with all of UWCD's O-H Pipeline existing users before it can obtain water from the O-H Pipeline (see Section 3.2.1). The new agreement would detail how the peak flow capacity of the Oxnard-Hueneme Pipeline will be allocated and the required fee to use the pipeline. UWCD charges emergency connections 1.5 times the rate of permanent connections.

Water Distribution Pipeline Improvements for Proposed Consolidated Water System

Under a consolidated distribution system, the existing distribution systems of the participating water systems would be interconnected. Due to the minimal topographic relief across the consolidated system, all of the pipeline networks would operate within a single pressure zone. The ownership of the pipelines would be transferred from each of the participating systems to the consolidating water entity (Ventura County). Portions of the existing systems may be replaced, addressing localized leaks, deteriorated pipe conditions, and inferior sizing compared to modern standards.

To interconnect the five systems, a looping pipeline is planned along Vineyard Avenue, Central Avenue, and N. Rose Avenue. This looping pipeline would connect to each of the five participating water systems.

Water Storage Requirements for Proposed Consolidated Water System

The proposed consolidated system may require the installation of additional water storage tanks. Additional storage volume may not be necessary if the consolidated system is able to install an additional reliable and non-interruptible interconnection that can provide both the MDD and fire flow required.

The currently proposed storage tank site for the consolidated system is located at Vineyard Mutual Water Company's (VMWC) existing storage tank site and the southwest corner of the parcel for the Ventura County Juvenile Justice Facility. VMWC has approximately 650,000 gallons of storage capacity. To accommodate the MDD and fire flow requirements of the consolidated system, approximately 990,000 gallons of additional storage is needed.

6.1.2 Improvements Required at Individual Water Systems

Each public water system in the El Rio-Del Norte Study Area was analyzed for their ability to meet average and maximum day demands under the baseline water demand scenario (i.e. existing demands) as described in Section 4.0.

Due to the large number of individual water systems in the Study Area, water supply and storage facilities are decentralized to each water system. Growth within the service area of each water system that increases the water demand beyond the capacity of existing infrastructure would necessitate improvements on the specific water system's supply and storage. Exceptions could apply to water systems that purchase water from a separate entity or have an interconnection with a separate water system.

Within this Technical Appendix, it is assumed that supply and storage deficiencies for the five water systems participating in the proposed consolidated system would be addressed by the consolidation of those systems. This section addresses systems in the Study Area that have not expressed interest in the proposed consolidation project. This section does not address the schools. Rio Del Valle Middle School and Rio Real School is discussed in Section 6.1.3.

6.1.2.1 Improvements at Cloverdale Mutual Water Company

Cloverdale Mutual Water Company has adequate water supply from its sources to supply its current Maximum Day Demands, but does not have adequate water storage to supply the MDD and fire flow requirements.

As previously discussed in Section 3.4.4, CMWC is considering increasing its storage capacity by constructing taller tanks and is planning to purchase a lot to install either one new 353,000-gallon tank or two new 100,000-gallon storage tanks. There is minimal space available within CMWC's service area to construct larger or additional storage tanks. These tanks would need land use permitting (e.g. conditional use permit) from Ventura County due to the proposed height. With the planned tank addition(s), Cloverdale Mutual Water Company would be able to supply its MDD, but would not be able to supply the combined MDD and fire flow requirements. Cloverdale Mutual Water Company needs a total of approximately 386,000 gallons of storage to supply the MDD and fire flow requirements.

6.1.2.2 Improvements at California American Water Company – Rio Plaza

California American Water Company (Rio Plaza) has adequate water supply from its sources to supply its Maximum Day Demands, but does not have adequate water storage to supply its MDD and fire flow requirements. Cal-Am needs approximately 330,000 gallons of storage to meet MDD alone and a total of 480,000 gallons of storage to meet MDD and fire flow requirements.

California American Water Company (Rio Plaza) is planning to install an interconnection to United Water Conservation District's Oxnard-Hueneme Pipeline (O-H Pipeline). This interconnection would be expected to provide an additional source of water to meet MDD and fire flow. However, the O-H Pipeline is considered an interruptible source of water.

6.1.2.3 Improvements at Nyeland Acres Mutual Water Company and Garden Acres Mutual Water Company

Due to the existing interconnection between Nyeland Acres Mutual Water Company and Garden Acres Mutual Water Company, water infrastructure improvements at one system may be beneficial to the other. Both systems only have one active water source and Nyeland Acres Mutual Water Company does not have any storage facilities.

If either well is rendered offline, the other well has adequate capacity to supply both system's MDD (approximately 656,000 gpd when combined*). Garden Acres Mutual Water Company's storage tanks have an existing capacity of 361,500 gallons and is able to supply the fire flow requirement (150,000 gallons) for either system. However, the existing storage capacity may not able to supply the combined MDD and fire flow requirements for both GAMWC and NAMWC. The two systems would need a total of approximately 807,000 gallons of storage to meet demands during a "worst-case" scenario where both systems are experiencing their MDD, a fire emergency occurs, and both water sources (wells) are offline. However, in other cases, either system may be able to supply the other's water demands via their interconnection.

There is minimal additional space for the construction of new storage tanks at Garden Acres Mutual Water Company's tank site. A new parcel could be purchased for the construction of new tanks. These tanks may need land use permitting (e.g. conditional use permit) from Ventura County due to the proposed height.

*Since MDD is calculated from the most recent ten years of operation at each individual system, the MDD may land on differing days, months, and years. The true combined MDD of the systems on a single day may be more or less than this estimate.

6.1.3 Improvements Required at School Water Systems

The three schools in the Study Area (Rio Mesa High School, Rio Del Valle Middle School, and Rio Real School) do not meet fire flow requirements on their respective campuses. Rio Mesa High School has approximately 250,000 gallons of storage, but has stated that the school does not meet fire flow requirements. Rio Del Valle and Rio Real do not have potable water storage facilities on-site and rely solely on purchased water from UWCD's O-H Pipeline, which DDW considers an interruptible source.

The probability of a fire event at these schools occurring concurrent with an outage of the O-H Pipeline is low. However, the O-H Pipeline has a limited history of outages when water supply was temporarily reduced or paused.

For Rio Del Valle Middle School and Rio Real School to supply its existing maximum day demand and fire flow requirements during a worst-case scenario where the O-H Pipeline is undergoing an outage, each school would need approximately 306,000 gallons of storage.

Constructing storage tanks, booster stations, backup generators, and electrical improvements at Rio Real or Real Del Valle for fire suppression would have a high capital cost, and these facilities would seldom be used for fire suppression activities. The facilities would be used more often for periodic testing.

6.1.4 Additional Improvements Needed to Consolidate the El Rio-Del Norte Study Area

Additional improvements would be needed if it were desired to consolidate the remaining water systems in the El Rio-Del Norte Study Area into the proposed consolidated system discussed in Section 6.1.1.1.

Anticipated improvements include additional storage volume, additional water source capacity, the installation of pipelines from the looping pipeline planned along Vineyard Avenue, Central Avenue, and N. Rose Avenue to the existing distribution systems, and the upsizing of pipelines to meet fire flow demands.

6.1.4.1 Improvements at Schools

If the schools were to consolidate with one or more nearby public water systems, existing or proposed storage, pumping, and electrical facilities could supply the school and the other systems participating in a consolidation. These facilities would be utilized by all water systems participating in the consolidation. Pipelines in the immediate vicinity of these schools would need to larger to accommodate the higher flows required during fire suppression events. The sizes of pipeline improvements fronting these facilities is generally determined by the fire suppression flow rate requirements of each campus. Pipeline sizing requirements for fire suppression flows are vastly greater than the potable water demands at each school. Although the exact fire flow requirements have not been confirmed by the Ventura County Fire Department (VCFD), it is expected that the schools would require a similar fire flow to the Ventura County Juvenile Justice Facility, which is located within VMWC's service area, which requires 2,500 gpm for 2 hours (300,000 gallons).

For a consolidation involving Rio Del Valle Middle School, these pipelines would need to have larger diameters (approximately 12 inches):

- Alvarado Street between E. Stroube Street and Helsam Drive
- E. Collins Street east of Alvarado Street
- Orange Drive east of Alvarado Street
- Walnut Drive east of Alvarado Street
- Corsicana Drive east of Alvarado Street
- N. Rose Avenue between Corsicana Drive and E. Collins Street

For a consolidation involving Rio Real School, these pipelines would need to have larger diameters (approximately 12 inches):

- Kenney Street/Wright Road between E. Stroube Street and Balboa Street
- E. Stroube Street between N. Rose Avenue and Balboa Street
- Alvarado Street between Kenney Street and E. Collins

The above recommendations are preliminary and should be confirmed during design of a consolidation. They provide a framework of anticipated pipeline improvements should these schools decide to participate in a system consolidation.

A water system consolidation including any of these school water systems would need to be designed to meet the fire flow requirements designated by the VCFD. The fire flow requirements for the schools are likely to be higher than the existing fire flow requirements at a water system that does not contain a school or the Juvenile Justice Facility. As a result, the increase in storage and pumping requirements to meet fire flows at a school could require significant investment by the consolidating entity.

Rio Mesa High School is a potential participating entity in the proposed water system consolidation project described in Section 6.1. This consolidation would include Vineyard Mutual Water Company, which currently provides fire flow to the Juvenile Justice Center. To provide fire flow to Rio Mesa High

School, these proposed pipelines would need to have larger diameters (approximately 12 to 16 inches):

- Vineyard Avenue between Lambert Street and Central Avenue
- Central Avenue between Vineyard Avenue and N. Rose Avenue
- N. Rose Avenue between E. Collins Street and Central Avenue (approximately 8-12 inches)

As Vineyard Mutual Water Company already provides fire flow to the Juvenile Justice Center, minimal storage and pumping improvements may be required to provide fire flow to Rio Mesa High School.

6.1.4.2 Improvements at Cloverdale Mutual Water Company and Vineyard Avenue Estates Mutual Water Company

Cloverdale Mutual Water Company's and Vineyard Avenue Estates Mutual Water Company's existing distribution systems are adjacent to a participating system of the proposed consolidation project, Vineyard Avenue Acres Mutual Water Company. In order to connect the system to the consolidated system, three interconnections (approximately 8-inches) could be installed along Cortez Street, Balboa Street, and Alvarado Street for each connecting system.

Cloverdale Mutual Water Company participated in extensive consolidation discussions with Vineyard Avenue Acres Mutual Water Company in 2020 but withdrew from discussions in 2021. In early 2023, during the planning of a larger consolidation project (see Section 6.1.1), Vineyard Avenue Estates Mutual Water Company did not express interest in the proposed consolidated system.

6.1.4.3 Improvements at California American Water Company – Rio Plaza

California American Water Company (Rio Plaza) is planning to install an interconnection to United Water Conservation District's Oxnard-Hueneme Pipeline (O-H Pipeline). If Cal-Am were interested in connecting to the proposed consolidated system, an interconnection could be installed to the consolidated system's proposed supply from UWCD's well field and treatment facility instead.

In early 2023, during the planning of a larger consolidation project (see Section 6.1.1), Cal-Am did not express interest in the proposed consolidated system.

6.1.4.4 Improvements at Nyeland Acres Mutual Water Company and Garden Acres Mutual Water Company

Nyeland Acres Mutual Water Company and Garden Acres Mutual Water Company are located in the community of Nyeland Acres, approximately 2 miles from the proposed infrastructure for the proposed consolidated system.

Due to the agricultural parcels and City of Oxnard parcels located between the communities of El Rio and Nyeland Acres, a pipeline connection the proposed consolidated system to the existing distribution systems of Nyeland Acres Mutual Water Company and Garden Acres Mutual Water Company would be installed along Central Avenue and Santa Clara Avenue. This pipeline would be approximately 12-inches in diameter and 2 miles long. The pipeline would connect from the consolidated system at N. Rose Avenue and Central Avenue to Nyeland Acres Mutual Water Company's distribution system near Santa Clara Avenue and Friedrich Road. Due to the existing interconnection between Nyeland Acres Mutual Water Company and Garden Acres Mutual Water

Company, it may not be necessary to connect Garden Acres Mutual Water Company's existing distribution system. However, additional pipelines may be installed to connect to Garden Acres Mutual Water Company's distribution system and/or to increase hydraulic looping.

6.2 IMPROVEMENTS TO MEET SPECIFIC GROWTH SCENARIO DEMANDS

Several growth scenarios for the Study Area were identified and described in Section 5.0. These growth scenarios evaluated the additional water demands that would result from development, land use conversions, and parcel build-out.

Growth scenarios project changes in water demand on an annual basis (Average Day Demand) and during higher demand periods (e.g. hot summer days) (Maximum Day Demand). Some growth scenarios could require an increased fire flow demand in areas where the existing distribution pipeline infrastructure cannot support fire flow requirements. As a result of these changes in water demand, improvements to water production (e.g. wells), storage tanks, pump stations, and pipelines may be required. Changes in Average Day Demand typically impact water rights or other allocations to extract or purchase groundwater. Maximum Day Demands typically impact production and storage facilities. Fire flow demands tend to impact storage, pump station, and pipeline sizing.

This section identifies strategic capital improvements that could be constructed to support each growth scenario. Improvements are identified for each growth scenario individually, but actual growth in the Study Area may comprise of multiple scenarios, which may be calculated via Attachment A. A summary of the supply and storage needs as a result of the growth scenarios is shown in Table 7.

Table 7 – Summary of Growth Scenario Supply and Storage Needs in the Study Area

Water System	Adequate Supply for Maximum Day Demand[1]?	Adequate Storage for Maximum Day Demand[2]?	Adequate Supply Flow for Fire Flow[3]?	Adequate Storage for Fire Flow[4]?
Beedy Water Company	No	Yes	No	Yes
California American Water – Rio Plaza	Yes	No	No	No
Cloverdale Mutual Water Company	Yes	No	Yes	No
Garden Acres Mutual Water Company	No	Yes	Yes	Yes
Nyeland Acres Mutual Water Company	No	Yes	No[3]	No
Strickland Acres Mutual Water Company	Yes	No	No	No
Vineyard Avenue Acres Mutual Water Company	Yes	No	No	No
Vineyard Avenue Estates Mutual Water Company	No	Yes	No[3]	Yes
Vineyard Mutual Water Company	Yes	Yes	No[3]	Yes
Rio School District – Rio Del Valle School	No	Yes	No	No
Oxnard Union High School District – Rio Mesa High School	Yes	No	No	No
Rio School District – Rio Real School	No	No	No	No

Notes:

1. This column summarizes whether the system has adequate water sources to meet maximum day demand (MDD) and/or if they have adequate source capacity with the highest-capacity source offline.
2. This column summarizes whether the system has adequate water storage to meet MDD.
3. This column summarizes whether the minimum fire flow can be meet with only the pumping capacity of the system's water sources. It is assumed that the system's hydropneumatic tank(s) and booster pumps are in good working condition, that the water sources can pump consistently for at least 2 hours, and that aquifer levels are not depleted.
4. This column summarizes whether the system has adequate water storage to meet the minimum required fire flow (in total gallons). A water system does not need to meet the minimum fire flow requirements with both their source capacity and storage.

6.2.1 Growth Scenario 1

Growth Scenario 1 (G1) accounts for existing development potential according to current zoning regulations regarding Accessory Dwelling Units (ADUs) and state law SB 9 lot divisions, which are only allowed in parcels zoned R1.

ADUs would have a minimum fire flow rate of 1,000 gpm (for 2 hours), which equals the rate for single family homes. Therefore, for ADUs installed within public water systems that already have this capacity, no additional infrastructure would be needed to provide the fire flow. If an ADU were to be installed within a public water system that cannot provide fire flow at 1,000 gpm, improvements would be needed for that system. Many of the water systems in the Study Area supply water to

residential, and commercial, and/or industrial service connections and may be required by the Ventura County Fire Department to provide a minimum fire flow greater than 1,000 gpm.

A summary of the water demand increases resulting from this growth scenario are shown in Table 8 and a summary of the supply and storage needs in the affected systems is shown in Table 9.

Table 8 – Growth Scenario 1 Water Demand Increases

Growth Scenario	Description	Increase in Maximum Day Demand in the Study Area (gpd)	Percentage Increase from Existing MDD in the Study Area
1.1	50% of residential properties build 1 ADU	336,000	10%
1.2	10% of R1 zoned properties build 4 units	66,000	2%

Notes:
- Water demands are approximate and rounded to the nearest thousand. Percentages are rounded to the nearest whole percent.

Table 9 – Summary of Growth Scenario 1 Supply and Storage Needs in Affected Water Systems

Water System	Adequate Supply for Maximum Day Demand[1]?	Adequate Storage for Maximum Day Demand[2]?	Adequate Supply Flow for Fire Flow[3]?	Adequate Storage for Fire Flow[4]?
California American Water – Rio Plaza	Yes	No	No	No
Cloverdale Mutual Water Company	Yes	No	Yes	No
Nyeland Acres Mutual Water Company	No	Yes	No[3]	No
Strickland Acres Mutual Water Company	Yes	No	No	No
Vineyard Avenue Acres Mutual Water Company	Yes	No	No	No
Vineyard Avenue Estates Mutual Water Company	No	Yes	No[3]	Yes

Notes:
1. This column summarizes whether the system has adequate water sources to meet maximum day demand (MDD) and/or if they have adequate source capacity with the highest-capacity source offline.
2. This column summarizes whether the system has adequate water storage to meet MDD.
3. This column summarizes whether the minimum fire flow can be meet with only the pumping capacity of the system's water sources. It is assumed that the system's hydropneumatic tank(s) and booster pumps are in good working condition, that the water sources can pump consistently for at least 2 hours, and that aquifer levels are not depleted.
4. This column summarizes whether the system has adequate water storage to meet the minimum required fire flow (in total gallons). A water system does not need to meet the minimum fire flow requirements with both their source capacity and storage.

6.2.1.1 Growth Scenario 1.1

Under Growth Scenario 1.1 (G1.1), where half of the residential zoned parcels in the Study Area construct one ADU, Maximum Day Water Demand would increase by approximately 336,000 gallons per day. This would be an increase of 10% from current Maximum Day Demands in the Study Area.

The systems impacted by G1.1 are listed below:

- California American Water Company – Rio Plaza
- Cloverdale Mutual Water Company
- Garden Acres Mutual Water Company
- Nyeland Acres Mutual Water Company
- Strickland Acres Mutual Water Company
- Vineyard Avenue Acres Mutual Water Company
- Vineyard Avenue Estates Mutual Water Company

Garden Acres Mutual Water Company and Nyeland Acres Mutual Water Company have adequate supply capacity from their connections with each other, and Vineyard Avenue Estates Mutual Water Company has adequate supply capacity from its connection with UWCD's O-H Pipeline. However, due to the interruptible nature of these connections, it is not clear whether the systems can meet the Maximum Day Demand (MDD) and fire flow requirements with the additional of G1.1 demands. These three systems may need to install an additional water source or interconnection to reliably meet demands if either Nyeland Acres Mutual Water Company or Garden Acres Mutual Water Company's sole source is offline, or while UWCD's O-H Pipeline is not in operation. Garden Acres Mutual Water Company would need an addition of approximately 208,000 gallons of storage, Nyeland Acres Mutual Water Company would need approximately 439,000 gallons of storage, and Vineyard Avenue Estates Mutual Water Company would need an addition of approximately 505,000 gallons of storage.

Cal-Am (Rio Plaza), Cloverdale Mutual Water Company, Strickland Acres Mutual Water Company, and Vineyard Avenue Acres Mutual Water Company are currently unable to supply its Maximum Day Demands with available storage capacities.

Cal-Am has 40,000 gallons of storage and would require an addition of approximately 590,000 gallons of storage to meet both MDD and fire flow requirements. Cal-Am is planning to install an emergency interconnection with United Water Conservation District that may provide an additional source to meet MDD and/or provide supply during fire emergencies.

Cloverdale Mutual Water Company has approximately 100,000 gallons of storage and would require an addition of approximately 416,000 gallons of storage to meet both MDD and fire flow requirements.

Strickland Acres Mutual Water Company does not have adequate storage capacity to supply its MDD and fire flow requirements and Vineyard Avenue Acres Mutual Water Company does not have any water storage tanks. However, a total of approximately 1,640,000 gallons of storage is proposed for the consolidation project, as described in Section 6.1.1. To meet the additional demands under G1.1, a total of approximately 1,713,000 gallons of storage is needed for the consolidated water system.

6.2.1.2 Growth Scenario 1.2

Under Growth Scenario 1.2 (G1.2), where a tenth of R1 zoned parcels constructed up to a total of 4 units, Maximum Day Water Demand would increase by approximately 66,000 gallons per day. This would be a 2% increase from current Maximum Day Demands in the Study Area.

Within the Study Area, parcels zoned R1 are located in the service areas of California American Water Company (Rio Plaza) and Strickland Acres Mutual Water Company. Approximately 85% of the R1 zoned parcels are located within the Cal-Am service area, while the other 15% is located within the SAMWC study area.

Growth Scenario 1.2 is intended as an addition to Growth Scenario 1.1 and not mutually exclusive. As previously described in Section 6.2.1.1, both Cal-Am and Strickland Acres Mutual Water Company require additional storage capacity to meet the demands under G1. Cal-Am has 40,000 gallons of storage and would require an addition of approximately 647,000 gallons of storage to meet MDD and fire flow requirements. Strickland Acres Mutual Water Company is expected to be a part of the proposed consolidated system described in Section 6.1.1.1. The consolidated system would require a total of approximately 1,722,000 gallons of storage to meet additional demands under G1.1 and G1.2. Currently, approximately 1,640,000 gallons of total storage are proposed under the consolidation project.

6.2.2 Growth Scenario 2

Growth Scenario 2 (G2) accounts for the construction of additional residential units subject to state law SB 4 at religious institution sites. The systems impacted by G2 and where religious institution sites are located are listed below:

- Cloverdale Mutual Water Company
- Nyeland Acres Mutual Water Company
- Strickland Acres Mutual Water Company
- Vineyard Avenue Acres Mutual Water Company

A summary of the water demand increases resulting from this growth scenario are shown in Table 10.

Table 10 – Growth Scenario 2 Water Demand Increases

Growth Scenario	Description	Increase in Maximum Day Demand in the Study Area (gpd)	Percentage Increase from Existing MDD in the Study Area
2.1	4 du/ac	38,000	1%
2.2	3 du/ac (80% density build-out)	27,000	Less than 1%
2.3	5 du/ac (50% density bonus on 80% density build-out)	47,000	1%

Notes:
- Water demands are approximate and rounded to the nearest thousand. Percentages are rounded to the nearest whole percent.

As noted in Table 10, an increase of 1 du/ac leads to approximately 10,000 gallons per day of increased Maximum Day Water Demands in the Study Area. The increases between Growth Scenarios 2.1, 2.2, and 2.3 do not vary significantly or cause a different set of infrastructure improvements to be needed at each water system. Thereby, the summary of the G2.1 supply and storage needs in the affected systems shown in Table 11 may also be applied for G2.2 and G2.3.

Table 11 – Summary of Growth Scenario 2 Supply and Storage Needs in Affected Water Systems

Water System	Adequate Supply for Maximum Day Demand[1]?	Adequate Storage for Maximum Day Demand[2]?	Adequate Supply Flow for Fire Flow[3]?	Adequate Storage for Fire Flow[4]?
Cloverdale Mutual Water Company	Yes	No	Yes	No
Nyeland Acres Mutual Water Company	No	Yes	No[3]	No
Strickland Acres Mutual Water Company	Yes	No	No	No
Vineyard Avenue Acres Mutual Water Company	Yes	No	No	No

Notes:
- See notes on Table 9.

Cloverdale Mutual Water Company has approximately 100,000 gallons of storage and would require an addition of approximately 416,000 gallons of storage to meet MDD and fire flow requirements.

Nyeland Acres Mutual Water Company only has one water source and does not have any water storage, but has an interconnection with Garden Acres Mutual Water Company that can supply approximately 1,500 gpm. If Nyeland Acres MWC's sole water source is rendered offline, the system would have to rely solely on supply from Garden Acres MWC. To meet the existing and additional demands without the interconnection with Garden Acres MWC, Nyeland Acres Mutual Water Company would need up to approximately 265,000 gallons of storage to supply the MDD and fire flow requirements.

Additional water demands within Vineyard Avenue Acres Mutual Water Company and Strickland Acres Mutual Water Company would be addressed by the proposed water system consolidation. The consolidated system would need to be able to supply up to approximately 1,376,000 gallons per day and have a storage capacity of up to approximately 1,675,000 gallons. This would require a total additional 1,025,000 gallons of storage to Vineyard Mutual Water Company's existing storage site.

6.2.3 Growth Scenario 3

Growth Scenario 3 (G3) accounts for the potential land use conversion in commercial zones to residential uses within and outside of the High-Quality Transit Corridor (HQTC). The systems impacted by G3 and where commercial zoned parcels are located are listed below:

- California American Water Company (Rio Plaza)
- Cloverdale Mutual Water Company
- Garden Acres Mutual Water Company
- Nyeland Acres Mutual Water Company
- Strickland Acres Mutual Water Company
- Vineyard Avenue Acres Mutual Water Company

A summary of the water demand increases resulting from this growth scenario are shown in Table 12 and a summary of the supply and storage needs in the affected systems is shown in Table 13.

Table 12 – Growth Scenario 3 Water Demand Increases

Growth Scenario	Description	Increase in Maximum Day Demand in the Study Area (gpd)	Percentage Increase from Existing MDD in the Study Area
3.1a	20 du/ac outside of the HQTC	229,000	7%
3.1b	16 du/ac outside of the HQTC (80% density build-out)	182,000	6%
3.1c	24 du/ac outside of the HQTC (50% density bonus on 80% density build-out)	279,000	9%
3.2a	80 du/ac inside the HQTC	9,700	Less than 1%
3.2b	64 du/ac inside the HQTC (80% density build-out)	7,600	Less than 1%
3.2c	96 du/ac inside the HQTC (50% density bonus on 80% density build-out)	13,000	Less than 1%

Notes:

- Water demands are approximate and rounded to the nearest thousand, or nearest hundred for demands less than 10,000 gpd. Percentages are rounded to the nearest whole percent.

Table 13 – Summary of Growth Scenario 3 Supply and Storage Needs in Affected Water Systems

Water System	Adequate Supply for Maximum Day Demand[1]?	Adequate Storage for Maximum Day Demand[2]?	Adequate Supply Flow for Fire Flow[3]?	Adequate Storage for Fire Flow[4]?
California American Water – Rio Plaza	Yes	No	No	No
Cloverdale Mutual Water Company	Yes	No	Yes	No
Garden Acres Mutual Water Company	No	Yes	Yes	Yes
Nyeland Acres Mutual Water Company	No	Yes	No[3]	No
Strickland Acres Mutual Water Company	Yes	No	No	No
Vineyard Avenue Acres Mutual Water Company	Yes	No	No	No

Notes:
- See notes on Table 9.

6.2.3.1 Growth Scenario 3.1

Growth Scenario 3 (G3) accounts for the potential land use conversion in commercial zones to residential uses outside of the High-Quality Transit Corridor (HQTC).

Cal-Am (Rio Plaza), Strickland Acres Mutual Water Company, and Vineyard Avenue Acres Mutual Water Company are currently unable to supply its Maximum Day Demands with available storage capacities. The increase of water demands under G3 would increase the storage capacity needed for these systems. The approximate additional storage described below is evaluated from Growth Scenario 3.1c, which accounts for the highest number of additional dwelling units (24 du/ac) in G3. Thereby, these values are considered the maximum additional storage requirements for G3.1.

Cal-Am has 40,000 gallons of storage and would require an addition of approximately 578,000 gallons of storage to meet both MDD and fire flow requirements. Cal-Am is planning to install an emergency interconnection with United Water Conservation District that may provide an additional source to meet MDD and/or provide supply during fire emergencies.

Strickland Acres Mutual Water Company does not have adequate storage capacity to supply its MDD and fire flow requirements and Vineyard Avenue Acres Mutual Water Company does not have any water storage tanks. Both systems are participating the in the proposed water system consolidation, for which approximately 1,640,000 gallons of storage is proposed (Section 6.1.1). To meet additional storage requirements under G3.1c, a total of 1,712,000 total gallons of storage is needed for the consolidated system.

Garden Acres Mutual Water Company and Nyeland Acres Mutual Water Company are noted as not having adequate water supply to meet MDD because they each only have one active source. If the source were to be rendered offline at one of the systems, the system would have to rely on its existing interconnection with the other. Garden Acres Mutual Water Company's existing storage capacity is able to meet the additional storage needed for G3.1, but cannot meet both MDD and fire flow requirements at the same time. To supply both MDD and fire flow demands, Garden Acres

Mutual Water Company would need an addition of approximately 235,000 gallons of storage. Nyeland Acres Mutual Water Company does not have any storage and would require approximately 468,000 gallons of storage to meet both MDD and fire flow requirements.

Fire flow requirements for residential areas are lower than requirements for commercial areas. However, multi-story developments may require a higher fire flow (such as 2,000 or 2,500 gpm for 2 hours).

6.2.3.2 Growth Scenario 3.2

Growth Scenario 3 (G3) accounts for the potential land use conversion in commercial zones to residential uses within the High-Quality Transit Corridor (HQTC).

Multiple state bills allow for increased density and/or modified development standards for projects at the two commercial parcels located within the HQTC under G3.2 (APNs 145-015-401 and 145-021-107). These high-density residential developments are likely to require higher fire flow requirements than the systems' current design fire flow. Fire flow requirements are expected to be similar to the requirement assigned to the Ventura County Juvenile Justice Facility of 2,500 gpm for 2 hours.

The first parcel is located within Vineyard Avenue Acres Mutual Water Company's service area, which is a participant of the proposed consolidation system. The proposed consolidation system would be capable of meeting the fire flow requirements for high-density housing due to the existing fire flow requirements at the Ventura County Juvenile Justice Facility.

The second commercial parcel is located within Cloverdale Mutual Water Company's service area. To meet fire flow requirements under G3.2, a significant increase in additional storage is necessary. Cloverdale MWC currently has 100,000 gallons of storage and would likely need at least 636,000 gallons of additional storage to meet the new MDD and fire flow requirements. Improvements to upsize the surrounding pipelines to approximately 12 inches would also be required.

6.2.4 Growth Scenario 4

Growth Scenario 4 (G4) is accounts for built-out commercial and industrial zones in the Study Area. A summary of the water demand increases resulting from this growth scenario are shown in Table 14 and a summary of the supply and storage needs in the affected systems is shown in Table 15.

Table 14 – Growth Scenario 4 Water Demand Increases

Growth Scenario	Description	Increase in Maximum Day Demand in the Study Area (gpd)	Percentage Increase from Existing MDD in the Study Area
4.1	60% lot coverage at commercial parcels, 17.7% vacancy	108,000	3%
4.2	50% lot coverage at industrial parcels, 2% vacancy	286,000	9%

Notes:
- Water demands are approximate and rounded to the nearest thousand. Percentages are rounded to the nearest whole percent.

Table 15 – Summary of Growth Scenario 4 Supply and Storage Needs in Affected Water Systems

Water System	Adequate Supply for Maximum Day Demand[1]?	Adequate Storage for Maximum Day Demand[2]?	Adequate Supply Flow for Fire Flow[3]?	Adequate Storage for Fire Flow[4]?
Beedy Water Company	No	Yes	No	Yes
California American Water – Rio Plaza	Yes	No	No	No
Cloverdale Mutual Water Company	Yes	No	Yes	No
Garden Acres Mutual Water Company	No	Yes	Yes	Yes
Nyeland Acres Mutual Water Company	No	Yes	No[3]	No
Strickland Acres Mutual Water Company	Yes	No	No	No
Vineyard Avenue Acres Mutual Water Company	Yes	No	No	No
Vineyard Mutual Water Company	Yes	Yes	No[3]	Yes

Notes:
- See notes on Table 9.

6.2.4.1 Growth Scenario 4.1

Under Growth Scenario 4.1 (G4.1), commercial zones are assumed to be built out to a 60% lot coverage with an average vacancy rate of 17.7%. The systems impacted by G4.1 and where commercial zoned parcels are located are listed below:

- California American Water Company (Rio Plaza)
- Cloverdale Mutual Water Company
- Garden Acres Mutual Water Company
- Nyeland Acres Mutual Water Company
- Strickland Acres Mutual Water Company
- Vineyard Avenue Acres Mutual Water Company

Cal-Am (Rio Plaza), Cloverdale Mutual Water Company, Strickland Acres Mutual Water Company, and Vineyard Avenue Acres Mutual Water Company are currently unable to supply its Maximum Day Demands with available storage capacities. The increase of water demands under G4.1 would increase the storage capacity needed for these systems.

Cal-Am has 40,000 gallons of storage and would require an addition of approximately 512,000 gallons of storage to meet both MDD and fire flow requirements. Cal-Am is planning to install an emergency interconnection with United Water Conservation District that may provide an additional source to meet MDD and/or provide supply during fire emergencies.

Cloverdale Mutual Water Company has approximately 100,000 gallons of storage and would require an addition of approximately 387,000 gallons of storage to meet both MDD and fire flow requirements under G4.1.

Strickland Acres Mutual Water Company does not have adequate storage capacity to supply its MDD and fire flow requirements and Vineyard Avenue Acres Mutual Water Company does not have any water storage tanks. However, both systems are participating in the proposed water system consolidation, for which approximately 1,640,000 gallons of storage is proposed at the existing Vineyard Mutual Water Company tank site. To meet additional storage requirements under G4.1, approximately 1,832,000 gallons of total storage would be needed for the proposed consolidated system.

Garden Acres Mutual Water Company and Nyeland Acres Mutual Water Company are noted on Table 14 as not having adequate water supply to meet MDD because they each only have one active source. If the source were to be rendered offline at one of the systems, the system would have to rely on its existing interconnection with the other. Garden Acres Mutual Water Company's existing storage capacity is able to meet the additional storage needed for G4.1, but cannot meet both MDD and fire flow requirements at the same time. To supply both MDD and fire flow demands under G4.1, Garden Acres Mutual Water Company would need an addition of approximately 200,000 gallons of storage. Nyeland Acres Mutual Water Company does not have any storage and would require a total of approximately 429,000 gallons of storage to meet both MDD and fire flow requirements.

6.2.4.2 Growth Scenario 4.2

Under Growth Scenario 4.2 (G4.2), industrial zones are assumed to be built out to a 50% lot coverage with an average vacancy rate of 2%. The systems impacted by G4.1 and where industrial zoned parcels are located are listed below:

- Beedy Water Company
- Cloverdale Mutual Water Company
- Garden Acres Mutual Water Company
- Vineyard Mutual Water Company
- Industrial parcels outside of existing public water systems

Cloverdale Mutual Water Company is currently unable to supply its Maximum Day Demands with its available storage capacity. Cloverdale Mutual Water Company has approximately 100,000 gallons of storage and would require a total of approximately 393,000 gallons of storage to meet both MDD

and fire flow requirements under G4.2. To meet additional demands for both G4.1 and G4.2, Cloverdale Mutual Water Company would require an addition of approximately 394,000 gallons of storage.

Beedy Water Company and Garden Acres Mutual Water Company are noted on Table 14 as not having adequate water supply to meet MDD because they each only have one active source. If the source were to be rendered offline at either system, the system would only be able to supply its customers with the water supply remaining in its storage tanks or via an interconnection. Beedy Water Company is a participating system of the proposed consolidation project and additional water supply needs under G4.2 are expected to be supplied by the consolidated system's sources (see Section 6.1.1.1). Garden Acres Mutual Water Company could all receive supplemental water supply from its existing interconnection with the Nyeland Acres Mutual Water Company, assuming that Nyeland Acres Mutual Water Company's well is operational.

As described in the previous section, Garden Acres Mutual Water Company's existing storage capacity is able to meet the additional storage needed for G4, but cannot meet both MDD and fire flow requirements at the same time. To supply both MDD and fire flow demands under G4.2, Garden Acres Mutual Water Company would need an addition of approximately 188,000 gallons of storage. To supply additional water demands from both G4.1 and G4.2, Garden Acres Mutual Water Company would need an addition of approximately 203,000 gallons of storage.

Vineyard Mutual Water Company currently has adequate additional supply and storage capacity to meet the MDD and fire flow requirements under G4. Vineyard Mutual Water Company is also a participating water system in the proposed consolidation project. Due to the excess storage capacity, robust booster station, and potential nearby land for the construction of water storage tanks, Vineyard Mutual Water Company's existing tank site is proposed to be the future tank site of the consolidated system. Additional storage tanks would be constructed to meet the existing water demands of the other participating systems that currently lack adequate supply and storage to meet MDD.

6.2.5 Growth Scenario 5

Growth Scenario 5 (G5) accounts for potential land use density increases at residential zoned properties located within the High-Quality Transit Corridor. The systems impacted by G5 and where residential zoned parcels are located in the HQTC are listed below:

- Cloverdale Mutual Water Company
- Vineyard Avenue Acres Mutual Water Company

A summary of the water demand increases resulting from this growth scenario are shown in Table 16 and a summary of the supply and storage needs in the affected systems is shown in Table 17. Water demands per dwelling unit were assigned using the current water demands in Cloverdale Mutual Water Company and Vineyard Avenue Acres Mutual Water Company. These are a conservative estimate as water demands for a dwelling unit within a high-density development may use less water than the current urban residential homes in the area.

Table 16 – Growth Scenario 5 Water Demand Increases

Growth Scenario	Description	Increase in Maximum Day Demand in the Study Area (gpd)	Percentage Increase from Existing MDD in the Study Area
5.1	20 du/ac inside the HQTC	1,440,000	45%
5.2	16 du/ac inside the HQTC (80% density build-out)	1,138,000	36%
5.3	24 du/ac inside the HQTC (50% density bonus on 80% density build-out)	1,748,000	55%

Notes:
- Water demands are approximate and rounded to the nearest thousand. Percentages are rounded to the nearest whole percent.

Table 17 – Summary of Growth Scenario 5 Supply and Storage Needs in Affected Water Systems

Water System	Adequate Supply for Maximum Day Demand[1]?	Adequate Storage for Maximum Day Demand[2]?	Adequate Supply Flow for Fire Flow[3]?	Adequate Storage for Fire Flow[4]?
Cloverdale Mutual Water Company	Yes	No	Yes	No
Vineyard Avenue Acres Mutual Water Company	Yes	No	No	No

Notes:
- See notes on Table 9.

Multiple state bills allow for increased density and/or modified development standards for projects at the two commercial parcels located within the HQTC under G3.2 (APNs 145-015-401 and 145-021-107). These high-density residential developments are likely to require higher fire flow requirements. If storage capacities are met as described below, higher fire flow requirements could be supplied via upsized pipelines (e.g. approximately 12-inches) fronting the developments.

The approximate additional storage described below is evaluated from Growth Scenario 5.3, which accounts for the highest number of additional dwelling units (24 du/ac) in G5. Thereby, these values are considered the maximum additional storage requirements for G5.

Cloverdale Mutual Water Company is currently unable to supply its Maximum Day Demands with its available storage capacity. Cloverdale Mutual Water Company has approximately 100,000 gallons of storage and would require an addition of approximately 2,071,000 gallons of storage to meet both MDD and fire flow requirements under G5.3.

If the G5 land use density increases were limited to the three RHD zoned parcels within Cloverdale Mutual Water Company's service area, the system would be able to supply its Maximum Day Demands with its available water sources, but would require additional storage capacity. To meet the G5.1, G5.2, and G5.3 water demands, Cloverdale Mutual Water Company would require an addition

of approximately 704,000; 640,000; and 768,000 gallons of storage to meet MDD and fire flow requirements, respectively.

Vineyard Avenue Acres Mutual Water Company does not have any water storage tanks. However, Vineyard Avenue Acres Mutual Water Company is a participating water system in the proposed consolidated system, for which approximately 1,640,000 gallons of total storage is proposed (Section 6.1.1). To meet storage requirements under G5.3, a total of approximately 1,703,000 gallons of storage would be needed for the proposed consolidated system.

7.0 CAPITAL COSTS OF IMPROVEMENTS

The costs of improvements are estimated from other water system infrastructure projects in southern California. Costs estimated in this section represent current average costs and may vary in the future and depend on multiple factors such as location, design, applicability of prevailing wage requirements, and contractor bid results.

The average capital costs for drilling and installing a new groundwater well range between $1,000 and $2,000 per vertical foot.

Distribution system improvements within the existing water systems are expected to require pipelines that are between 6-inch to 8-inch in diameter. The average capital costs for the installation of pipelines between 6-inch to 8-inches in diameter range.

Distribution and transmission pipeline improvements connecting water sources to storage tanks and/or connecting existing water systems are expected to require pipelines that are between 8-inch to 12-inch in diameter. The average capital costs for the installation of pipelines between 8-inches to 12-inches in diameter range between $300 to $500 per linear foot. The costs for pipelines varies greatly depending on the pipe material and special construction requirements (e.g. concrete encasing, trenchless installations).

The average capital costs for storage improvements range between $5 to $10 per gallon for new storage tanks installed.

8.0 AREAS FOR FURTHER STUDY

Areas for further study that would benefit the Ventura County 2040 General Plan in understanding the water needs in the Study Area include:

- An evaluation of wastewater flows and wastewater quality for the existing developments and growth scenarios and assessment of wastewater infrastructure needed to support existing and/or anticipated flows.
- An evaluation of recycled water infrastructure improvements to extend the City of Oxnard's recycled water program into the Study Area to provide non-potable water. This would help attenuate the demand of potable water that is currently used for non-potable uses.
- An evaluation of existing water demands within state small systems and private wells. An analysis of wells that have adequate or surplus of water. This would be dependent on the

availability of information from the well owners and other sources (e.g. Ventura County Environmental Health Division).

- An evaluation on the impacts of the lack of water storage for fire flow on fire insurance costs and subsequent development limitations in the Study Area.

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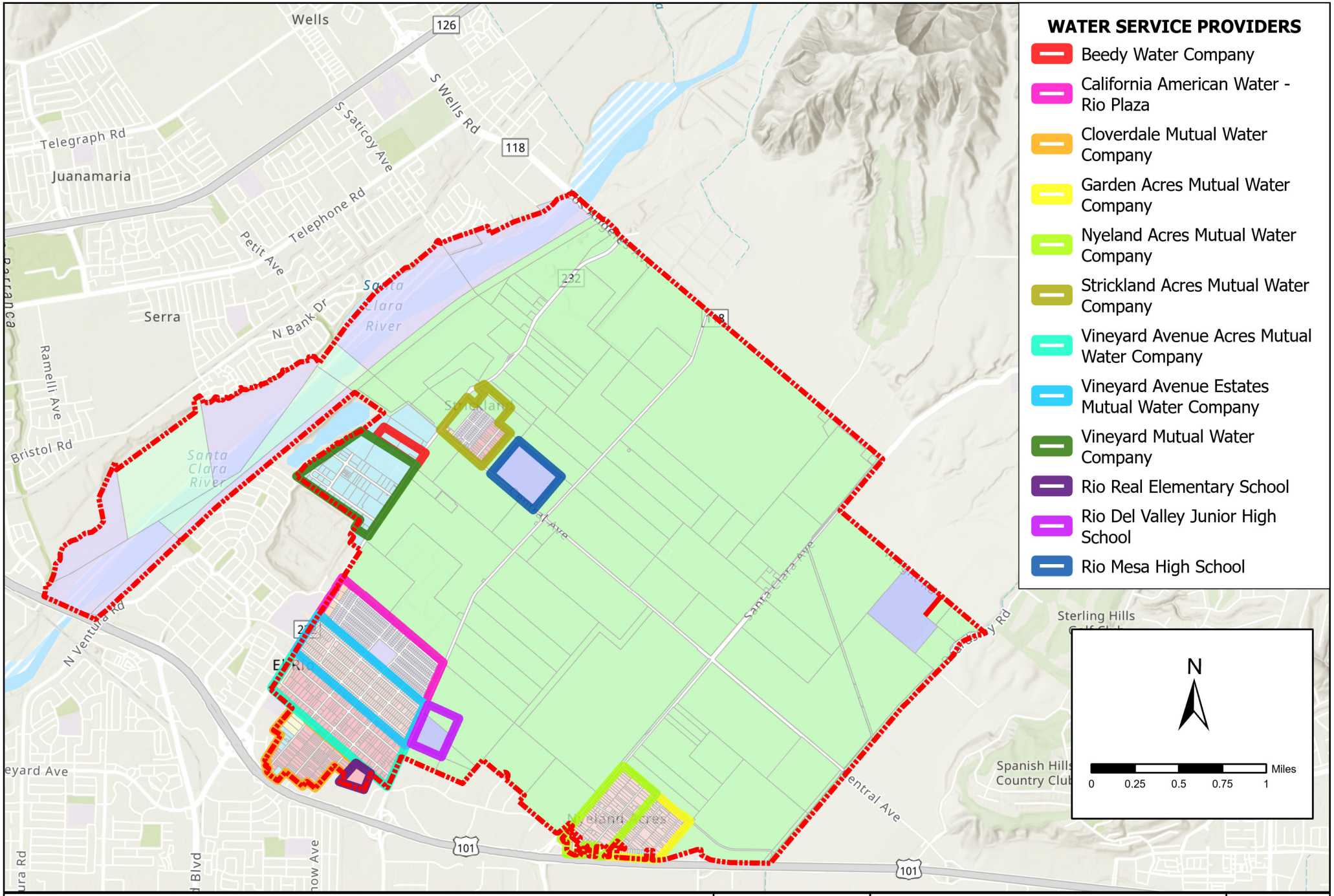

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AREA PLAN ZONING DESIGNATIONS
- Agriculture 40 AC Min.
- Commercial
- Industrial
- Institutional 10 AC Min.
- Open Space 80 AC Min.
- Urban Residential 1-2 DU/AC
- Urban Residential 10-15 DU/AC
- Urban Residential 2-4 DU/AC
- Urban Residential 4-6 DU/AC
- Urban Residential 20 DU/AC
- Study Area

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STUDY AREA

FIGURE NUMBER: 1

SCALE: 1 inch = 1 mile

JOB NUMBER: 228124-0001933-01

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DATE SUBMITTED: SEPT 2024

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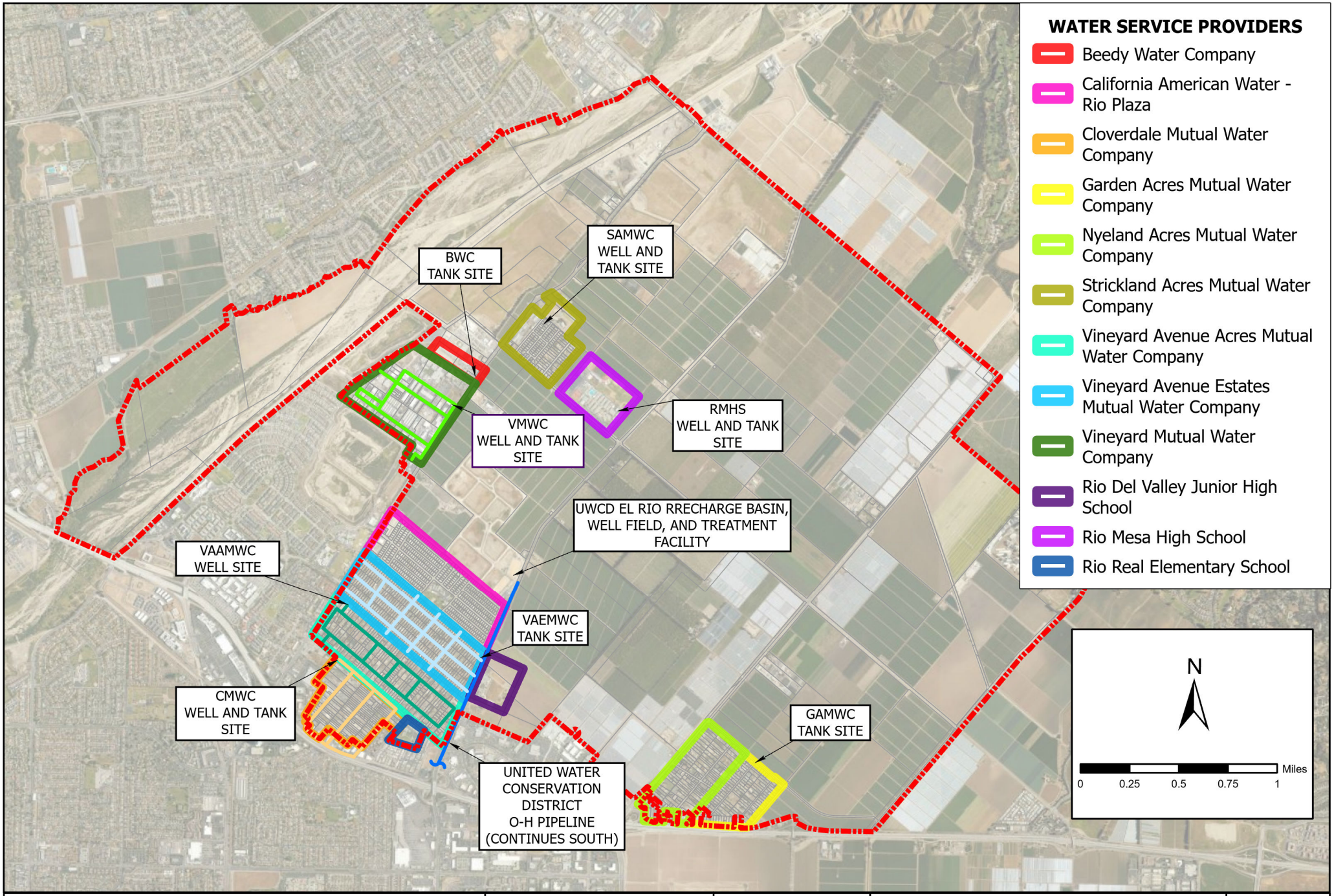

Legend

EXISTING PIPELINES
- CMWC
- O-H Pipeline
- VAAMWC
- VAEMWC
- VMWC
- Parcels
- Study Area

Note:
This figure does not include an exhaustive view of the existing infrastructure in the area as not all water system infrastructure was provided by the water systems.

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EXISTING INFRASTRUCTURE

FIGURE NUMBER
2

SCALE
1 inch = 1 mile

JOB NUMBER:
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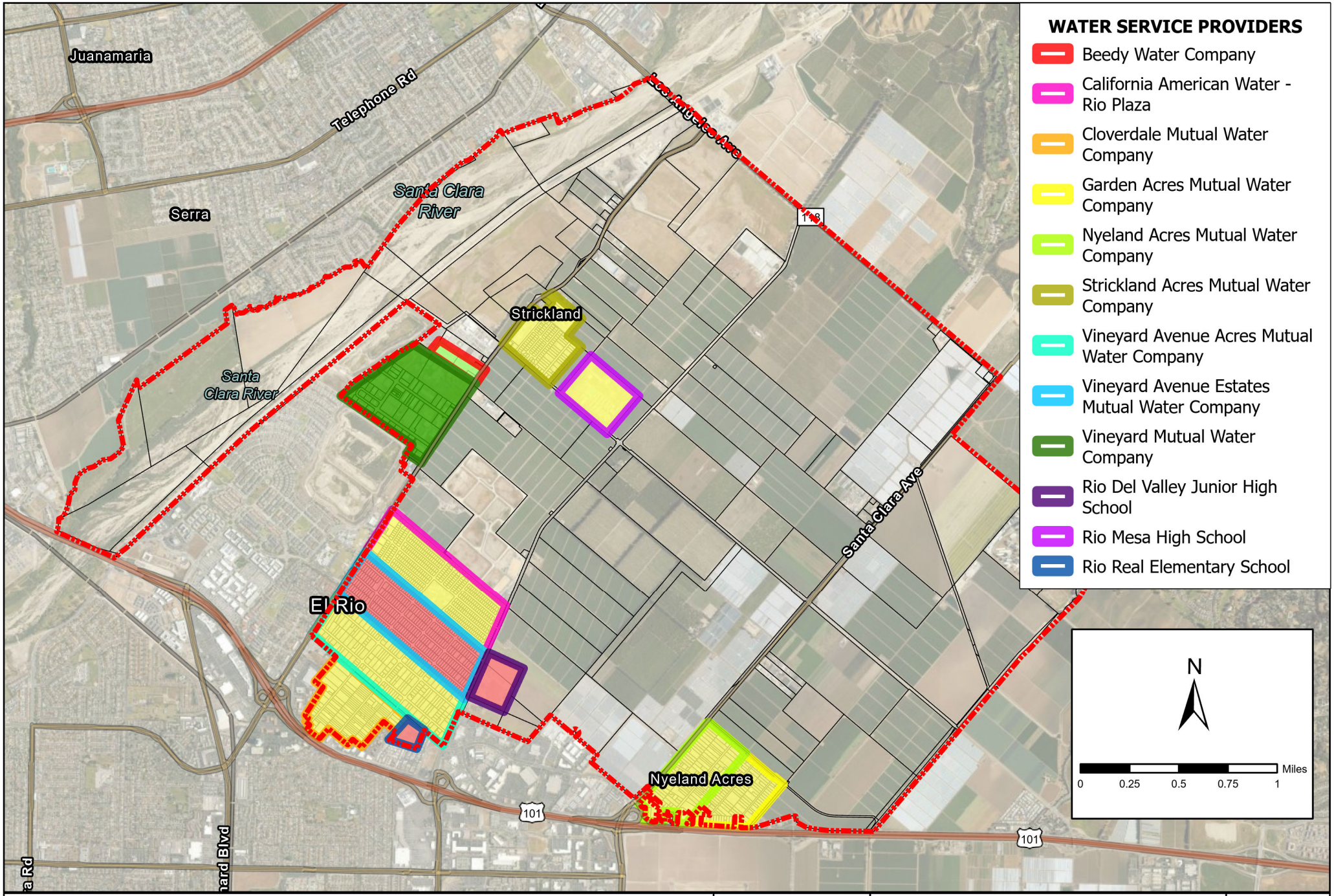

Legend

- Meets MDD and Fire Flow
- Meets MDD with Supply, but Supply is Vulnerable
- Requires Additional Storage to Meet MDD and Fire Flow
- Requires Additional Storage to Meet MDD and Fire Flow, and Supply is Interruptible
- Study Area
- Parcels

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Systems Lacking Adequate Water Supply (Baseline Scenario)

FIGURE NUMBER: 3

SCALE: 1 inch = 1 mile

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DATE SUBMITTED: SEPT 2024

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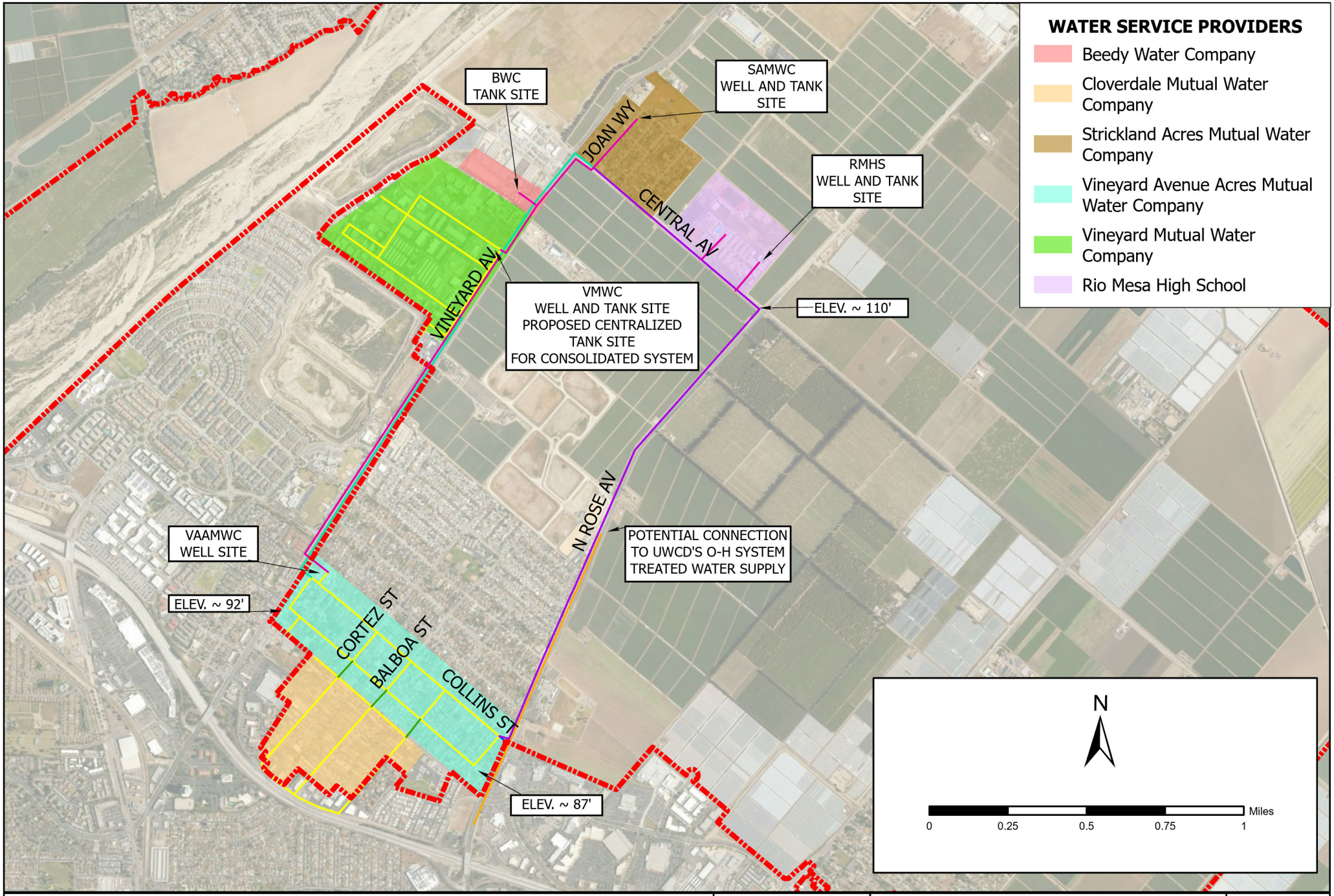

Legend

- Existing Pipeline
- Existing UWCD Oxnard-Hueneme Pipeline
- Proposed Distribution Pipeline
- Proposed Emergency Connection
- Proposed Interconnection
- Proposed Looping Pipeline
- Proposed Transmission Pipeline
- Study Area

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POTENTIAL INFRASTRUCTURE COMPONENTS FOR PROPOSED WATER SYSTEM CONSOLIDATION

FIGURE NUMBER: 4

SCALE: 1 inch = 0.4 miles

JOB NUMBER: 228124-0001933-01

PREPARED FOR: VENTURA COUNTY RESOURCE MANAGEMENT AGENCY PLANNING DIVISION

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