VERNON WESTSIDE SPECIFIC PLAN
BASELINE STUDIES
OPPORTUNITIES AND CONSTRAINTS

JANUARY 28, 2021

The Arroyo Group

LOHA

CITY OF VERNON
CALIFORNIA
EXCLUSIVELY INDUSTRIAL

INTRODUCTION & SETTING

INTRODUCTION

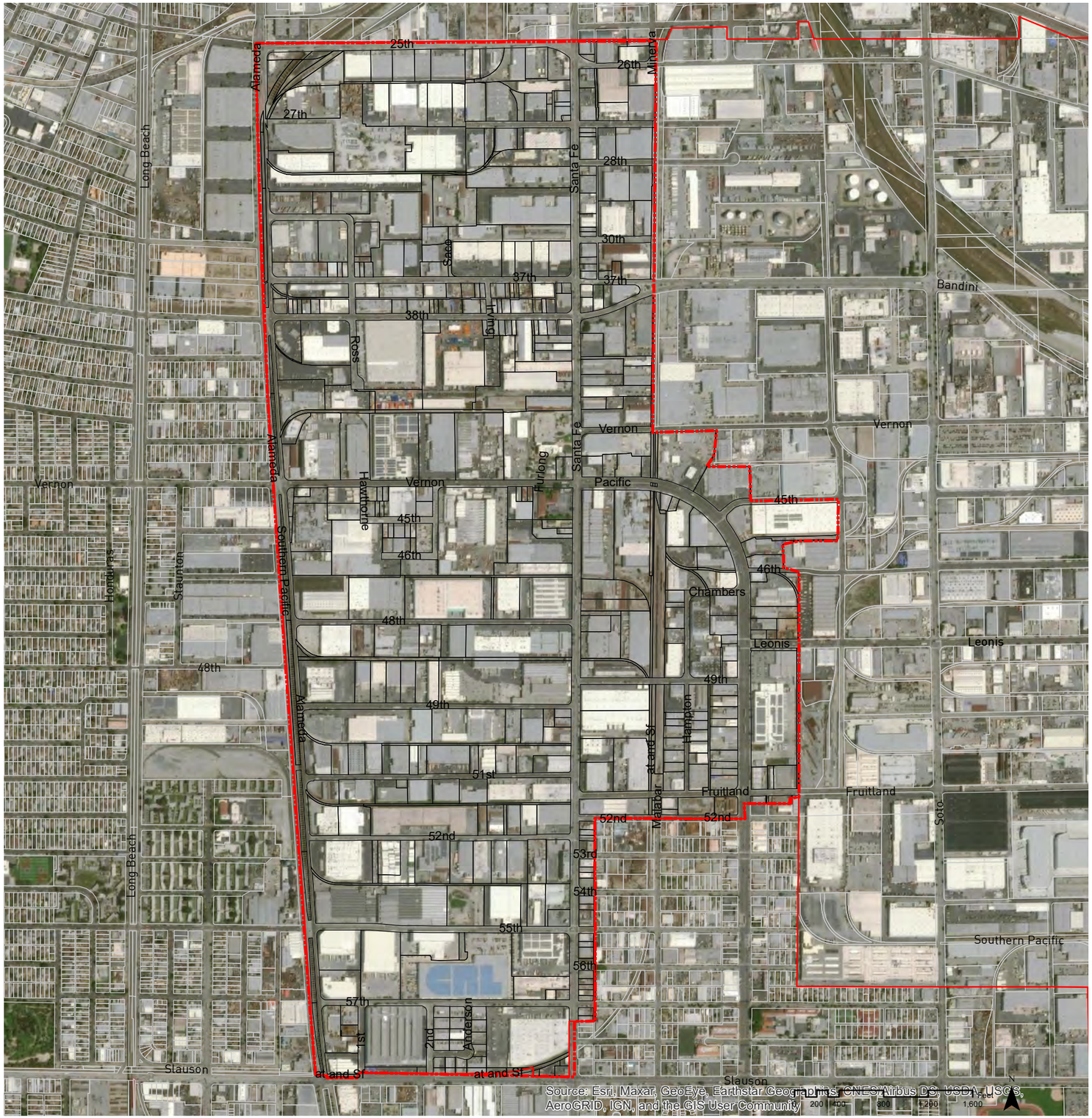
The City of Vernon is anchored by a robust network of utilities serving the physical and economic stability and growth of its resident industries. Vernon's strong historical focus on its utility infrastructure has been a means to providing a competitive cost advantage to businesses operating within the City. This continued focus on providing a suite of reliable service networks creates the backbone to operations within the City. City provided infrastructure systems rely upon the availability of adequate resources, provisions for utility improvement and ongoing maintenance, coordination within the local and regional regulatory context, and alignment to the needs of the industries and residents who call Vernon home.

Founded initially as an industrial city, Vernon has a unique demographic makeup, primarily serving as a business hub. The current populations within the city rest around 100 residents, with redevelopment of the Specific Plan Area considering the influx of additional resident populations. Industrial and commercial establishments make up the daily population of the city. Vernon is currently home to 1,800 businesses, employing a total of 50,000 people in industries such as food and agriculture, apparel, waste recycling, electronics, film production, and materials processing.

Vernon was entirely built-out before 1990 with an almost exclusively industrial demographic. Unique utility and city planning considerations in Vernon have led to innovative, non-traditional thinking to anticipate constraints, resolve risk, and ideate potential for enhanced distribution of services. While the City of Vernon does not follow the patterns of other regional cities with regards to infrastructure provision, its unique makeup has allowed it to continue to serve its customers with a high level of quality, service, reliability and cost, turning challenges into opportunities. For example, the city's primarily commercial and industrial customer portfolio creates a peak timing demand pattern which is an inverse of many other cities, as operations and associated peak usage hours fall within the business hours practiced.

The City of Vernon Public Utilities Department (VPU) is the primary municipally owned utility provider, which offers water, electric, gas, and fiber optic services to residents and businesses at competitive rates.

INFRASTRUCTURE CAPACITY &

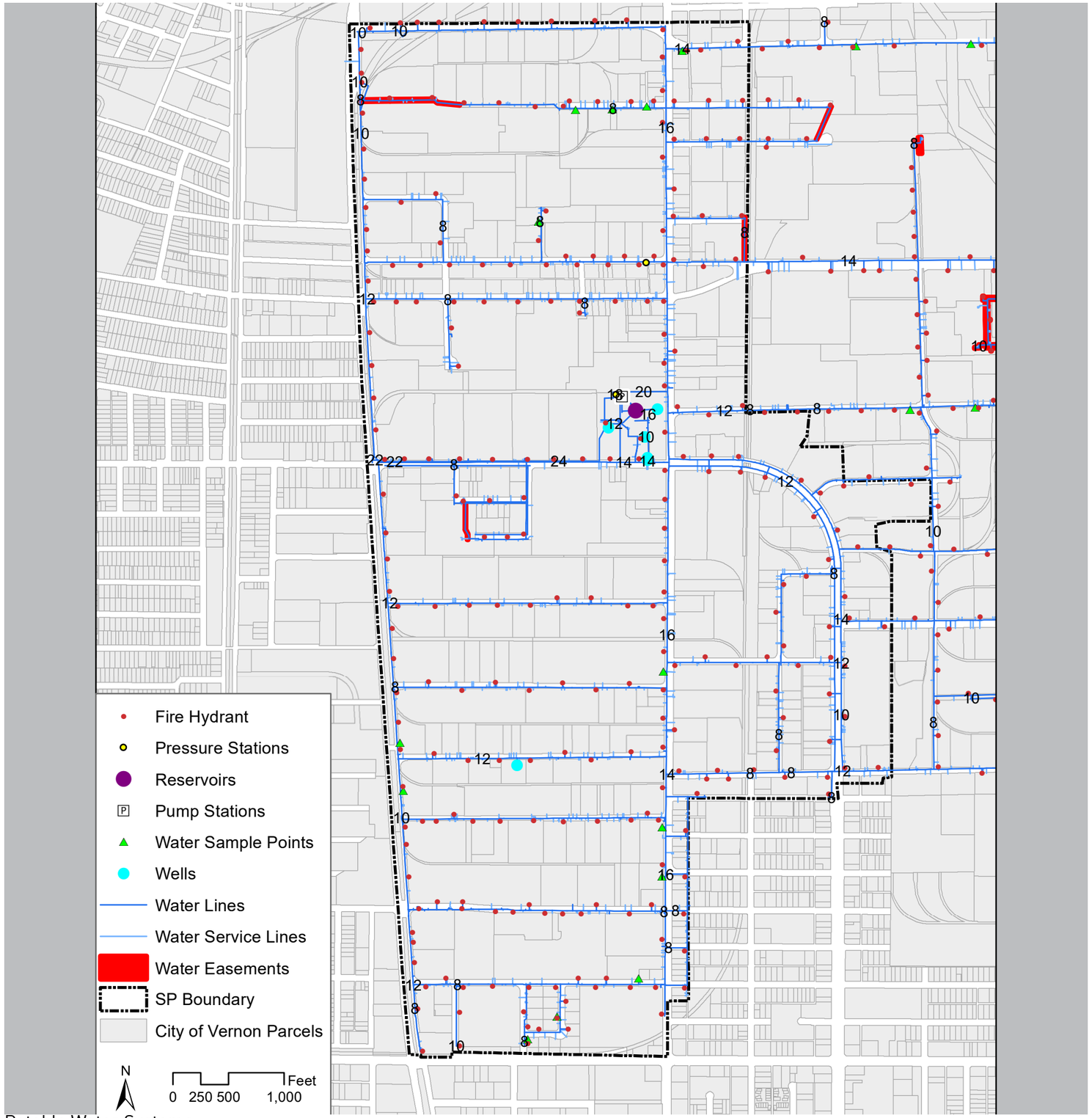


The following sections elaborate on the various baseline conditions of infrastructure utility systems serving the Specific Plan Area. These include potable water, sewage and wastewater, recycled water, stormwater, electricity, natural gas, and data.

Sections are organized to provide a general introduction, and baseline information on the supply and distribution systems, capacity, protection, and improvements identified by the City or other utility providers.

POTABLE WATER SYSTEMS

The majority of the City's water is supplied by the City's Water Department. The City's Water Department supplies water from its Central Basin groundwater rights and supplements demand via Central Basin Municipal Water District (CBMWD) imported potable and recycled water. Two other suppliers, California Water Service Company (Cal Water) - East Los Angeles District, Commerce System, and Maywood Mutual Water Company Number 3 supply water to small portions of the northeast and southeast regions of the City, respectively, outside of the Specific Plan Area. The Insurance Service Organization (ISO) has awarded the City of Vernon a Class I rating, speaking to Vernon's water system that includes exemplary sustained flow rates, water system maintenance, and type of supply.



Potable Water Systems

POTABLE WATER SYSTEMS

WATER SERVICE

The City of Vernon draws its groundwater supply from deep City-owned wells located within the Central Groundwater Basin. The City overlaps with the Central Basin and is party to the Central Basin Third Amended Judgement. This groundwater source supplies approximately 200,000 acre-feet of potable water to the area south of the Whittier Narrows to the Pacific Ocean and from Orange County to the City of Compton. The City specifically has an Allowable Pumping Allocation (APA) of 7,539 AFY.

To supplement the water supply needed, the City is a member agency of the Central Basin Municipal Water District and purchases imported water as needed. The potable water purchased from CBMWD reported in 2015 was 1,034 AF of drinking water level of treatment. All supplemental water is bought from CBMWD via the Metropolitan Water District of Southern California. The imported potable water is treated surface water sourced from the Colorado River and areas in Northern California via the State Water Project. The City has no surface water supply.

The Central Basin is characterized by groundwater at relatively shallow depths. The Central Basin within the region of interest is categorized into two primary forebays, the Los Angeles forebay and the Montebello forebay. The Los Angeles forebay is in the northern portion of the Central Basin, where the Los Angeles River enters the basin, and the Montebello forebay extends south where the San Gabriel River encounters the Central Basin. The Montebello forbear is the most important area in the Central Basin for groundwater recharge. Both forebays have unconfined groundwater conditions and are both relatively interconnected aquifers that extend up to 1,600 feet deep to provide recharge to the aquifer system. Although the area near the two aforementioned forebays are unconfined aquifers, much of the Central Basin is characterized by confined aquifers but with some areas that are semipermeable and allow interaction between the aquifers. This interaction between aquifer systems plays an important role in the capacity, quality and recharge potential of the groundwater sources serving the City and the Specific Plan Area.

Currently, the City of Vernon's Water Department provides potable water to all its customers and recycled water to only one customer, the City's power plant. The City does not currently receive or deliver raw water.

WATER DISTRIBUTION NETWORK

The Vernon water distribution system consists of approximately 250,000 linear feet of pipe, eight wells, six ground-level reservoirs, one elevated tank and a below-ground reservoir. In addition to the aforementioned resources, additional City and County owned wells exist but not all of them are utilized for extraction for water supply purposes. [1]

A 16" distribution line runs along S Santa Fe Avenue, and connects to hydrant laterals, fire service lines, individual parcels, and adjoining distribution lines of varying diameter to serve the entirety of the Specific Plan Area. According to County and City mapping, three Country owned wells and six City owned wells lie within the Specific Plan Area, although these wells do not all serve an active extraction role in providing for the City's water supply.

As of 2020, the water system distributes approximately 2.8 billion gallons of water annually and has a total storage capacity of 16 million gallons. The average pressure available in the system is approximately 75 pounds per square inch.

Overall, Vernon's rates are amongst the lowest compared to several water suppliers in the region, including all members of the Southeast Water Coalition. The City's fixed monthly rate is based on meter size and is exactly proportional to the American Water Works Association (AWWA) standard. As most customers are commercial and industrial sites whose water demands are based on productivity levels, rather than seasonal demands, all customers have essentially flat water demand profiles throughout the year.[2]

The water system needs extensive capital improvements. In a 2020 study, the purveyor stated that the budget for capital improvement is $21 million for the next five years. This is higher than the listed budget in a 2018 version of the same study, with the listed reason for the accelerated budget being added to account for recent water well failures. It is important to note that the water system in its current state is oversized, due to the decline in water sales over the past decade. Thus, capital improvement projects are concentrated in only portions of the system that are needed to serve the current load. Planned system improvements include improved operating technologies that will result in better operating efficiency.

1 http://www.cityofvernon.org/departments/public-utilities/26-water

2 http://www.cityofvernon.org/images/water/Vernon_Water_Rate_Study_2019_09_26_Final.pdf

POTABLE WATER SYSTEMS

CAPACITY

All of the City's sources of supply are sustainably managed and are projected to meet demand through 2040. The City does not give major attention to future water demand predictions given the unpredictable nature of the economic cycle which the City must respond to. When determining projected needs, the City's projected supply was compared to the projected demand under both normal and drought conditions to verify the adequacy of supply. On average, projected supply and demand is expected to steadily remain at 10,860 AFY across both categories through 2040.

Local groundwater is available via the Los Angeles River and Gaspar aquifers. These basins are utilized and affected by neighboring cities, creating concern for potential contamination and depletion from cumulative extraction and infiltration impacts. Pumping has lowered the water level in the Central Basin, changing outflow patterns in the region. The Water Replenishment Act of 1959 enabled the formation of the Water Replenishment District of Southern California (WRD), which is in charge of replenishing both the Central and West basins. They are mandated to manage, regulate, replenish and protect the quality of groundwater supplies within its boundaries, or which the City of Vernon is included. While the Central Basin has a large storage capacity, it is reliant on imported water, regional stormwater capture and recycled water for replenishment. The constraints on these sources are reduced due to WRD's diversified supply portfolio.

DEMAND

From 2005 to 2015, approximately 85% of all water was delivered to the commercial and industrial sectors, approximately 8% was dedicated to power generation, with the remaining 7% comprising residential, losses and other uses, with residential comprising only about 1% . Irrigation demands are extremely low for the area, and the irrigable land area in the City is estimated at less than 16 acres. Due to this makeup of usage, fluctuation in demand is most sensitive to economic trends, as opposed to changes in precipitation or population, as is seen in most cities. Over the past decade, the purveyor has noted a steady, slight decrease in demand.

Residential purveyor demands are extremely low, as only approximately 100 people live in the City as of 2015. While the City is largely built-out, population growth could increase alongside changes in land use to support the densification and adaptation of the City through residential and mixed use allocations. This change in user profile could have an impact on the provision of potable water in the City, adding an additional population consideration to the current economic drivers. Currently, a constant population of 100 people is used for future demand projections since there has been no changes to residential land use in the Water Service Area for many decades. This concept has been discussed with and approved by the jurisdictional Water Resources Department. In addition to the minimal number of residential uses in the City, approximately 30,000 to 50,000 people come to the City each day for work.

Due to the new potential influx of residents, the Specific Plan is intended to qualitatively evaluate the resource demand assumptions in line with potential residential or other utility user anticipated increases. As additional contributing factors will play a role in the development of the City's water balance, specific metrics and investigations will need to be further coordinated and considered to ensure adequate provisions are allocated for adapted land uses. Based on the following current demand estimates however, the City has shown an ability to adapt to serve varying resource demands, and is currently positioned to continue supplying adequate capacity to serve new and adapted populations.

The City of Vernon is one of 15 signatories to the Gateway Regional Alliance, an official Joint Power Authority, aimed at providing governance for development and implementation of an integrated regional water management plan. In an effort to reduce water demand and conserve resources, Vernon is working to implement the Gateway Regional Alliance Water Use Reduction Plan.

The City established a target to reduce per capita water use by 20% by 2020. The baseline, established in 2010, is 100,296 gallons per capita per day, making the target consumption to be 89,809 GPCD. This target was already surpassed in 2015, with an estimated 68,057 GPCD. The California Water Conservation Act of 2009 dictates, per CWC 10608.24(e):

> When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

Vernon's role as a center of commercial and industrial activity means that water demand within the City is linked to impacts on the regional and global marketplace and

POTABLE WATER SYSTEMS

targeted to meet the needs of economic intensity and productivity. Therefore, despite the City's relatively complete buildout, there still exists the potential for increases in water demand. The City's water systems are designed to adapt to and meet the needs of commercial and industrial sectors across a wide range of factors and changing requirements.

IMPROVEMENTS

The City has been developing and implementing water conservation programs to decrease potable water consumption. Elements of this plan include the installation of durable water-saving fixtures and devices, and the installation of weather based irrigation controllers and landscape with drought resistant and lower water intensive plants. Several recommendations with respect to local management are included in Section 6.3.2.2 of the 2015 Urban Water Management Plan, including spreading out the location of groundwater extraction wells to lessen the risk of potential contamination impacts through well interference and upconing, advancements to better collect groundwater level measurements, and the development of a Groundwater Monitoring and Management Plan. As part of water shortage contingency planning under stressful emergency and long-term water shortage conditions, tiers of water conservation stages and additional adherence to the prohibition of water end uses are enacted as planned, potential implementations given future scenarios.

The Community Services and Water Department of Vernon published a 2013-2018 Five Year Plan which included capital improvements projects to the potable water system. The plan included a rehabilitation of a 10MG buried concrete reservoir and two other reservoirs, as well as the construction of a pump station at Smurfit Well #21.

RECOMMENDATIONS

The potential for fluctuations in water demand serving a variety of existing and new land uses speaks to the opportunities inherent in a sustainable and robust water management plan and system. Additional water demands will increase the amount of imported water, as the City generally meets its extraction capacity and supplements from outside sources. Therefore, implications to the future water resiliency and cost to a variety of customers must be considered and integrated into conservation measures, reuse considerations, and reliability planning.

VPU currently provides recycled water service to one customer which is their Power Plant's cooling towers. The expansion to another demand node such as the Specific Plan area and a larger customer base has the opportunity to provide recycled water for non potable uses such as irrigation, toilet flushing, industry processing and cooling. A recycled water network or expansion to demand nodes will contribute towards the city's water resiliency with respect to its wells while helping maintain lower costs for its customers.

The integration of greywater systems at a building or district scale also has the potential to benefit water conservation and reuse measures within the redevelopment strategy. By integrating infrastructure updates in tandem with redevelopment, additional infrastructure necessary to serve alternative water use and reuse strategies can be targeted to reduce implementation costs and allow for future integration with water saving systems. As the prioritization of City strategies will guide this process of system development, climate change considerations and future demand constraints should continue to guide potential alternatives to conserve and reuse natural resources. Capital improvements should be addressed in tandem with potential resiliency opportunities, and options should be considered throughout planning stages in order to ensure that future development is not limited or adversely impacted by the preclusion of current opportunities.

Additionally, VPU should consider implementing additional Automatic Metering Infrastructure (AMI). AMI is an integrated system of smart meters, communications networks, and data management systems that enables a two-way communication between utilities and customers.

Benefits include:

- Automatically and remotely measure water use
- Better asset management
- Minimize non-revenue water loss
- Ability to read and turn on/off meters remotely
- Identify leaks and ruptures more quickly, minimizing losses
- Ability to be more reactive to outages, overuses, and crises
- Customers can access their meter reading in near-real time
- Improved customer service
- Creation of jobs to implement meters

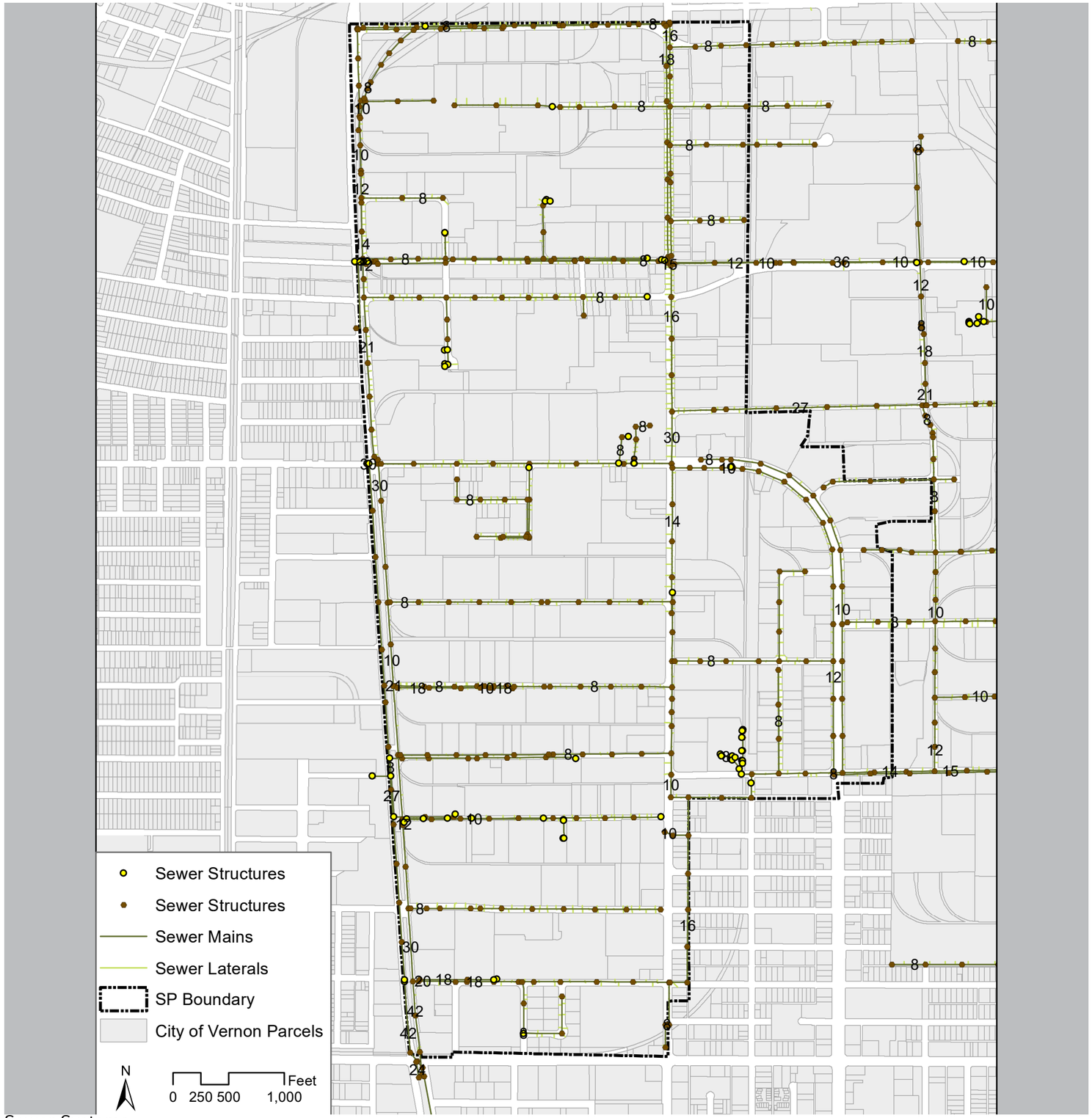
SEWAGE, WASTEWATER & RECYCLED WATER

WASTEWATER TREATMENT

The City of Vernon owns and operates a sewage collection system that discharges into the Los Angeles County Sanitation District system. The City generated an estimated 4,655 AFY of wastewater in 2015. The Specific Plan Area falls entirely within District 23 of the LACSD. The Joint Water Pollution Control Plant (JWPCP), located in Carson, is the largest wastewater treatment plant within the LACSD, serving over 3.5 million residents and treating an average of 260 million gallons of wastewater per day. The plant utilizes biogas produced during the digestion process to offset energy use by 22 MW and $18 million per year. In the 2007-2008 fiscal year, the Joint Outfall System produced 490,998 AF of effluent, 46% of which was able to be reused as recycled water.

SEWER COLLECTION NETWORK

Sewer laterals serving each parcel collect wastewater into mostly 8" diameter mains that traverse all streets running from east-west within the Specific Plan Area. A 14-16" collector runs along S Santa Fe and one 30" collector runs south along S Alameda Street. This 30" collector is part of the Joint Outfall System (JOS).



Sewer Systems

SEWAGE, WASTEWATER & RECYCLED WATER

RECYCLED WATER SYSTEMS

The City of Vernon is in agreement that recycled water should be used and its application be maximized within the jurisdiction wherever its uses are economically justified, technically and financially feasible, and is consistent with legal requirements and the preservation of public health and welfare of the environment. Access to this resource is limited by the existing infrastructure.

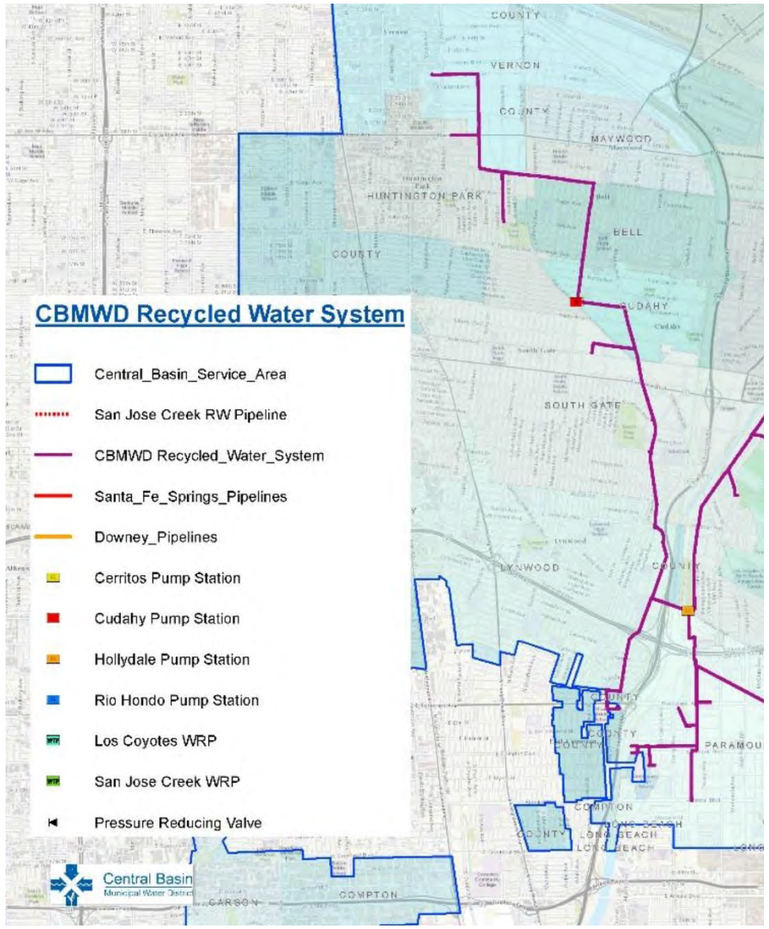
Vernon is a participant in the development of an update to the Central Basin Municipal Water District Recycled Water Master Plan, and has provided input on customer development, rates, facilities and impacts. The City has evaluated potential recycled water use as a precursor to continued development of the Southeast Water Reliability Project, which aims to reduce reliance on imported water and conserve regional groundwater. CBMWD is aware of all potential recycled water use within the service area, which informs the expansion of the City's recycled water system, future rate structures and phasing of implementation. The City has a current contract to purchase from CBMWD tertiary treated water.

The Central Basin Municipal Water District accepts proposals to extend recycled water service into areas with a high non-potable demand. The most appropriate uses for recycled water, according to the Central Basin Municipal District, are:

- Landscape irrigation (e.g., public parks, cemeteries, golf courses, street medians);
- Industrial processes (e.g., paper manufacturing, carpet and textile dyeing, boiler feed);
- Commercial uses (e.g., cooling towers, toilet flushing, laundries, car washes);
- Construction activities (e.g., dust control, soil compaction, pipeline backfill consolidation, concrete mixing).

The recycled water currently routed to the City is provided via the Century Distribution System and currently serves only one customer, the Malburg Generation Station power plant, outside the Specific Plan Area to the east. Water use for the on-site cooling towers at the power plant in 2016 was 742 AF. Rates for 2021 are set at $799/AF. The City of Vernon has constructed approximately 10,000 linear feet of recycled water pipeline to serve this need.

The Southeast Water Reliability Project Proposed Phase 2 is in the planning stages, and would install a 42-inch diameter looped pipe to connect the region's recycled water network across the City of Vernon. The proposed project would ultimately provide 5,600 acre-feet per year of recycled water to a potential 100 public and private entities throughout the cities of Commerce, (East) Los Angeles, and Vernon. The pipeline would be constructed entirely within the road rights-of-way, adjacent to commercial and industrial land uses.



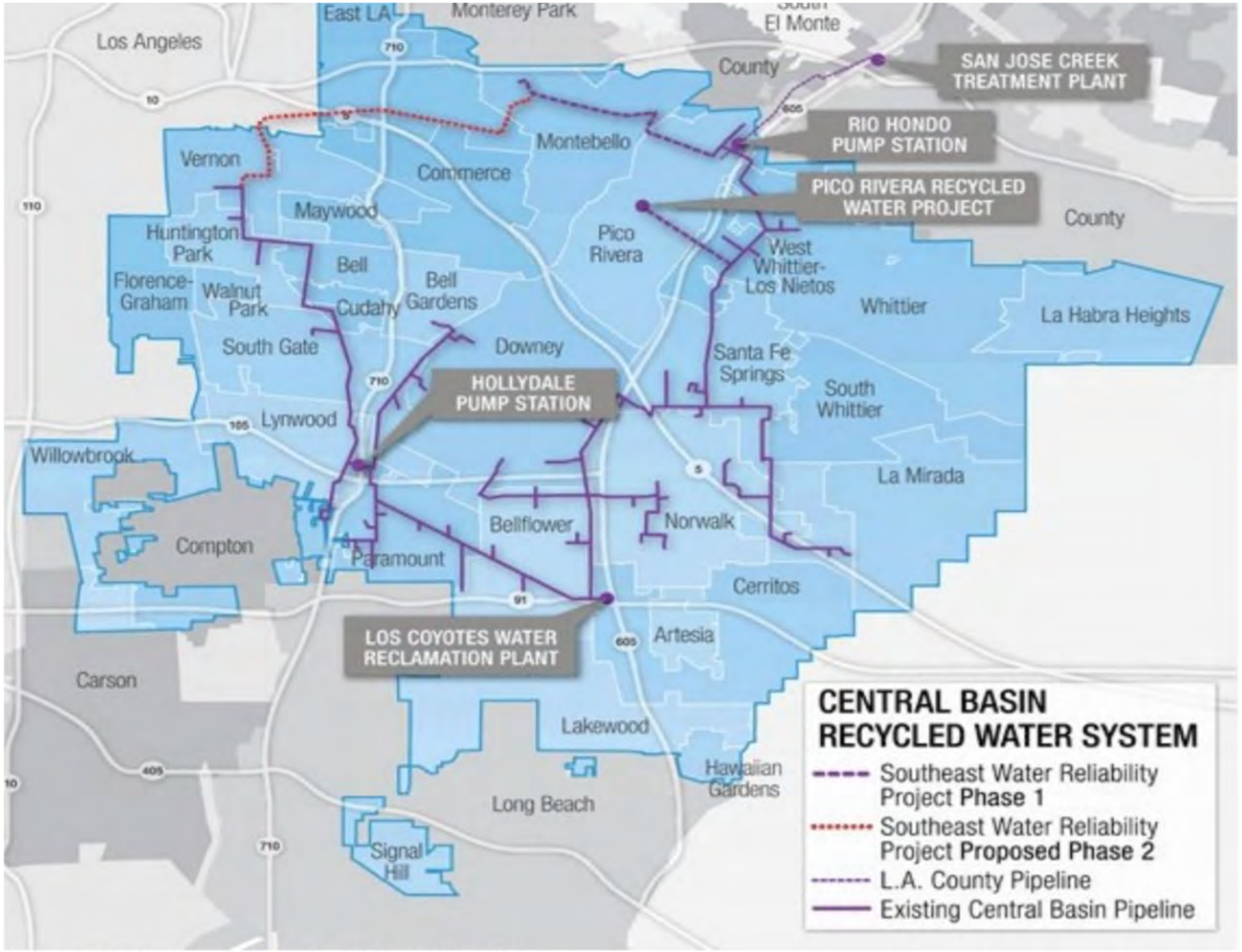
Central Basin Municipal Water District Recycled Water System (2015)

SEWAGE, WASTEWATER & RECYCLED WATER

IMPROVEMENTS

There is currently an oversupply of recycled water in the Central Basin, however, insufficient distribution infrastructure exists to reach all potential recycled water customers. The Southeast Water Reliability Project would allow for the expansion of regional recycled water distribution systems to better serve the City of Vernon, reduce their dependence on imported and ground water, and enhance the resiliency and adaptability of the City's water network.

Around 2012, the City of Vernon installed a section of cured-in-place-concrete pipes at District Boulevard between Heliotrope and Slauson Avenue according to the Community Services and Water Department of Vernon 2013-2018 Five Year Plan. The city reported significant cost savings for this pipe installation. The report did not include additional sewer replacements as part of the five year plan.



Source: Central Basin Municipal Water District

SEWAGE, WASTEWATER & RECYCLED WATER

RECOMMENDATIONS

Collection of sewage flows typically represents an opportunity for the creation of recycled water via on parcel or larger scale treatment. With the expansion of the recycled water delivery network via the future Southeast Water Reliability Project (Phase 2), added supply and pressure would be anticipated as available to the City of Vernon. While increased recycled water usage for irrigation alone is not largely viable, combining with other non-potable uses, including industrial uses, may represent a key opportunity.

Demand opportunities at both the parcel and district specific level could include irrigation (combined with other non potable uses), cooling, toilet flushing and as process water for factories, manufacturing, and cooling. City of Vernon customers would benefit from meeting their non potable demands via the use of recycled water at a lower cost than potable water. While the implementation of additional infrastructure would be required to connect the recycled water system to additional customers, the advent of an alternative water supply would support future resiliency benefits, alleviating groundwater and imported water supplies, and providing long-term cost savings.

The City had previously planned to evaluate the viability of implementing a Recycled Water Master Plan, although no action has been taken to date. The implementation of such a plan would support the City and specifically the Specific Plan Area in establishing opportunities for optimized recycled water use as part of the expansion of the Central Basin Municipal Water District system.

Arguments for the use of recycled water speak to its reliability and "drought tolerance", as wastewater treatment facilities will continue to produce a steady supply of water even in dry years. For the nearby City of Santa Fe Springs, located along CBMWD's recycled water network, reclaimed water is provided at a discounted rate to customers. The City uses approximately 1,000 AFY of reclaimed water treated to a tertiary level of treatment. Rates for different customer tiers are between $3.17 (up to 18 hcf) and $4.34 (400+ hcf) for potable water, and between $3.06 (up to 18 hcf) and $3.17 (50 AF+) for reclaimed water. Recycled water use within the City's service area is used in industry (carpet manufacturing, cooling towers, and concrete mixing) and for irrigation at the City's parks, athletic fields, schools, roadway medians, business park landscaping, and along the California Department of Transportation freeways and highways. Approximately 40% is used for industrial demands.

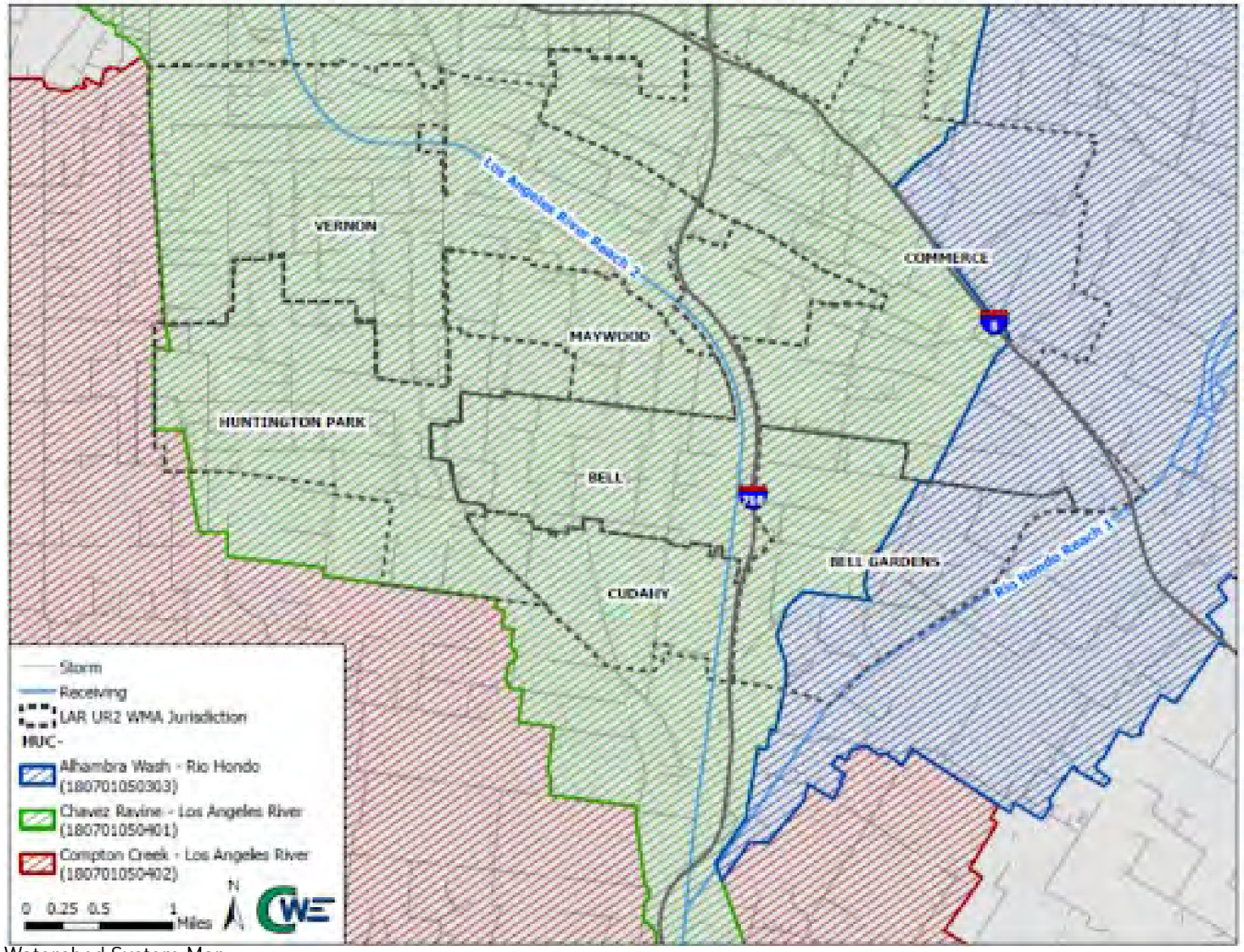
As a member agency of CBMWD, the City has the advantage of receiving financial assistance for plumbing retrofits necessary to receive recycled water. CBMWD advances funds for the necessary plumbing retrofits, which are then reimbursed. In addition, CBMWD offers recycled water at a lower rate and the savings are passed on to City customers with non-potable water demands. CBMWD also promotes the use of recycled water within its system as a more reliable water source than imported water.

CBMWD imported water rates have been shown to increase over time. According to CBMWD, annual rate increases were 7.1% over the past fifteen years, 10.6% over the past ten years, with no change in the last five years. The increase of rates of outside water sources illustrates that the approach of increasing reliance on imported water to meet additional demand is unsustainable and unreliable.

STORMWATER

HYDROLOGY

The City of Vernon is part of the Chavez Ravine subwatershed of the Los Angeles River Upper Reach 2 Watershed. The vast majority of the land usage within the City limit is designated as Industrial. The remaining portion is 15% transportation infrastructure and 7% vacant. The high coverage and impermeability of the land throughout the Specific Plan Area makes stormwater percolation difficult and impractical.



Watershed System Map

STORMWATER

Stormwater System

DRAINAGE COLLECTION

Stormwater is collected in catch basins within the public ROW and conveyed through the storm drains owned and maintained by both the City of Vernon and Los Angeles County. Both City and County storm mains span the Specific Plan Area. Storm lines drain south along S Alameda Street, S Santa Fe Avenue and Pacific Blvd, with lines east of Santa Fe draining to the east, and lines west of Santa Fe draining to the west. All runoff within the Specific Plan Area is collected into a LACFCD 66" storm drain which ultimately outfalls into the Los Angeles River via the East Compton Creek No. 1 84" Reinforced Concrete Box. The outfall location is just east of the intersection of Southern Ave and Salt Lake Ave in the city of South Gate. The City does not currently divert stormwater for capture purposes.

STORMWATER

Stormwater Drainage Patterns

WATER QUALITY PROTECTION & RUNOFF CONTROL REQUIREMENTS

The City of Vernon has published their own Low Impact Development Guidance Manual, which provides minor amendments to enhance the County of Los Angeles Department of Public Works Low Impact Development Standards Manual of February 2014. The City of Vernon Municipal Code Chapter 21 Article V Storm Drains outlines stormwater pollution controls for specific new development and redevelopment projects. All projects referred to as Designated Projects under the County's LID Standards Manual are defined as Planning Priority Projects in the City's Code.

The City of Vernon is part of the Los Angeles River Upper Reach 2 Watershed Management Group, along with the City of Huntington Park, Los Angeles County Flood Control District, and the cities of Bell, Bell Gardens, Cudahy, Commerce, and Maywood. The Watershed Management Group (WMG) authored a Watershed Management Program (WMP) in 2015 which provides an implementation and prioritization plan for institutional and infrastructure BMPs to address regional water quality issues.

The Los Angeles Regional Water Quality Control Board (LARWCB) primarily encourages the capture and treatment of water on individual parcels, prioritizing infiltration as the preferred method of treatment. The City of Vernon was founded as, and remains to be, a primarily industrial city. Infiltration as currently recognized by the City is not a practical approach to stormwater management in this region as there is considerable risk of groundwater contamination. While piped stormwater in Vernon does not actively infiltrate to recharge groundwater, it does outfall to the Los Angeles River and ultimately the Pacific Ocean, carrying continued concerns of contaminant sources into natural waterways and water bodies.

As part of the City's Water Protection and Conservation Action Plan, The City's ongoing target of protecting water quality is realized through the implementation of a plan to minimize the City's use of hazardous chemicals or materials for maintenance and operational purposes. The City plans to require City contractors and service providers to use lower-toxicity or non-toxic chemicals, or eliminate them completely for cleaning and pest control measures on City facilities. Additionally, in continuing to reduce stormwater pollution at the source, contractors are required to implement erosion and sediment enforcement control measures on renovation and construction projects. These measures could be further incentivized to other businesses within Vernon to adopt similar measures to protect and conserve the environment.

IMPROVEMENTS

Vernon Public Utility has millions of dollars in unallocated bond funds which can be spent on projects. For water projects this amount totals 50 million dollars in funds, some of which is allocated while some is not. As an initial improvement to protect water and ecosystem health, the City installed screens on stormwater catch basins to capture runoff debris before discharging into the LA River.

The Community Services and Water 2013-2018 Five Year Plan included plans to construct storm drains at 55th Street and 57th Street. The plan additionally included monies for continued structural upgrades for the National Pollution and Discharge Elimination System (NPDES) permits. Around 2012, the City of Vernon installed a section of cured-in-place-concrete pipes at Vernon Avenue between Soto Street and Boyle Avenue according to the Community Services and Water Department of Vernon 2013-2018 Five 5 Year Plan. The city reported significant cost savings for using this type of pipe installation.

RECOMMENDATIONS

In addition to the strides the City is taking in targeting City infrastructure and facilities, expanding the City's goals of protecting the ecosystem and reducing the volume of untreated stormwater discharges can be expanded to businesses and non-municipal facilities located within the Specific Plan Area. The implementation of traditional stormwater best management practices and enhanced integrated stormwater management systems not only reduces impact on the conveyance system, limiting potential upgrades, but can also have sustained widespread positive effects for the Specific Plan Area. The relative health of the stormwater conveyance system is adequately projected to meet the needs of the City alongside potential new uses and populations.

Redevelopment potential alongside the existing traditional stormwater collection and conveyance system presents opportunities to enhance public realm, parcel and district scale opportunities to minimize impact to infrastructure systems while increasing positive outcomes affecting natural waterways and groundwater protection.

Water quality enhancements that slow, collect, treat and even reuse stormwater can be implemented at both the

parcel and district level to accommodate the unique land restrictions in Vernon. If analyzed at specific district or campus level scales, stormwater credits may be obtained across sections or the entirety of the Specific Plan Area to meet water quality and retention goals even when opportunities are not feasible at specific lot scales. The implementation of an "in lieu" credit system for infill developers to pay a stormwater management fee when they are unable to meet stormwater requirements onsite. These funds can be consolidated and utilized to support Vernon's enhanced stormwater management systems, and innovative measures like underground detention, green corridors, and filtration, while still promoting densification and development.

Stormwater enhancements and in lieu fees can target both infill development and new tenant improvements, and can be integrated into complete streets planning. Linear green spaces within the railway corridor is one example of a long linear network that could connect and serve the entire plan area.

The City does not currently promote infiltration due to the high groundwater table and potential for contaminated runoff. The integration of green infrastructure addresses potential impacts of water pollution from industrial uses and impermeable surface collection and runoff that disrupts the health of the watershed, groundwater table and the Los Angeles River downstream. The presence of hazardous contaminants to natural systems are a risk to the overall regional ecosystem, and should be addressed at the Specific Plan Area scale to promote healthy natural systems, ensure the continued operation of relied upon natural resources, and support the potential for future remediation and infiltration opportunities down the road. Enhanced LID and green infrastructure systems can support these elements while being cognizant of the potential challenges to groundwater contamination.

Alignment to sustainability rating systems such as LEED, SITES, and Ecodistricts, can assist in providing value based incentives to promote building and campus scale redevelopment aligned to sustainability metrics that drive new businesses and residents.

For example, in assessing the benefits of healthy stormwater management systems, the Ecodistrict design and rating system connects objectives of ecosystem health to a whole systems thinking model that addresses both the ecological and social components of sustainability, while supporting economic viability. Ecosystem health objectives and metrics include management of rainwater within the district, setting percentages for water management of specific storm events, and the remediation of contaminated land for productive use, targeting the area of contaminated land remediated for reuse annually. The City's alignment to and incentivization of sustainability rating systems to support their prioritization of development and enhancements can drive business attractiveness while serving local and regional environmental goals on a variety of topics.

Examples of urban stormwater enhancement opportunities include:

- Green corridors to improve urban ventilation and reduce heat island effect while providing spaces for stormwater retention
- Bioswales and stormwater filtration to capture and treat contaminants prior to discharge into waterways and natural systems, either as a system separated from groundwater though lined basins or to promote future infiltration
- Enhancement of tree canopy along key pedestrian corridors and within public areas, and the use of modular suspended pavement in the form of structural soil cells to support tree health, water quality, peak overflow reduction and the accommodation of underground utilities
- Subsurface modular water storage tanks integrated under landscape, or pavement to reduce stormwater runoff and capture and harvest water for irrigation and cooling

Modular Subsurface Stormwater Storage

STORMWATER

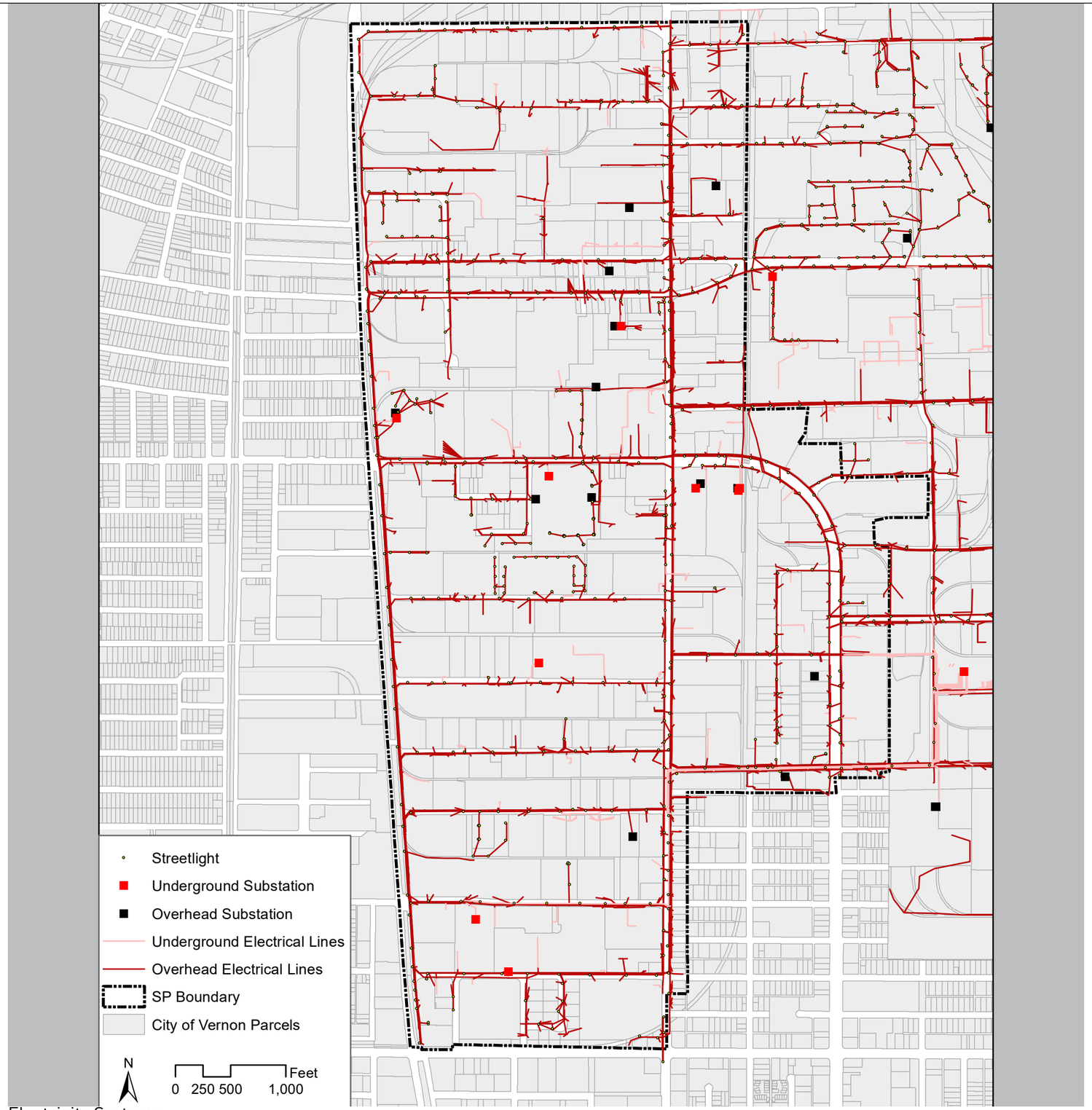
Roadside Bioswale

ELECTRICITY

In 1932, a Vernon bond authorized the construction of a municipal Light and Power plant. The City of Vernon constructed the Malburg Generating Station, a 134-MegaWatt gas turbine power plant, in 2005. Malburg has the capacity to supply 65% of the peak demand, the remainder is imported to support the City's peak load.

Vernon Public Utilities currently has significant excess power usage capacity. Power usage is decreasing, mostly due to the transition from manufacturing to warehousing land uses in the City. While the City previously opposed warehousing uses due to its fiscal dependence on income from VPU, it has now established a special tax on less power intensive warehousing uses which has helped to address the City's change in power distribution and consumption patterns. VPU has been awarded Diamond level Reliable Public Power Provider by the American Public Power Association for 2016-2019.

The City relies on electricity services as a major driver of revenue to the City, and is actively seeking opportunities to expand usage of the system. Future new uses and redevelopment demands have the potential to capitalize on this opportunity, while targeting both local and regional demands to meet the City's supply.



Electricity Systems

ELECTRICITY

DISTRIBUTION NETWORK

Three phase primary and secondary overhead electric distribution lines serve the Specific Plan Area. Along major street corridors, with additional overhead feeder lines serving historically power consumptive parcels. Additional underground service connects to individual parcels and across the City. A primary underground network connects the Malberg Generating station to the Specific Plan Area via Fruitland Avenue. The redundancy of electrical lines throughout the City offers local businesses a competitive advantage for utility pricing and prevents local operators from driving their own market prices.

Four substations are located within the Specific Plan Area. One substation at the southern edge of the City north of Huntington Park, located south of Fruitland Avenue and north of 52nd Street between Pacific Boulevard and Malabar Street, is operated by Southern California Edison. The Kinetic Substation and the Beejay Substation are owned by the City of Vernon and are located south of E Vernon Avenue, west of S Santa Fe Avenue and east of St. Charles Street, within the Borg Warner Industrial Products, Inc parcel. The City Hall Substation is located at City Hall. Additional substations are located throughout the City, specifically the Vernon Substation located at the Malburg Generating Station, and other municipal owned stations.

IMPROVEMENTS

Vernon adopted the City of Vernon's Power Integrated Resource Plan (IRP) in 2018 which outlines a 10-year plan to ensure reliable, affordable and environmentally-responsible energy. The IRP targets the mandated 60% Renewable Portfolio Standard by 2030 and the 40% GHG reduction from 1990 levels by the same year, setting the path to achieve 100% carbon free energy by 2045. The IRP develops a least-cost resource plan that targets resource diversity in solar, wind and geothermal, including necessary storage, which would be scaled up over time. Energy storage has been shown to be cost comparative to natural gas, and locally sited energy storage could support replacement for the Malburg Generating Station (MGS), especially as supported by accelerated cost decreases and efficiency increases. The MGS Power Purchase Agreement expires in 2028 and is not anticipated to remain in VPU's resource portfolio following this time. The preferred energy portfolio is expected to increase customer rates by 0.86% annually between 2018 and 2028, after which they are expected to decrease. The IRP includes specific Action Plans in the areas of Bulk Power System, Distributed Energy Resources, Customer Engagement, and Distribution System. VPU is also accelerating transportation electrification within its service territory. Collaboration and input between communities and VPU in establishing distributed energy resources and rate benefits for specific communities, for example, as part of the plan is one strategy to support environmental justice and quality of life in communities in and around Vernon.

Additionally, as outlined in the City of Vernon Sustainability Action Plan, the City's goals for energy efficiency include the purchase of one-third of electricity from renewable sources by 2020. The City's Energy Efficiency Action Plan outlines targets and their respective near-term, ongoing and long-term timeframes. Actions to promote energy efficiency are site specific and City-wide, as well as overarching, sector specific and socially targeted endeavors. Some of these targets include ongoing energy management and green building retrofit standards, near-term phasing in of renewable energy power sources by businesses, the provision of sustainability technical assistance to businesses, and the installation of cool roofs and green walls to minimize heat island effect.

Vernon Public Utilities published a Cost of Service and Rate Study Results report in January 2019. The results presented in this study inform the associated rate strategy, future procurement of resources and delivery of services. Vernon Public Utility has millions of dollars in unallocated bond funds which can be spent on projects. For power projects this amount totals 25 million dollars in funds, some of which is allocated while some is not.

Major sustainability improvements targeted by the City involve emissions reduction which include direct emissions (stationary combustion and natural gas, vehicle emission, and fugitive emissions), indirect emissions (street lighting and traffic signals, water delivering facilities, and other buildings), both from purchased electricity and from other emissions involving electricity used to treat and distribute water. The largest reduction in greenhouse gas emissions is targeted to occur in the emissions resulting from the electricity used to pump water to City buildings and facilities due to a transition to renewable energy sources. This is currently the largest greenhouse gas emitter with regards to government buildings and facilities.

The City purchased 30,000 acres of undeveloped prime wind energy generation land in Kern County, with the intent of developing significant wind and solar generated electricity to advance its renewable portfolio. The initial proposed wind energy project is expected to generate 175 megawatts of renewable energy to support the City's goal of obtaining one-third of its power from renewable energy sources by 2020. Updated metrics and estimates of City progress of this target are currently being investigated and reviewed.

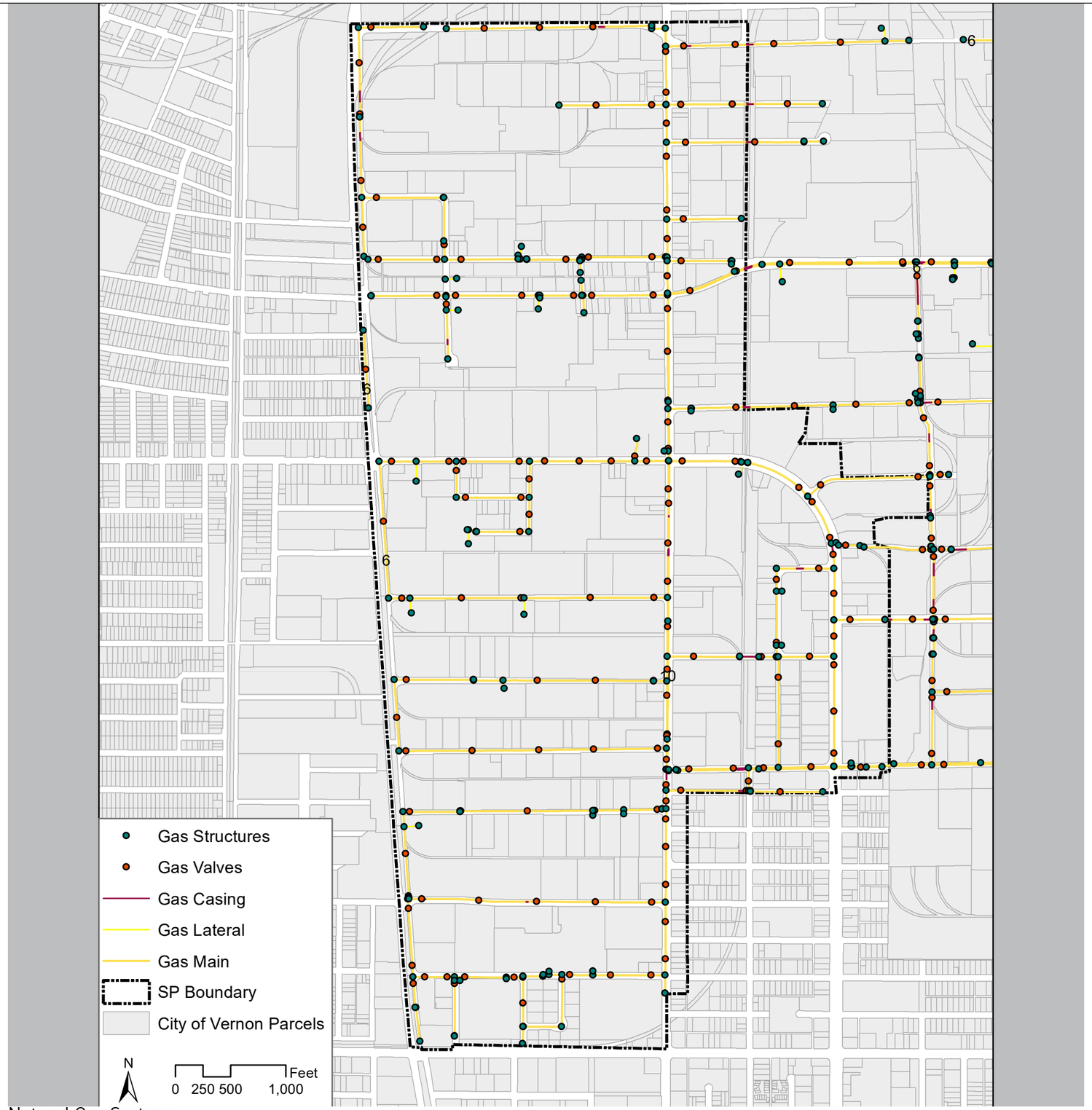
RECOMMENDATIONS

While the City is focused through its sustainability action planning on developing off-site renewable energy generation to supply and offset its power consumption, ample opportunities exist to expand on-site renewable energy production within the Specific Plan Area as part of targeted district-scale grid improvements that optimize energy resources across users. Potential opportunities exist for distribution of generated energy back into the main or district power grid to further support fluctuations in supply and demand. While the City's power usage prompts a different approach to peak power usage due to its working hours peak demand, opportunities exist to coordinate production and usage cycles within the City and region to specifically serve these needs.

The City may consider prioritizing and incentivizing solar energy production on a building and district/campus scale level within the Specific Plan Area, harnessing underutilized parking areas and rooftop spaces to support sustainability goals. As building space demands adapt to changing industries, additional opportunities may be actualized from vacant warehouses and other building spaces. For example, warehouses could be adapted to house electric vehicle charging stations, serving a city of regional need, advancing sustainability goals of the City, and incentivizing the transition to enhanced renewable energy generation in the Specific Plan Area. This could include all or a combination of allocating parcels for Tesla (or similar) supercharging stations, transitioning the City of Vernon vehicle fleet to electric use, providing electric charging hubs for LA Metro's future electric bus expansion into 2030, and providing charging to future electric freight transport from the port. The development of these systems in a decentralized or centralized manner, or a combination of the two will be based on available area, distribution cost, and local and regional need.

NATURAL GAS

Natural gas services are conveyed and delivered by VPU using a combination of storage and pipeline facilities. The system includes both residential and public services. Both stationary natural gas facilities and turbines are part of the City's energy strategy. Between 2008 and 2010 a slight increase was seen in facilities GHG emissions, while a major decrease of approximately half was seen in gas turbines, with numbers generally staying the same across targeted 2020 outlook projections, and the potential for reductions in facilities to slightly below 2008 values.



Natural Gas Systems

NATURAL GAS

DISTRIBUTION NETWORK

Natural gas distribution service networks provide full coverage throughout the Specific Plan Area. A 10" high pressure main runs along S Santa Fe Ave between Bandini Road and Fruitland Ave. Distribution is provided by a series of 6" PE gas lines that provide service along every street in the Specific Plan Area, and connect at the parcel level through a series of connecting laterals. A series of block valves and high pressure trans critical valves connect the various mains and connectors.

The distribution pipes are made of "caution yellow" colored plastic polyethylene and are located at least two feet underground, while service laterals are as shallow as 18 inches. The 10" steel high-pressure gas transmission pipeline in its entirety is seven miles long and delivers natural gas to the MGS Power Plant from the two distribution regulator stations. The transmission line is located at least five feet below the street and is coated to prevent corrosion.

In addition to VPU natural gas systems, the SoCal Gas system serves customers in the City.

IMPROVEMENTS

The City has identified emissions reductions targets specifically related to natural gas emissions. Stationary natural gas facilities and gas turbines are targeted for reductions, but these values are similar to existing conditions. The City is developing a Climate Action Plan to provide guidance to the City on how to take advantage of opportunities to reduce emissions of gases linked to climate change alongside the reduction of traditional criteria pollutants.

RECOMMENDATIONS

The combination of the VPU gas delivery and SoCal Gas provide for a reliable and robust network helping keep costs down for its customers. Along the lines of transitioning to use of cleaner fuels, the opportunity exists to move to a gas powered city vehicle fleet which may be done alone or in combination with transitioning to electric use. While the current system is anticipated to meet future demand projections including new populations, City prioritizations around natural gas versus electricity use will inform the continued or reduced use of these systems over time as one element in their energy strategy.

DATA

DISTRIBUTION NETWORK

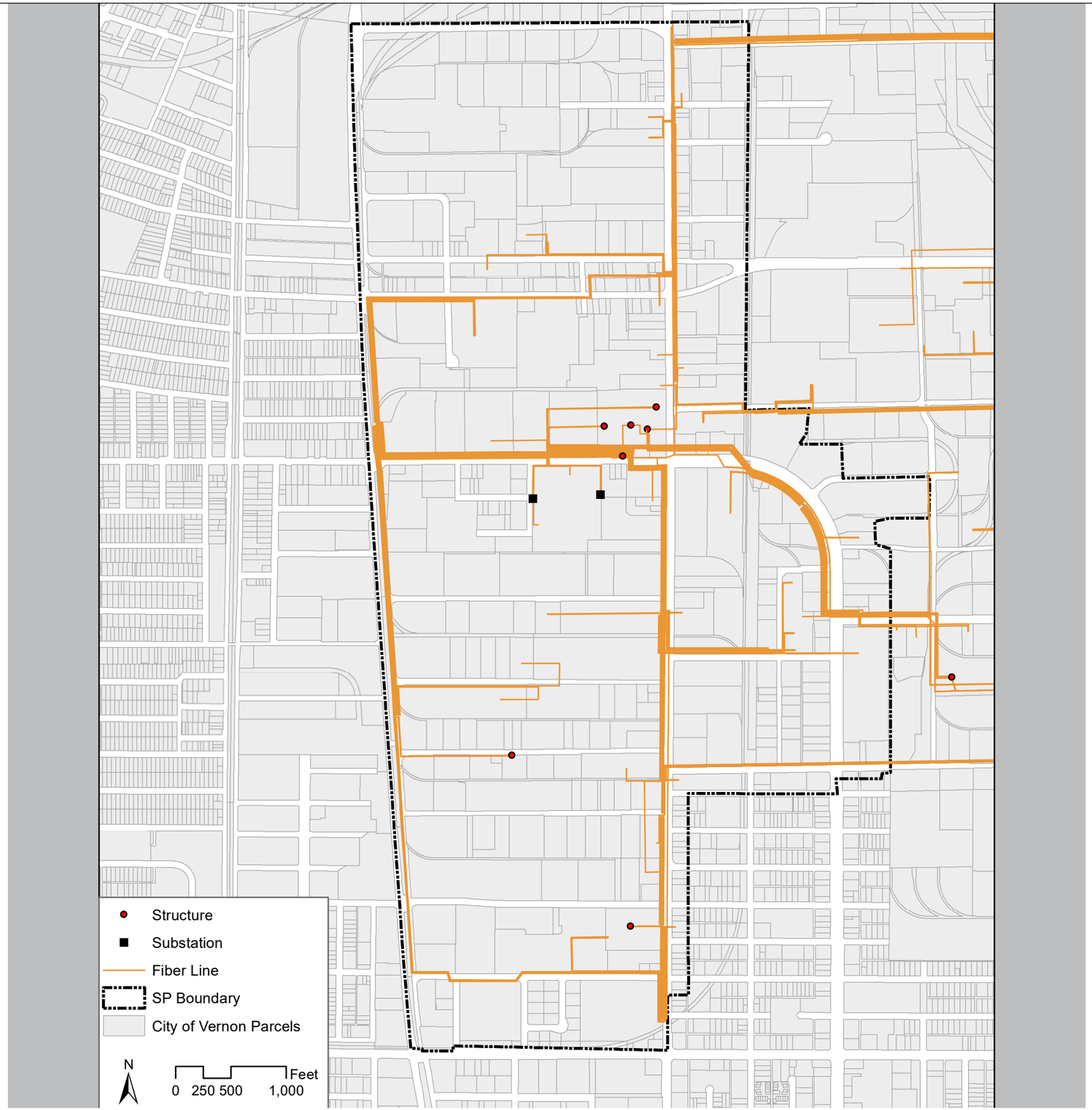
The City of Vernon maintains a municipal fiber network facilitating high speed data connectivity throughout the City. The existing data network includes 24-48-96-288 strand single mode fiber optic cable. A total of 35 miles of cable have been installed within City limits, offering both “dark fiber” and “lit fiber” services.

All cables are currently above ground. There is a single tower on the east side of the LA River, north of Bandini Boulevard. The Control Center is located two blocks east of the Specific Plan Area, at the corner of 50th Street and Seville Avenue. There are 288-strand, 96-strand, and 48-strand backbone cables that run along S Santa Fe Ave.

Several private providers offer service throughout the City. As Built drawings, made available by the City, show facilities owned by the City of Vernon, Air Touch Cellular, and Nextlink California.

IMPROVEMENTS

No improvements to the data distribution network are known at this time.



Data Systems

DATA

RECOMMENDATIONS

A potential opportunity for improvement is if the City were to petition for the expansion of Google Fiber into the area. Google Fiber is Google's fiber optic-based broadband internet service, which debuted in 2010. It's built to deliver high-speed connectivity to businesses and individuals in select cities. A primary benefit of Google Fiber is its speed, as it is built to support a bandwidth so high that it's unlikely any individual customer's bandwidth would be affected by their neighbors. Google Fiber also has services for businesses and property owners, offering a fast, cost-sensible solution that could encourage future development.

Additional Benefits to Google Fiber include:

- No hidden fees
- No rental fees for equipment
- No service contracts
- No data caps
- Fewer outages than standard Internet access

The expansion of Google Fiber was halted for four years, between 2016 and 2020, but it has recently expanded again for the first time in four years in July 2020 in Iowa.

Google Fiber is not currently available in Vernon, but is available in the neighboring county of Orange County, California. As one of Google's main goals for Google Fiber is to increase broadband access across the country for areas whose residents do not currently have widespread broadband access, the City of Vernon and the rest of southern Los Angeles County could be a great contender for another expansion if the County were to petition for such expansion. This would be especially beneficial to Vernon for two reasons: encouraging small business development in the City and also increasing broadband access for residents within the City, and throughout the County.

UTILITY SYSTEMS OPPORTUNITIES

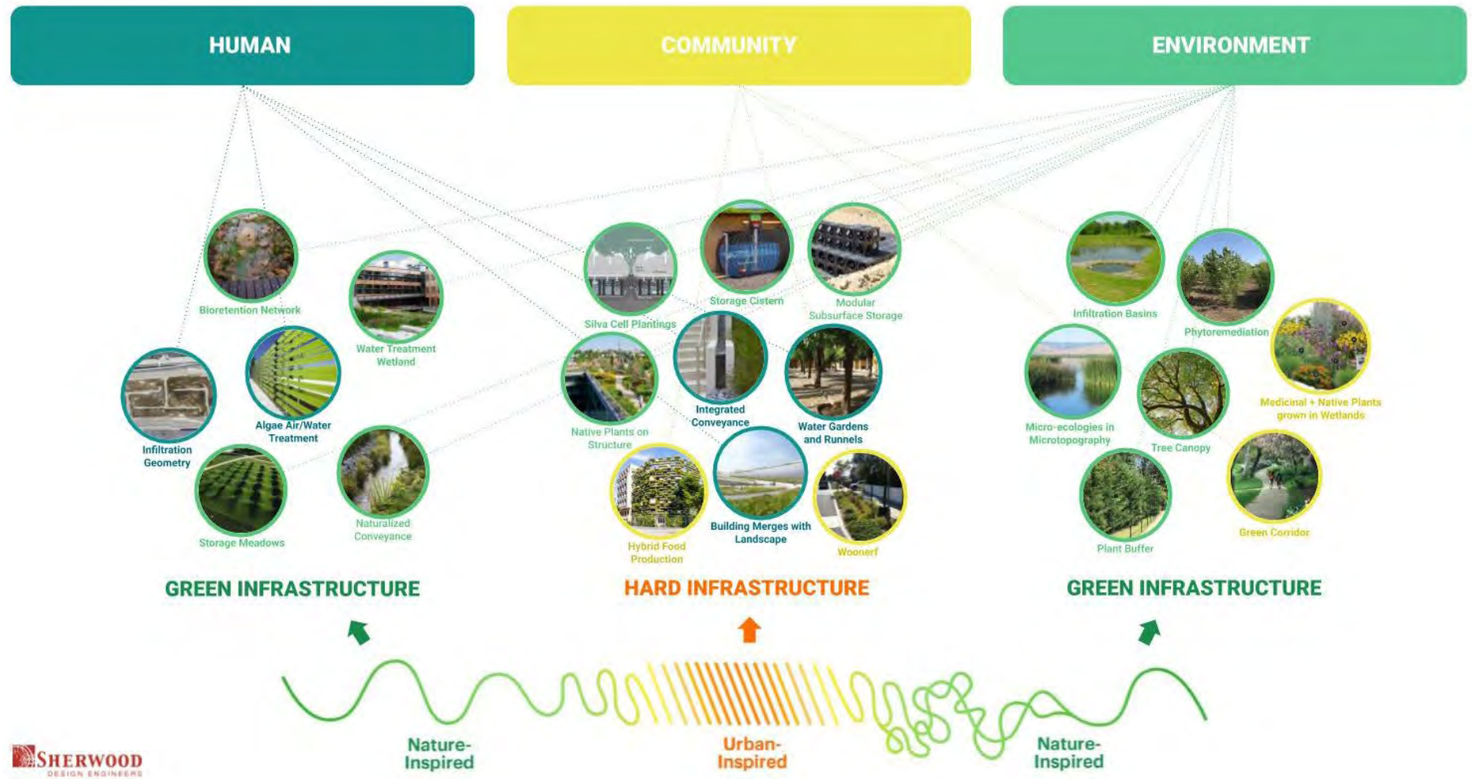
The City of Vernon utility network prides itself on an efficient and cost effective system that adequately serves its commercial and industrial customers, as well as its residents. Utility improvement, enhancement and sustainability opportunities can be further integrated into these systems to serve the City and the Specific Plan area through a greener, innovative and resilient network of solutions that aim to target specific high-level consumers, attract future industries targeting sustainability, and maintain competitive cost advantages.

The City has commissioned a study to create a Green Industrial Development Plan with which to establish a series of programs to enhance environmental sustainability and support economic vitality. These efforts will support critical issues including improving energy efficiency, expanding the use of renewable resources, improving the management of water and stormwater, and reducing the production of solid and hazardous waste.

A robust series of sustainability strategies has the potential to advance the future of circular infrastructure systems to continue to serve the diverse needs of Vernon's businesses and residents. As Vernon adapts to the future of industry, the development of the Specific Plan will help the City in identifying and harnessing opportunities to drive sustainable resource provisions for years to come. The projected industrial and commercial profile that Vernon attracts and retains may look very different from its past or current makeup in terms of scale and type of industries. The adaptation of these profiles and their associated resource demands create opportunities to contribute to sustainability and system circularity within the Specific Plan Area, for example with whole systems thinking of gridded utilities that target sustainability strategies across disciplines. Targeting an understanding of existing businesses to highlight opportunities for advancement, as well as looking to the future resource needs of the City's businesses will comprehensively inform sustainability strategies for the City and the Specific Plan area.

NEXUS OF OPPORTUNITIES

As discussed in the preceding sections, the various infrastructure systems are positioned to continue to support the current utility demands of the City, as well as adapt to meet future demand scenarios. Infrastructure systems both individually and in coordination with one another create opportunities to integrate grey and green infrastructure to serve not only the City and its businesses, but to also promote a sustained regional ecosystem while ensuring adequate and healthy supplies of natural resources for years to come. The nexus of human, community and environmental opportunities are inherent across Vernon's diverse and built-out set of utility system networks. The opportunities discussed in this chapter demonstrate the benefits of ensuring potential opportunities to serve the City's long-term needs remain in consideration across planning timelines. In ensuring the flexibility and adaptability of infrastructure systems through a unique set of social incentives, environmental solutions, and innovative infrastructure strategies, Vernon can ensure that its networks continue to operate as reliable, interdependent systems.



Nexus of Opportunities

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