City of Fowler
2040 General Plan

Appendices
December 2022

Appendix A
Environmental Justice Policy Paper

CITY OF FOWLER
GENERAL PLAN UPDATE
APRIL 2020

CITY OF FOWLER
California

ENVIRONMENTAL JUSTICE POLICY PAPER

GENERAL PLAN UPDATE

APRIL 2020

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INTRODUCTION

PURPOSE

The purpose of this policy paper is to provide an overview of Environmental Justice as it relates to land use planning, best planning practices, and statutory requirements for the City of Fowlers' General Plan update. This policy paper will also provide analyses of the environmental justice issues currently facing the City of Fowler and identify potential challenges to be addressed as part of the General Plan update moving forward. Information provided in the recently completed Fowler Community Report supplements the data used in the analyses that follow.

REPORT ORGANIZATION

This policy paper is organized around key concepts in environmental justice planning, allowing the reader to focus on both the ideological concepts and practical methods for assessing conditions in environmental justice communities, as required by law. The sections of this paper include:

Introduction. Provides background on environmental justice, legislative requirements, the relationship between land use planning and environmental justice, and demographics that may play a role in environmental justice issues.

Environmental Justice Issues Analysis. Determines key challenges and potential obstacles and identifies a set of recommendations organized around the following topics:

- Pollution exposure and air quality,
- Access to public facilities,
- Food access,
- Safe and sanitary homes,
- Physical activity, and
- Civil engagement.

Discussions include an overview of the environmental justice framework for each topic, an explanation of methodologies used in gathering and analyzing the available data, a summary of each analysis, and policy recommendations for consideration in the General Plan update.

ABOUT ENVIRONMENTAL JUSTICE

Throughout the country and the State of California, it has been documented that certain communities experience a disproportionate burden of environmental health hazards.[1] Often, these communities are made up of low-income residents, communities of color, indigenous peoples, or immigrant communities,

[1] (California Environmental Justice Alliance, Placeworks 2018)

leading to intersecting structural inequalities, or converging disadvantages, that further marginalize already under-served populations.

These burdens are often exacerbated by a range of factors which critically inform the way we plan and use land. Some of these factors include zoning, land use planning, discriminatory housing policies, limited community involvement in land use planning, and development patterns that tend to concentrate environmental hazards in certain communities while simultaneously placing economically or environmentally advantageous uses in others. The impacts of these factors leave certain communities, known as disadvantaged communities (DACs), facing significant barriers to their overall health, livelihood, and sustainability.[2] Evaluating the presence of DACs within a local jurisdiction, as well as the circumstances that contribute to the classification of a DAC, is an important step in establishing land use plans and policies which meet the needs of the most marginalized, vulnerable, and under-served populations in a community.

DISADVANTAGED COMMUNITIES

Disadvantaged Communities is a term defined in SB 1000 as "an area identified by the California Environmental Protection Agency pursuant to Section 39711 of the Health and Safety Code or a low-income area that is disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation."

It may also be helpful to note that recent movements in social and environmental justice may utilize the terms "disadvantaged community" and "environmental justice community" interchangeably. While environmental justice communities and disadvantaged communities often share common issues and may be analyzed in similar ways, this analysis will only refer to DACs in order to maintain consistency with the terms identified in SB 1000, which refers exclusively to Disadvantaged Communities.

Senate Bill 1000

In order to recognize and address environmental justice issues, the State of California passed legislation requiring cities and counties to incorporate environmental justice policies and programs into their land use planning processes. Senate Bill (SB) 1000, also known as the *Planning for Healthy Communities Act*, was signed into law on September 24th, 2016. The purpose of this law is to create healthier cities and counties by protecting sensitive land uses and prioritizing the needs of DACs. This law defines DACs as "an area identified by the California Environmental Protection Agency (CalEPA) pursuant to Section 39711 of the Health and Safety Code or an area that is a low-income area that is disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation."

As a result of this law, cities and counties must now determine the presence of DACs in their communities and, if present, adopt an environmental justice element or integrate environmental justice goals, objectives, and policies into their general plans. These policies must work to reduce unique or compounded health risks in DACs by addressing the following:

- Pollution exposure and air quality,
- Access to public facilities,

[2] (California Environmental Justice Alliance, Placeworks 2018)

- Access to healthy food,
- Access to safe and sanitary homes,
- Access to spaces for physical activity,
- Community engagement, and
- Program improvements to identify and reverse systemic funding inequities for disadvantaged communities.

The primary screening tool used to identify DACs is CalEnviroScreen. CalEnviroScreen is a mapping tool maintained by CalEPA that identifies DACs by U.S. Census Tract. A search of the CalEnviroScreen tool indicates that most of the City and planning area being considered as part of the General Plan update falls within the 91st-100th percentile ranking for disadvantaged community indicators, with the remaining area falling within the 81st-90th percentile. A map of the City of Fowler's CalEnviroScreen rankings can be seen in **Figure 4: CalEnviroScreen 3.0 Rankings Map**. Based on these results, environmental justice will be a required component of the Fowler General Plan update. Additional analysis specific to Fowler's Planning area can be found in the section below titled **Disadvantaged Communities in Fowler.**

Land Use Planning and Environmental Justice

There are three important concepts of environmental justice which are linked to land use planning: distributive justice, procedural justice, and social justice.

- **Distributive justice** refers to the inequitable distribution of harms and public benefits in which certain communities are exposed to pollution or lack access to public improvements.[3] Distributive justice is often exhibited through land use planning and local implementation documents, such as zoning codes or Capital Improvement Programs, which establish development requirements and prioritize investments in public improvement projects.
- **Procedural justice** refers to equity in decision-making and can be facilitated by targeted community involvement in the land use planning process.
- **Social justice** refers to the reality that racial, class, economic, and political factors influence the quality of life and the distribution of pollution.[4]

By recognizing these concepts and integrating policies which address environmental justice issues as part of the General Plan update process, we can ensure that every community member is considered when planning future development in the City of Fowler.

EXISTING CITY DEMOGRAPHICS

The City of Fowler was incorporated in 1908, having been built around a railroad switch yard that opened in 1872. The City is now home to approximately 6,200 residents according to the 2017 American Community Survey.[5] While the California Department of Finance provides a more recent population estimate of 6,605 as of January 1, 2019, they do not provide more specific demographic data.[6]

[3] (California Environmental Justice Alliance, Placeworks 2018)
[4] (California Environmental Justice Alliance, Placeworks 2018, 5)
[5] (United States Census Bureau 2017)
[6] (State of California, Department of Finance 2019)

Racial and Ethnic Composition

Fowler is primarily Hispanic, with Hispanics and Latinos representing 68.7 percent of the total population. White and Asian people comprise the next largest ethnic groups, representing 17.4 percent and 9.7 percent of Fowler's population, respectively. A more detailed breakdown is provided in **Table 1: Fowler Racial & Ethnic Population**.

Table 1: Fowler Racial & Ethnic Population[7]

	Number	Percent
White	1,079	17.4%
Black or African American	11	0.2%
Asian[1]	605	9.7%
American Indian/Alaska Native	14	0.2%
Hawaiian and Pacific Islander	0	0.0%
Some Other Race	0	0.0%
Two or More Races	234	3.8%
Hispanic or Latino (of any race)	4,257	68.7%
TOTAL:	6,200	100.0%

[1] *Including South Asian populations*

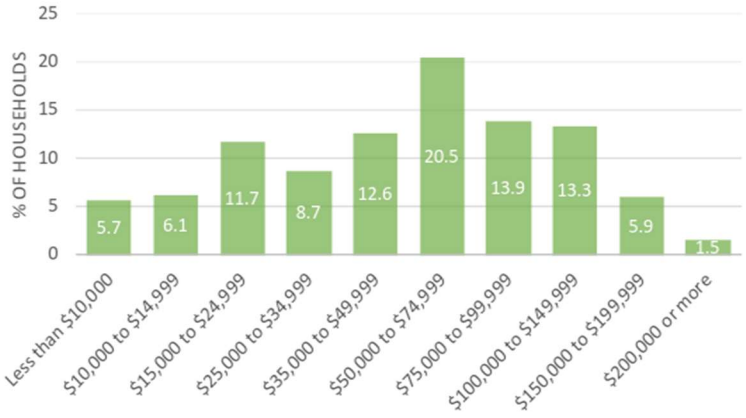
Household and Income Information

The City of Fowler has 1,828 households, according to the United States Census Bureau.[8] A household includes all people living together in a housing unit, which may include one or more families living together, a person living alone, or a group of related or unrelated people. Fowler's households have an average of 3.37 people.[9] This is slightly higher than the averages for Fresno County and California, which are 3.16 and 2.96 respectively.[10]

Fowler's estimated median household income as of 2017 was $56,375, which increased from $35,280 in the year 2000.[11] The distribution of income is represented in more detail in **Figure 1: Fowler Household Income**. The City median income is slightly low compared to Fresno County as well as the State of California overall, which were reported as $65,300 and $67,739, respectively. Fowler's per capita income is $20,903, while Fresno County's is $22,234 and the State of California's is $33,128.[12] Fowler's average home price is among the highest in Fresno County at $228,000 and has increased by 27 percent since 2010.[13]

[7] (United States Census Bureau 2017)
[8] (United States Census Bureau 2018)
[9] (United States Census Bureau 2018)
[10] (United States Census Bureau 2018)
[11] (City of Fowler 2019)
[12] (United States Census Bureau 2018)
[13] (Fresno County Economic Development Corporation 2016)

Figure 1: Fowler Household Income



19.5 percent of individuals in the City of Fowler live below the poverty level, where poverty status is determined based on household income and thresholds according to size and composition. The poverty rate for the State of California in 2018 was 12.8 percent, while the rate for Fresno County was 21.3 percent.[14]

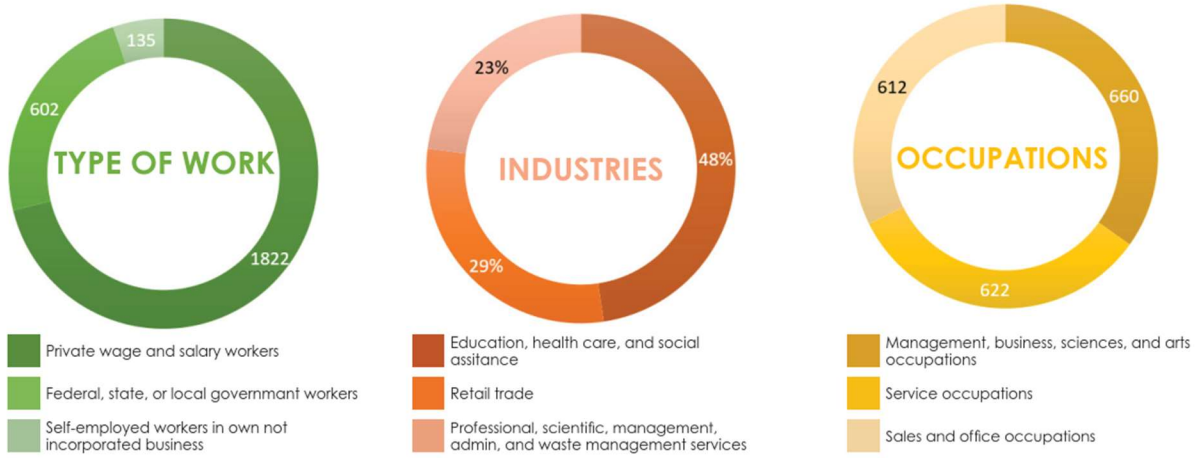
Employment and Workforce Information

The economic health of an area largely depends on the composition of its labor force. In part, major employers decide where to locate based on the availability of the workers that can meet their needs. United States Census data identifies a labor force of 2,829 individuals over the age of 16 in Fowler, with 61.2 percent of the labor force actively working.[15] The California unemployment rate was 7.5 percent in 2014 according to the California Employment Development Department. Fresno County had an unemployment rate of 11.6 percent while Fowler's rate was 9.6 percent.[16] Fowler's unemployment rate did not change significantly at the time of the 2017 American Community Survey.

Private wage and salary workers make up the bulk of employed residents within the City at approximately 1,822 workers. Self-employment accounted for 135 workers with federal, state, or local government workers amounting to 602 workers. Fowler's top three types of work, industries, and occupations are represented in Figure 2: Fowler's Workforce.

[14] (United States Census Bureau 2018)
[15] (United States Census Bureau 2018)
[16] (Fresno Council of Governments 2015)

Figure 2: Fowler's Workforce



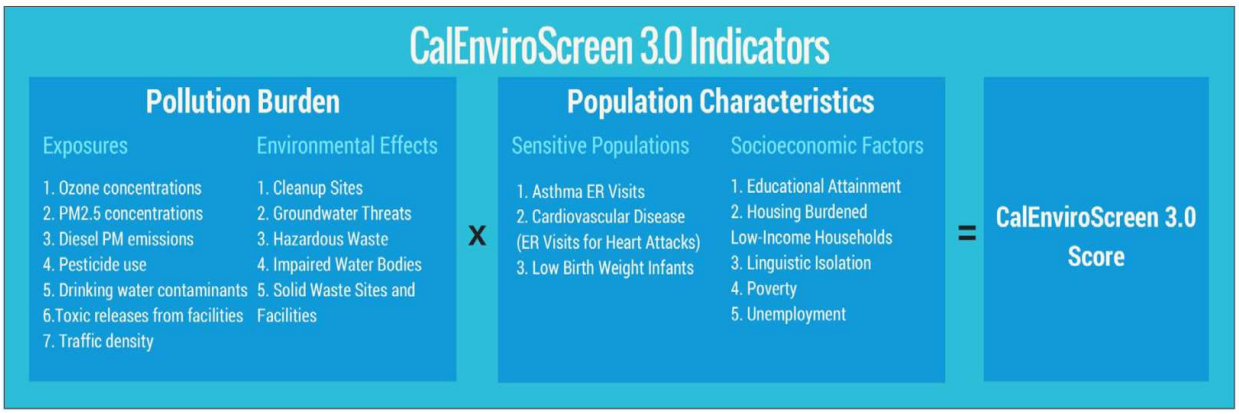
DISADVANTAGED COMMUNITIES IN FOWLER

The first step in planning for environmental justice is identifying the communities in a jurisdiction that are considered disadvantaged as defined in SB 1000. The primary screening tool used to identify DACs is CalEnviroScreen, a mapping tool maintained by CalEPA that identifies DACs by census tract. Scores are assigned to each census tract based on 20 different statewide indicators shown to significantly impact health or influence vulnerability to disease, including pollution exposures, other environmental effects, sensitive populations, and socioeconomic factors.[17] A comprehensive list of the indicators analyzed in the CalEnviroScreen rankings can be seen in **Figure 3: CalEnviroScreen 3.0 Indicators**.

Using the scores calculated through the CalEnviroScreen tool, all census tracts are ordered from highest to lowest and assigned a percentile rank. The ranking for each census tract demonstrates the tract's degree of burden relative to the rest of the state's census tracts. Areas with higher scores experience a higher pollution burden than areas with lower scores. A search of the CalEnviroScreen tool indicates that most of the City limits and planning area falls within the 91st-100th percentile with the remaining area falling within the 81st-90th percentile. A map of the City of Fowler's CalEnviroScreen rankings can be seen in **Figure 4: CalEnviroScreen 3.0 Rankings Map**.

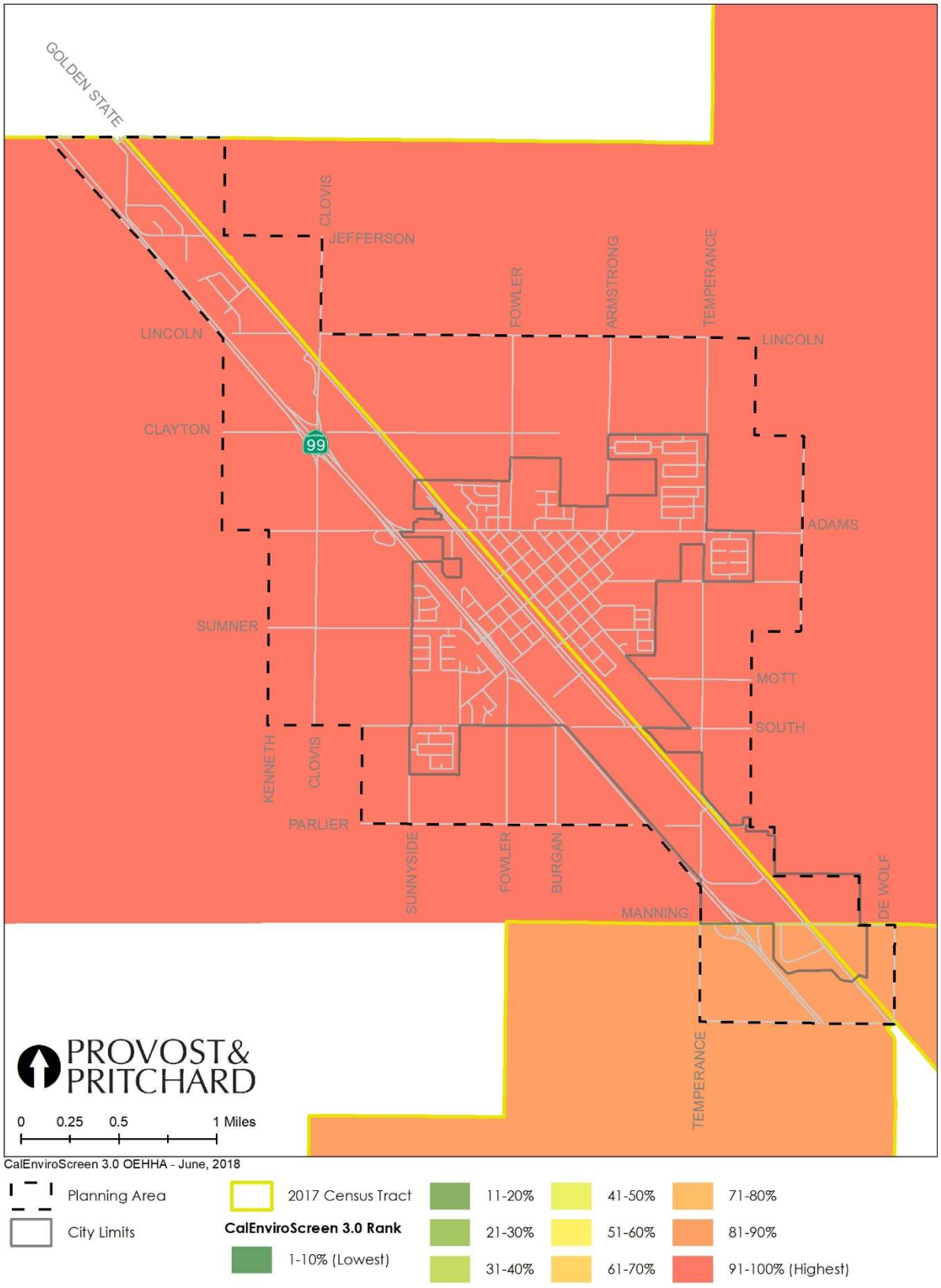
[17] (California Environmental Justice Alliance 2018)

Figure 3: CalEnviroScreen 3.0 Indicators



(California Environmental Justice Alliance, Placeworks 2018)

Figure 4: CalEnviroScreen 3.0 Rankings Map



ENVIRONMENTAL JUSTICE ISSUES ANALYSIS

In order to comply with the requirements of Senate Bill 1000, the environmental justice (EJ) element or EJ policies integrated across the elements of a general plan must address the unique and compounded health risks present in DACs by addressing at a minimum the following topics:

UNIQUE AND COMPOUNDED HEALTH RISKS

Unique and compounded health risks refer to hazards or health risks caused by hazards that may not be harmful to health in isolation but are harmful when considered with other health risks or stressors associated with negative health outcomes. These are also referred to as cumulative risks.

- Pollution Exposure and Air Quality
- Public Facilities
- Food Access
- Safe and Sanitary Homes
- Physical Activity
- Community Engagement
- Improvements and Programs that Address the Needs of Disadvantaged Communities

While CalEnviroScreen is a useful tool for establishing a community's level of environmental burden in relation to other communities throughout California, there are some limitations to the tool. Since data is collected and analyzed at the census tract level, it may not fully represent the nuanced issues faced by small or rural communities. To provide a more comprehensive, customized, and local analysis of environmental justice issues facing the City of Fowler, the analyses outlined below will consider additional indicators of equity, such as access to parks and open space as well as access to health care facilities. Two types of maps have been produced for this effort: inventory and analysis maps. Inventory maps demonstrate the presence and location of important features. Analysis maps relate those features to existing residential land uses and determine level of access. These additional analyses and corresponding maps can be seen in **Figures 5-14** in the sections that follow.

POLLUTION EXPOSURE

Pollution exposure occurs daily in all communities where people encounter air, water, and soil contaminants present in the built environment. A key concept in environmental justice is that some communities are exposed to multiple sources of pollution that make them more vulnerable, or disproportionately burdened by, pollution compared to other communities.

SB 1000 requires environmental justice elements to "reduce pollution exposure and improve air quality." Although air pollution is a type of pollution exposure, it is addressed separately by SB 1000 and is geared toward reducing specific air contaminants. Other types of pollution that should be addressed include water contamination and exposure to hazardous materials. Addressing these pollution exposures is critical to achieving environmental justice. This portion of the environmental justice analysis will focus on identifying the sources, types, and quantities of pollution to which the community in Fowler is exposed.

Air Quality

Methodology

Healthy air quality is defined as the degree to which ambient air is pollution free.[18] DACs can be disproportionately exposed to air pollution due to the proximity of pollution-emitting sources. Air pollutants are split into three categories: greenhouse gases (GHGs), criteria air pollutants, and toxic air contaminants (TACs).

GHGs trap heat in the atmosphere to make the planet warmer. This is known as the greenhouse effect and is the primary cause of global climate change. GHGs are primarily made up of carbon dioxide, methane, nitrous oxide, water vapor, ozone, and fluorinated gases. GHGs enter the atmosphere through the burning of fossil fuels; the production and transport of coal, natural gas, and oil; industrial activities, and agricultural practices.

Criteria air pollutants are made up of six common pollutants (carbon monoxide, lead, sulfur dioxide, nitrogen dioxide, particulate matter, and lead) that cause smog, acid rain, and other health hazards. Typically, these pollutants are the products of the combustion of fossil fuels and industrial processes. The US EPA and the State of California have set acceptable concentration levels for criteria pollutants. Areas that exceed these concentrations are considered in nonattainment status.

Toxic air contaminants (TACs) are pollutants that cause serious health issues even with low levels of exposure. TACs include benzanen, asbestos, arsenic, chloroform, and particulate matter from diesel-fueled engines, among many others.

GHGs, criteria air pollutants, and TACs are generally emitted by three types of sources:

- Stationary sources, such as power plants, refineries, and manufacturing facilities.
- Area-wide sources which spread pollution over a large geographic area. These include fugitive dust and farming operations.
- Mobile sources, which include automobiles, boats, and airplanes, among others.

The California Air Resources Control Board (CARB) has created an *Air Quality and Land Use Handbook* (Handbook) which provides a method for assessing air pollution exposure. The Handbook outlines a three-step process to assess pollution exposure near sensitive land uses:

1. Locate mobile and stationary sources of air pollution, including freeways, high volume roads, distribution centers, rail yards, gasoline dispensing facilities and others listed above.
2. Establish what areas are at risk of exposure by applying CARB's recommended buffers around pollution sources.
3. Identify sensitive land uses existing within those buffers.

[18] (California Environmental Justice Alliance, Placeworks 2018)

Analysis

The San Joaquin Valley's air quality is impacted by its topography, climate, and geography. The mountains surrounding the Valley cause pollution to collect in high concentrations with limited ability to disperse. Additionally, the presence of major transportation corridors through the San Joaquin Valley connecting northern and southern California exacerbate the problem.[19] There are several state and federal air quality standards not being met in the San Joaquin Valley. Specifically, the region is in nonattainment status for concentrations of ozone and particulate matter.[20]

In order to determine the extent to which sensitive land uses in Fowler are disproportionately exposed to air pollution, it is necessary to locate pollution sources and establish acceptable proximity of pollution sources to sensitive land uses. Sensitive land uses are places where individuals who are most susceptible to poor air quality, such as children, older adults, pregnant women, and those with health problems, are most likely to spend their time. These land uses can include schools, parks, playgrounds, daycare facilities, nursing homes, hospitals, and residential communities.[21]

SENSITIVE LAND USES

Sensitive land uses include homes, schools, day care centers, playgrounds, and medical facilities.
The populations within DACs are more likely to have their homes, schools, parks, and daycare facilities near pollution emitting sources and are therefore disproportionately exposed to such hazards.

CARB provides siting recommendations for sensitive land uses around specific sources of air pollution, including high traffic freeways and roads, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and large gas dispensing facilities. Using these siting recommendations, it is possible to map the locations of sensitive uses in closer proximity to pollution sources than is recommended by CARB.

An inventory of Fowler's pollution emitting sources and sensitive land uses are shown in **Figure 5: Pollution Emitting Sources in Fowler**. As seen in this figure, the primary air pollution sources in Fowler come from mobile source emissions along State Route 99 and gas stations situated along the freeway. After applying CARB's recommended buffers, it is clear that most sensitive existing land uses in Fowler are well-situated in relation to these emissions sources. However, there are some residential parcels bordering State Route 99 that are either partially or entirely in closer proximity than is recommended. These residential uses with disproportionate exposure to air pollution from the freeway can be seen in **Figure 6: Sensitive Land Uses with Disproportionate Exposure to Pollution**.

[19] (San Joaquin Valley Air Pollution Control District 2019)
[20] (City of Fowler 2019); (United States Environmental Protection Agency 2018)
[21] (California Environmental Protection Agency, California Air Resources Control Board 2005)

Figure 5: Pollution Emitting Sources in Fowler

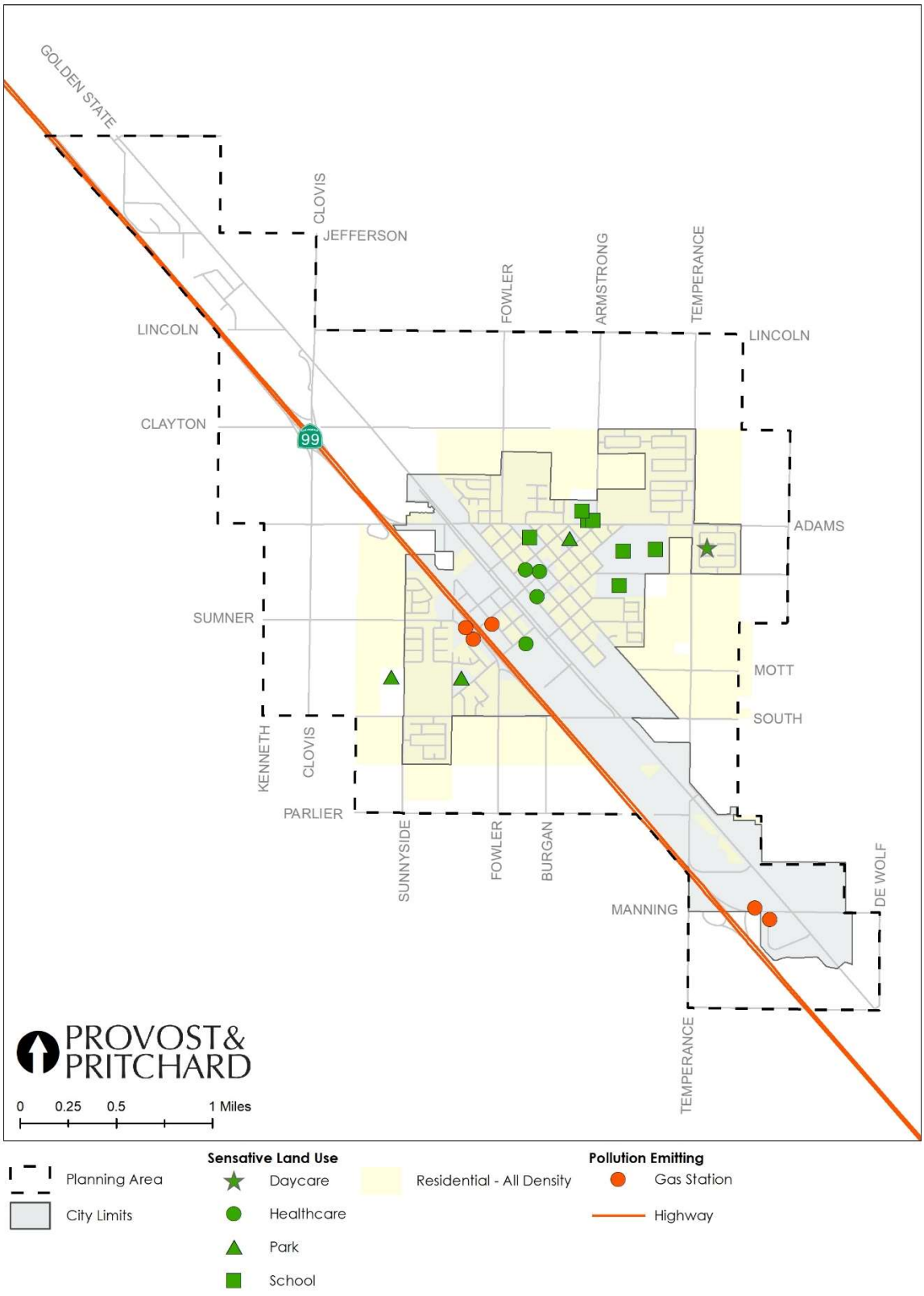


Figure 6: Sensitive Land Uses with Disproportionate Exposure to Pollution[22]

[22] (California Air Resources Control Board, California Environmental Protection Agency 2005)

Water Contamination

Methodology

The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards are regulatory agencies in charge of water quality. SWRCB tracks surface water conditions throughout California as well as water bodies with contaminants exceeding water quality standards.

Groundwater quality is often assessed through resources provided through SWRCB, including the Groundwater Ambient Monitoring and Assessment program, the online database called GeoTracker, as well as the Sustainable Groundwater Management (SGMA) program. In addition to these sources, the City of Fowler provides an annual water quality report which informs the public of the quality of their groundwater.

Analysis

Surface Water

The City of Fowler receives a surface a water allocation from Consolidated Irrigation District (CID). The 1,000 ac/ft per year allocation from CID is used for groundwater recharge. There are no other surface water sources in Fowler used for consumption or recreation.

Groundwater Contamination

The City of Fowler relies on groundwater for its drinking water supply, sourced from six local wells. Water throughout the city is sourced from each well depending on demand. In accordance with state and federal standards, municipal water is tested monthly to ensure quality. According to the Annual Water Quality Report published by the City of Fowler in 2019 for the 2018 reporting year, Fowler's existing wells produce drinking water of good quality. However, in August of 2018 the City was notified that levels of 1,2,3-trichloropropane (TCP) levels exceeded the maximum contaminant limit in one City well. Consumption of water exceeding the maximum contaminant limit over long periods of time can lead to increased cancer risk.

The City is continuing to monitor water quality monthly and has initiated litigation against the manufacturer of the fumigants causing the issue to ensure they share in the cost of solving the issue. While only one well is affected, treatment would apply to all wells City-wide.

Hazardous Materials and Toxins

Methodology

Sources of hazardous materials and toxic substances that may lead to exposure include industrial facilities, brownfields, hazardous waste cleanup sites, superfund sites, abandoned mines, or housing built on previous industrial land that has not been properly cleaned up.

In order to identify hazardous sites, locals can access EnviroStor, an online database maintained by CalEPA, to identify hazardous sites in communities throughout California that may ultimately need to be addressed through EJ policies.

Analysis

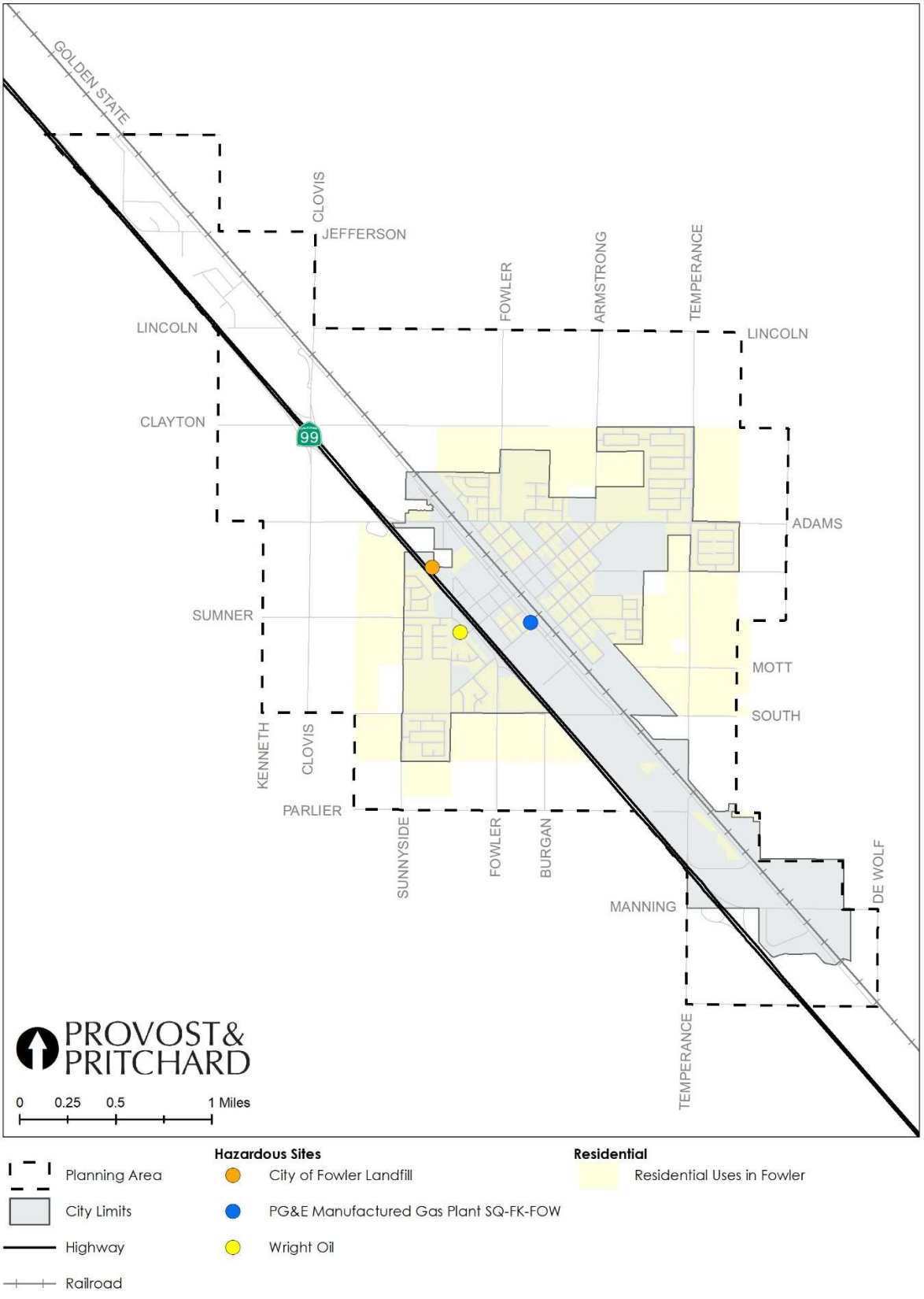
Fowler has three open status cleanup sites on the Hazardous Waste and Substances Sites (Cortese) List, as shown in Figure 7: Hazardous Sites Inventory Map:

- PG&E Manufactured Gas Plant SQ-FK-FOW (10490099). This site operated as a manufactured gas plant by PG&E from 1914 to 1930 and has potential contaminants of concern, including polynuclear aromatic hydrocarbons (PAHS). This site is inactive and has been in need of evaluation since June 30, 1995.
- Wright Oil (T10000011242). During a site assessment related to a former leaky underground storage tank (UST), analytical results indicated that total petroleum hydrocarbons as diesel (TPHd) from additional leaking aboveground storage tanks (ASTs) was present from the surface of the ground to a depth of at least 40 feet. California State Water Resources Control Board (SWRCB) has been requesting an investigation of the soil and groundwater beneath the affected property and subsequent cleanup since the contamination was discovered in 2014. According to the Geotracker, a site assessment was initiated in 2018. The lateral extent of the TPHd has not been delineated and groundwater conditions have not been evaluated.
- Fowler City Landfill (L10004199996). This site was historically used for waste disposal prior to the regulations set forth in Title 27 of the California Code of Regulations. The cleanup status of this site is listed as open as of January 1, 1965.

Summary and Recommendations

1. Some residential uses in Fowler are disproportionately exposed to air pollution due to their proximity to the freeway. Moving forward, residential land uses should not be planned within 500 feet of State Route 99.
2. As part of ongoing planning processes, new land use plans and project approvals should follow CARB's siting recommendations, as outlined in the *Air Quality and Land Use Handbook.*

Figure 7: Hazardous Sites Inventory Map



PUBLIC FACILITIES

SB 1000 refers to public facilities as "public improvements, public services, and community amenities" in accordance with Government Code Section 66000. SB 1000 seeks to ensure that DACs have access to safe, clean public facilities. The equitable distribution of public facilities is an important part of environmental justice. Many DACs do not have adequate access to necessary public facilities. Even basic infrastructure such as sidewalks and streetlights can be inequitably distributed around a community. This can create a range of health risks and quality of life issues including poor physical and mental health, increased exposure to safety hazards, and stifled community growth.

Methodology

Analyzing the conditions of public facilities requires three steps: inventorying existing facilities; assessing access, demand, and compliance; and identifying future opportunities. This analysis should consider:[23]

- Distribution. Is the distribution of facilities equitable? Are there future facilities planned that may make it more equitable? Are there any barriers to achieving equitable distribution of facilities?
- Access. Is there vehicular, pedestrian, biking, or transit-served access to the facility?
- Conditions and Regulatory Compliance. Do facilities meet regulatory and safety standards? Are facilities in good working condition?
- Environmental Impacts. Are facilities contributing to pollution burdens, or are facilities minimizing their impacts on the environment?
- Operational Sustainability and Interagency Coordination. Is there sustained funding for the facility? Is there long-term maintenance infrastructure for the facility? Are applicable agencies aware of DAC needs?
- Future Demand. Are facilities planned to meet the needs of DACs?

Analysis

Generally, public facilities in Fowler are equally distributed. However, access is impeded by dominant physical barriers as well as lack of public transit and pedestrian facilities. While most facilities are located on the east side of SR 99, residents on the west side can only access the east via pedestrian infrastructure at the Merced Street underpass. There are a few residential uses in the southern general commercial zone. These residents face the most serious access issues as they are located farthest from services, have no pedestrian facilities by which to reach services, and would need to traverse Golden State Boulevard, a busy, high-speed road with no pedestrian infrastructure, to access downtown Fowler. Figures 8-10 provide an overview of the City of Fowler's distribution of community facilities, public improvements, and public services.

[23] (California Environmental Justice Alliance, Placeworks 2018)

Figure 8: Community Facilities Inventory Map

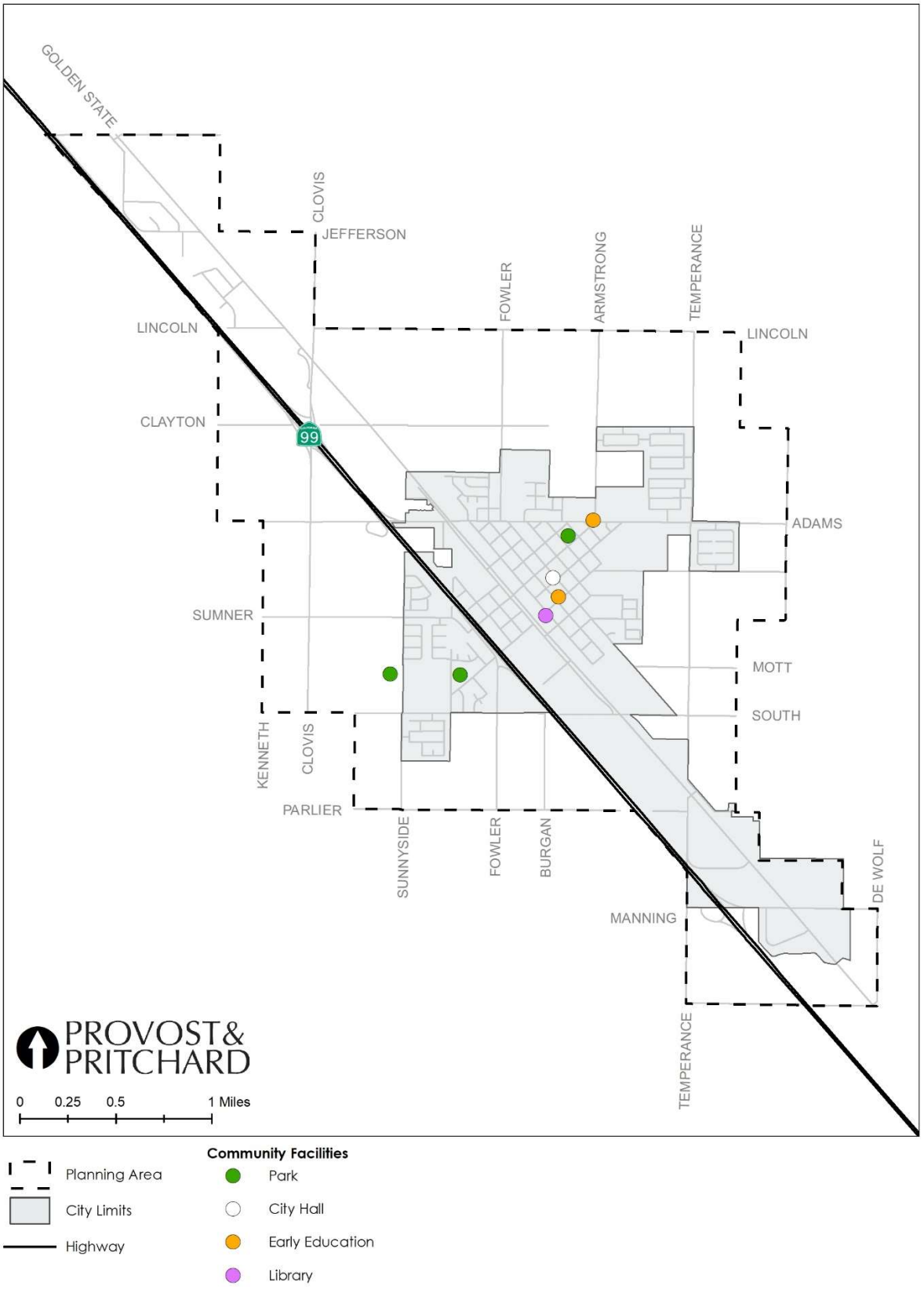


Figure 9: Public Improvements Inventory Map

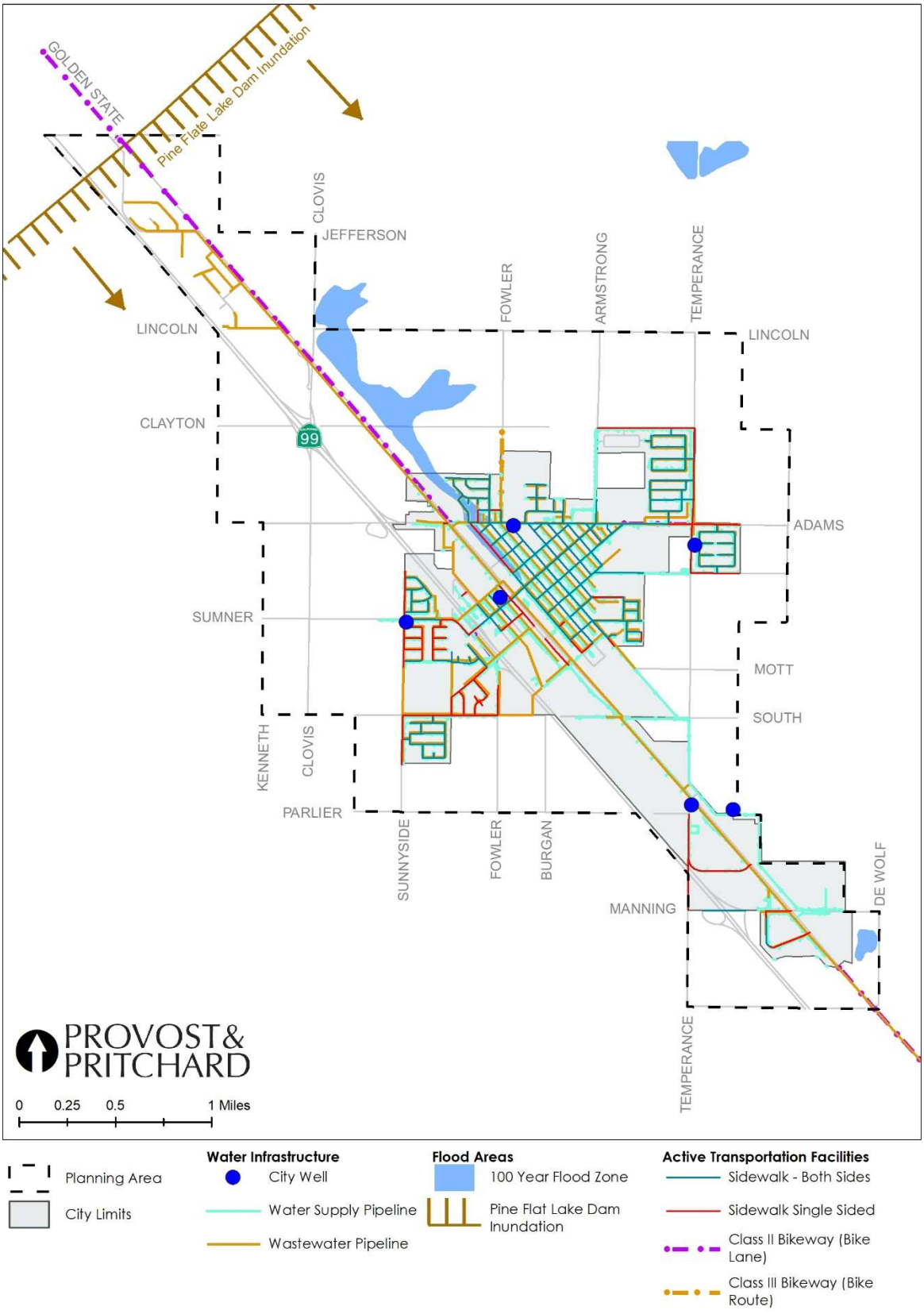
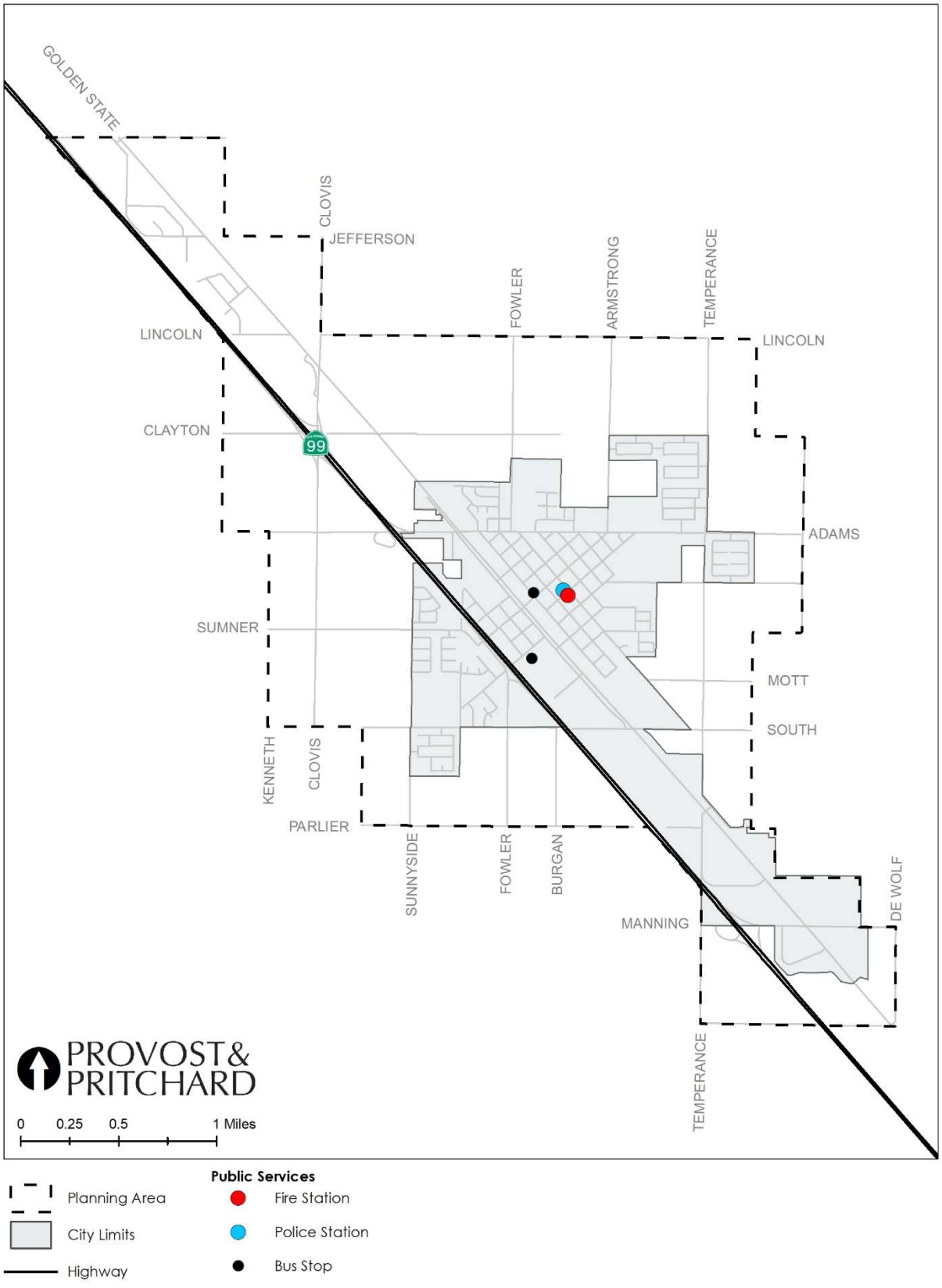


Figure 10: Public Services Inventory Map



Water, Wastewater, and Flood Control

The City of Fowler's domestic and fire flow water demand is generally well-served by its six local wells. Fowler is currently conducting a water supply model to determine if supply is sufficient to meet future demand. Throughout the San Joaquin Valley groundwater overdraft and contamination from agricultural chemicals have presented groundwater quantity and quality challenges. Distribution is provided by the City's Public Works Department and their system of pumps, mains, pipelines, and laterals. The department is responsible for repairs and replacement of equipment. At present, the City is not aware of any areas facing water supply issues. However, the City anticipates that with future growth, especially on the west side of SR 99, supply issues may occur. Additional studies are underway which evaluate the capacity of the water system. The City has identified several improvement projects required to meet additional water demands and maintain the aging system. While there is not currently a Capital Improvement Program that would ensure adequate funding for these improvements, one is in the process of being drafted and is anticipated to be completed by July 1, 2020.

Fowler is part of the Selma-Kingsburg-Fowler County Sanitation District (District). The District provides sewer service and wastewater treatment to its member cities through a mutual agreement. The cities served by the regional wastewater treatment plant, located just west of Kingsburg, are unified through the fiscal responsibility to fund its long-term operation and administration. Each city owns the portion of the wastewater system within their respective city limits while the District owns the wastewater treatment plant and the sewer lines outside of city limits. The District is also responsible for the maintenance of all sewer lines. The District monitors the capacity of the wastewater system and anticipates its growth to be consistent with the growth of the member cities.[24] All of Fowler is adequately served by the District.

The City currently has a storm drain system in place but does not currently have a storm drainage master plan, so system capacity is reviewed on a case-by-case basis as new development projects are submitted. Trunk lines lead to various basins throughout the City, though some projects retain stormwater on-site through the incorporation of a new basin depending on their proximity to current infrastructure.

The Federal Emergency Management Agency (FEMA) publishes maps showing regulated flood hazard zones for floods of varying severity. If an area has a greater than one percent chance of experiencing a 100-year flood,[25] flood insurance is mandatory. A small portion of the north side of Fowler is located within this flood zone. This area is made up of 53 parcels and includes a total of 57 buildings, 52 of which are residential.[26] Because Fowler and the surrounding lands are not likely to be impacted by floods and only a small portion is located within the 100-year, 200-year, or 500-year floodplains, it is not part of the Regional Flood Management Plans established for the San Joaquin Valley and prepared by the California Department of Water Resources. The City has identified two areas that, after periods of heavy rain, experience flooding. The first, located at the intersection of Tulare and 7th, has only slight backups. The intersection of Adams

[24] (Municipal Service Review and Sphere Of Influence Update Report 2017)
[25] A 100-year flood is a flood event with a 1 in 100 chance of occurring in a given year. In other words, the probability of a flood of this magnitude or greater in any year is 1%.
[26] (Fresno County Multi-Jurisdictional Hazard Mitigation Plan 2018)

and 7th, located in the 100-year floodplain, can experience flooding that necessitates a road closure after extreme precipitation.

The main risk of flooding for the City of Fowler comes from Pine Flat dam, located approximately 23 miles northeast of the planning area. This dam forms a one-million-acre-foot reservoir on the Kings River. Should the dam fail, a large portion of Fresno County, including nearly all of Fowler and its planning area, would be inundated with water. The Fresno County Multi-Jurisdictional Hazard Mitigation Plan named the Pine Flat Dam a high hazard dam but recognized that failures are more likely to occur with smaller dams.[27] Though there is a potential for dam failure, no major dams located in Fresno County have failed and the likelihood of a failure is low.[28]

Solid Waste, Recycling, and Composting Facilities

Solid waste collection in the City of Fowler is provided by Waste Management, Inc. The City's solid waste program includes waste disposal collection, a regular recyclables pickup program, and a green waste pickup program. Following the removal of recyclable materials, the solid waste is transferred to the Kettleman Hills Nonhazardous Co-disposal Site. The landfill is at approximately 44 percent capacity and has no scheduled closure date. There are no waste disposal facilities within the City's planning area, though there is an industrial recycling center located in the southern portion of the city. A few residences are located immediately adjacent to the center. All households in Fowler are served adequately by and have equal access to this system.

Streets and Roads

The roadway system within the Fowler planning area consists of State Route (SR) 99 and numerous City and County routes. SR 99 is the major regional transportation route into and out of the City, with access provided by the Merced Street, Adams Avenue and Manning Avenue exits. Other entrances into Fowler from surrounding County areas include:

- North Fowler Avenue,
- South Fowler Avenue,
- South Temperance Avenue,
- Golden State Boulevard, and
- East South Avenue.

Most of Fowler's land area lies on the east side of SR 99, but the west side also has substantial residential uses. Retail and industrial uses are generally clustered along SR 99 to the east of the highway. Only Merced Street, Adams Avenue, and Manning Avenue provide access across the highway, limiting the flow of both automobile and pedestrian traffic.

Fowler currently owns and maintains 37.5 miles of road. The average pavement condition for the City can be considered "fair".[29] The City currently budgets $250,000 for pavement repair and maintenance each year. With this level of annual spending, the amount of deferred maintenance would reduce the City's

[27] (Fresno County Multi-Jurisdictional Hazard Mitigation Plan 2018)
[28] (Fresno County Multi-Jurisdictional Hazard Mitigation Plan 2018)
[29] (Pavement Management System Implementation 2019)

average road conditions to "poor" by 2028, with the worst conditions being concentrated on the east side of SR 99. These roads will be reaching the end of their service life and may contribute to mobility issues throughout the City. Currently, there is no Capital Improvement Program which identifies maintenance priorities or funding mechanisms, though one is being drafted.

Public Utilities

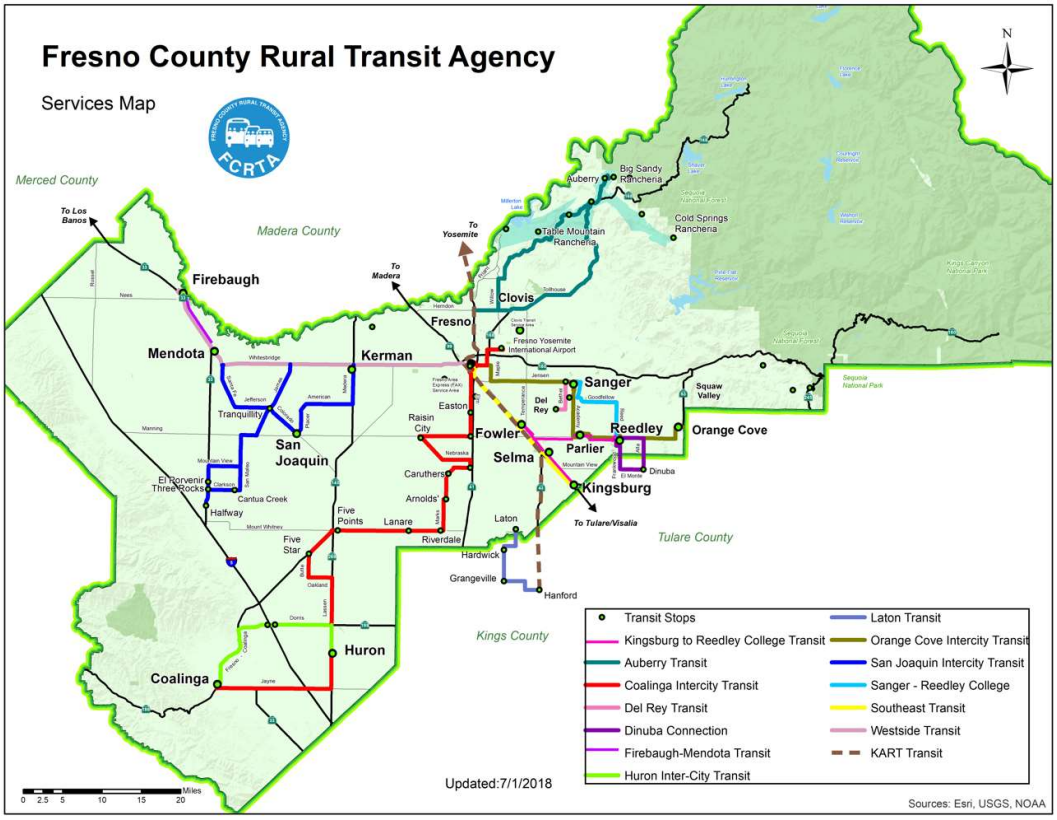
Electricity and natural gas are provided by Pacific Gas & Electric which plans to meet growth in the City of Fowler. There are a variety of communications companies that provide service in the City of Fowler. There are no known areas without access to these services.

Transit services

The Fresno Rural Transit Agency (FCRTA) operates fixed-route and on-demand bussing in the City of Fowler. The fixed-route service offers one line that links Fowler with the cities of Fresno, Selma, and Kingsburg as part of the Southeast Transit line. Three round trips are provided each day, Monday through Friday. Bus shelters are located at the intersection of E. Merced and N. 7th Street and in front of Fowler Medical Plaza. Both stops are on the east side of SR 99, which can make access difficult for those living on the west side of Fowler. Fares for the Southeast line range from $0.75 to $2.50 one way and from $1.25 to $4.75 round trip for the general public, with discounted fare for older adults, persons with disabilities, and children traveling with adults.[30] There are also shared-ride car and vanpool services, social service dial-a-ride, and specialized services for seniors and persons with disabilities. The service routes can be seen in **Figure 11: Fresno County Rural Transit Agency Services Map** below.

[30] (Southeast Transit Schedule 2018)

Figure 11: Fresno County Rural Transit Agency Services Map



(Fresno County Rural Transit Agency n.d.)

Hospitals, Emergency Rooms, and Trauma Centers

The City of Fowler has a contract with the City of Selma for emergency medical services provided by American Ambulance. Response times to emergencies average eight minutes. There are also a few medical offices in Fowler, including Adventist Health Medical Office, Fowler Medical Center, and United Health Centers. These primary care and family practice offices are concentrated in downtown Fowler, on the east side of SR 99. Residents on the west side of SR 99, who must cross the highway at the Merced Street underpass, and the residents in the southern general commercial zone have the farthest to travel to access primary care, with no offices within walking distance. The residential uses outside of walking distance from primary care are represented in Figure 12: Healthcare Access Map.

The closest all-hours hospital is Adventist Health Selma, is an approximately 8-mile vehicle trip from downtown Fowler. There is also an Urgent Care office in Selma. Additionally, there are several hospitals and emergency rooms located in Fresno. Community Regional Medical Center is the closest Fresno hospital, an approximately 12-mile vehicle trip north from downtown Fowler on SR 99. The locations of these hospitals are represented in Figure 13: Hospital Access Map. While both Adventist Health Selma and Community Regional Medical Center offer all-hours care, the Fresno hospital is larger and offers more services. The primary health access concern is the lack of all-hours facilities in Fowler, combined with the lack of public transportation in the evening. Should a medical emergency occur outside of regular business hours, residents would need to rely on a personal vehicle, ride-hailing service, or an ambulance.

Figure 12: Healthcare Access Map

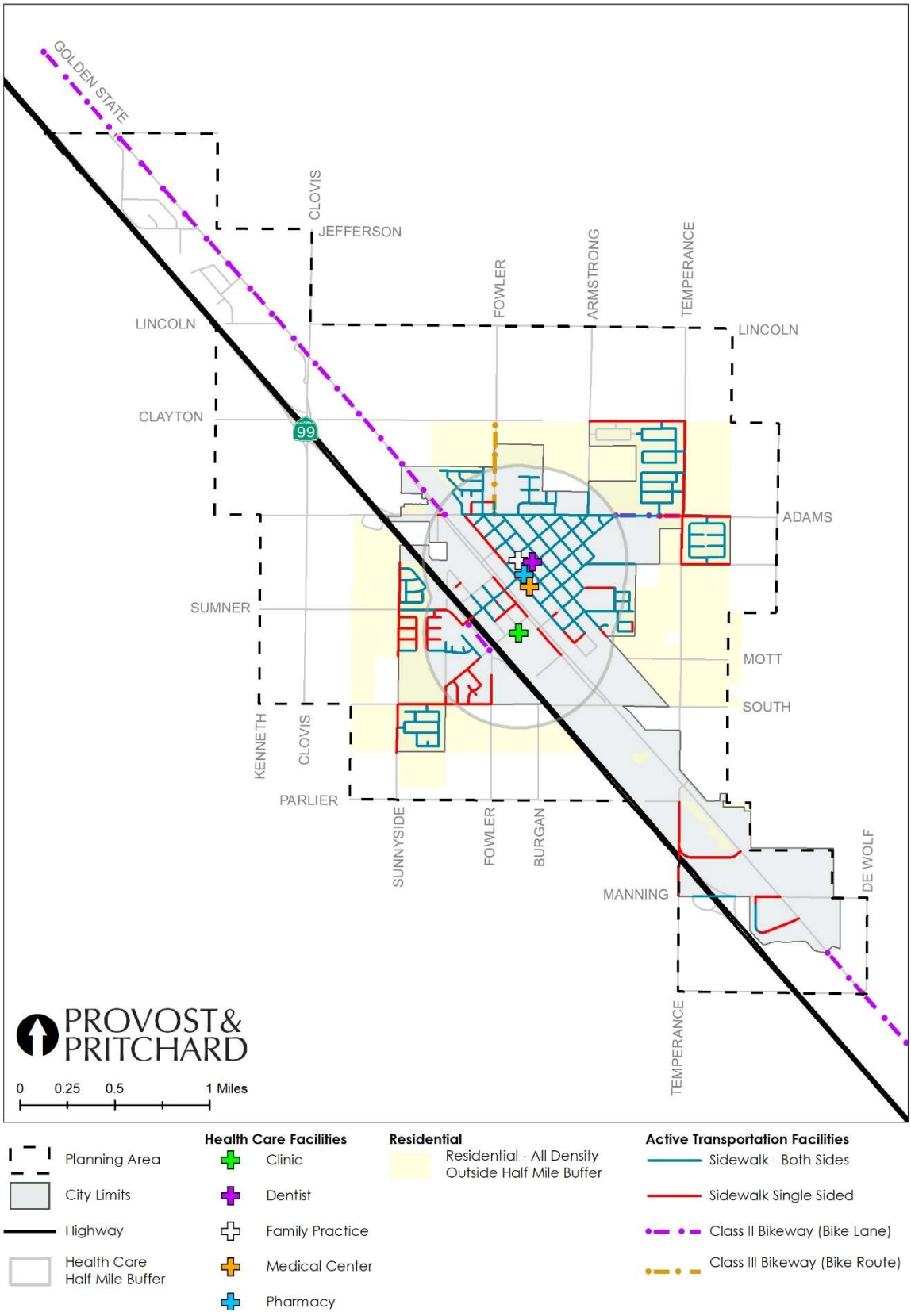


Figure 13: Hospital Access Map

Emergency Services and Public Safety

The Fowler City Police Department provides law enforcement services within the City limits. The entire City is served from the headquarters office at City Hall, using the detention facilities at the Fresno County Jail in downtown Fresno. The current[31] staffing ratio is approximately 1.5 full-time officers per 1,000 residents with a goal of 1 full-time officer per 500 residents. Unincorporated portions of the planning area are served by the Area 3 substation of the Fresno County Sheriff's Department. Based on the size of the City, Fowler is adequately served by its current police force.

The City of Fowler Fire Department provides service within City limits and is staffed by 12 volunteer firefighters, with approval for up to 14 firefighters. Emergency response times are six minutes during the day and eight to ten minutes at night. Construction on a new fire station across from City Hall is scheduled to be completed and staffed in early 2020. Unincorporated portions of the planning area are within the jurisdiction of the Fresno County Fire Protection District (District). The District also responds to some emergencies within City limits, such as vehicle accidents and structural fires. Both the City of Fowler Fire Department and Fresno County Fire services provide emergency medical services as well. The City has entered into a transition agreement with the District to provide property tax revenue as areas annex to the City, in order to reduce fiscal impacts on the District.

City and Government Buildings

Fowler is expected to complete construction on a new fire station in early 2020. City Hall, while functional, does have areas that are in slight disrepair. Specifically, a mobile trailer that houses the Planning, Building, and Code Enforcement Department is in poor shape. The City is considering renovating City Hall following the completion of construction on the fire station.

The City owns and operates a community center, which is used for senior programming and other community events, including a cooling center during extreme heat. The building is also starting to experience some effects from poor maintenance, such as a leaking roof. These buildings are all located on the east side of SR 99, meaning access for residents on the west side is often impeded by the highway.

Daycare Centers

8 acres of land within City limits and an additional 5.2 acres of land in the sphere of influence are used as day care facilities.[32] Additionally, there are both large and small day care homes on both sides of SR 99, providing equitable access to childcare.

Libraries

Fresno County Public Library operates a Fowler branch, which relocated to its current location at 306 S. 7th Street in 2008. The 8,660 square-foot branch offers accessible and inclusive programs year-round for Fowler residents of all ages. In addition to lending materials, the branch also provides 20 internet stations for public use, printing and photocopying for a small fee, and a meeting room space.

[31] As of August 20th, 2019
[32] (Community Report 2019)

Summary and Recommendations

	Distribution	Access	Conditions	Operational Sustainability	Future Capacity	Recommendation
Public Improvements						
Water Distribution	Equitable	Equitable	Adequate	Unknown	Unknown	Capital Improvement Program Needed
Wastewater Treatment	Equitable	Equitable	Adequate	Adequate	Adequate	NO ACTION REQUIRED
Flood Control & Drainage	Equitable	Equitable	Adequate	Adequate	Adequate	NO ACTION REQUIRED
Solid Waste	Equitable	Equitable	Adequate	Adequate	Adequate	NO ACTION REQUIRED
Streets & Roads	Equitable	Equitable	Adequate	Unknown	Unknown	Capital Improvement Program Needed
Utilities	Equitable	Equitable	Adequate	Adequate	Adequate	NO ACTION REQUIRED
Public Services						
Transit	Inequitable	Inequitable	Fair	Adequate	Adequate	Recommend bus shelter on west side of SR 99 in coordination with FCRTA
Healthcare	Equitable	Inequitable	Good	Good	Adequate	Consider programs to improve access for those outside walking distance
Emergency Services	Equitable	Equitable	Adequate	Adequate	Adequate	NONE
Community Facilities						
Government Buildings	Equitable	Inequitable	Fair	Adequate	Adequate	Consider additional and/or alternative locations for community meetings and cooling centers
Daycare Centers	Equitable	Equitable	Fair	n/a[1]	n/a	NO ACTION REQUIRED
Libraries	Equitable	Inequitable	Good	Adequate	Adequate	None

1. The City is not responsible for the operations or maintenance of private facilities.

FOOD ACCESS

Food access is a concept that includes several related topics, including the availability of nutritionally adequate and affordable food, having enough income to purchase food, as well as proximity and the ability to travel to a food source that offers affordable, nutritionally adequate food.[33] People in DACs, especially those with low income, may face greater barriers to accessing healthy and affordable food retailers.[34] Research shows that people cope with food insecurity by consuming nutrient-poor but calorie rich foods, going hungry, or both, which leads to health issues ranging from micronutrient malnutrition to obesity.[35]

[33] (California Environmental Justice Alliance, Placeworks 2018)
[34] (United States Department of Agriculture Economic Research Service 2019)
[35] (California Environmental Justice Alliance, Placeworks 2018)

Methodology

Community food access conditions may be evaluated using the following techniques and indicators.

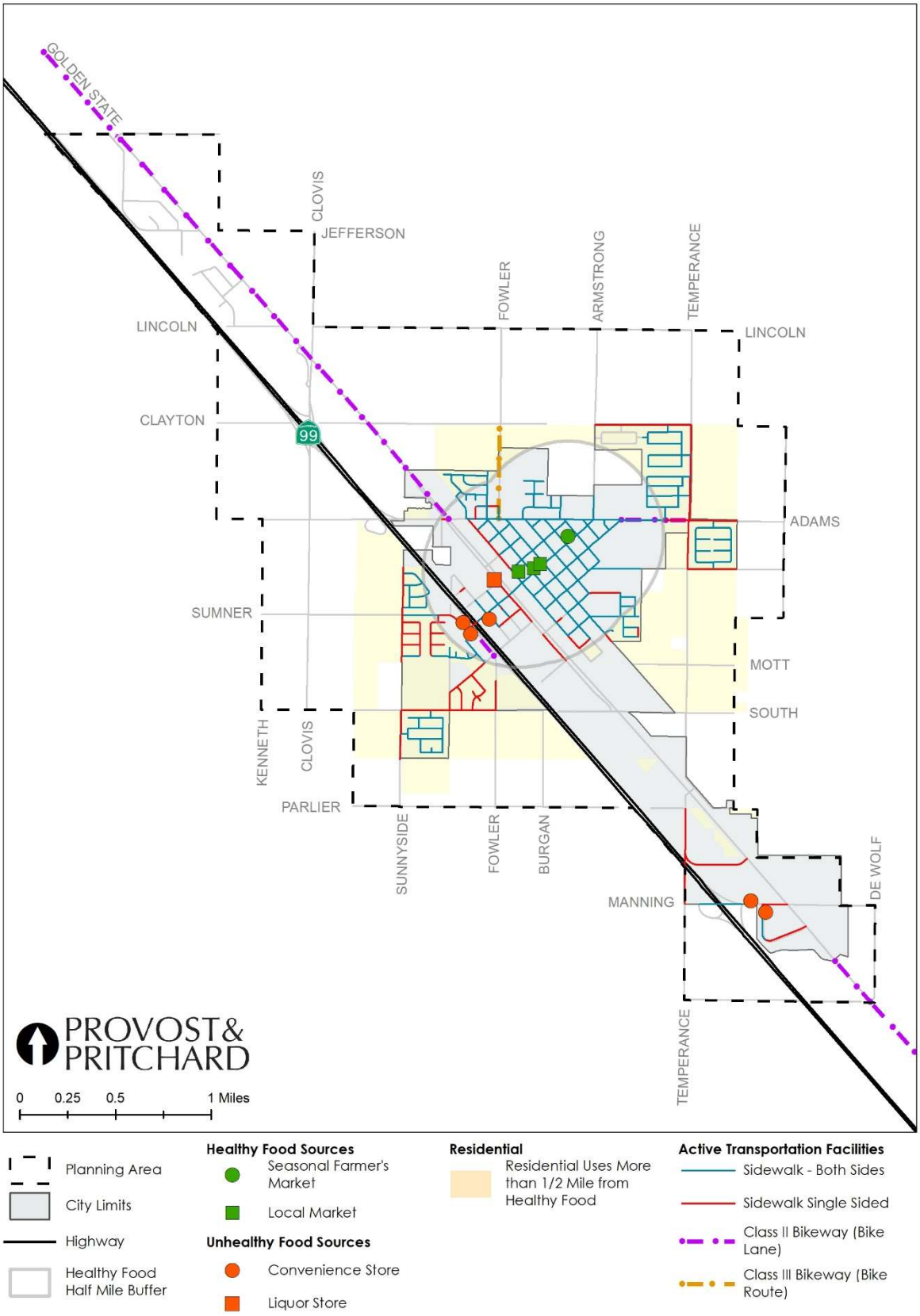
- Identify and map existing food outlets, including supermarkets, according to location, type, and cost of foods and produce.
- Identify means of access to food sources, whether by car, transit, or other.
- Identify barriers to shopping, such as situations where people have to carry groceries home.
- Measure percentage of local residents lacking cars, including special populations such as home-bound seniors. Evaluate level to which transit service meets community food shopping needs.

Analysis

The United States Department of Agriculture (USDA) Economic Research Service provides the Food Access Research Atlas, a visual mapping tool, which utilizes data on vehicle availability and supermarket access to create maps showing food access indicators by census tract. Using the Food Access Research Atlas, it was found that the City of Fowler's east and west census tracts have a 4.1 and 1.4 percentage rate, respectively, of households without vehicles that are more than one-half mile from a supermarket. While these percentage rates are relatively low, it does indicate that there are households in Fowler which have barriers to accessing healthy food and highlights the necessity of having a car in order to access healthy food retailers.

Figure 14: Food Access Map offers a more refined, local snapshot of the location of Fowler's food retailers. Based on this mapping exercise, Fowler lacks healthy food resources like grocery stores and supermarkets. There is an abundance of convenience stores and fast food restaurants for the size of the City, while healthy food retailers, like grocery stores and supermarkets are not found in the planning area at all. There are some local markets which sell meat and produce. However, these locations offer limited food supplies. In addition, the food supplies sold at these locations are expensive compared to grocery stores or supermarkets. For this reason, these locations have been identified as local markets instead of grocery stores or supermarkets that would offer a wider variety of general food supplies and household products. There is also a local variety store which sells some canned foods in addition to party supplies and other non-food household products.

Figure 14: Food Access Map



Summary and Recommendations

1. There are no policies regarding healthy food sources in the current General Plan or Zoning Code. **Update planning and regulatory documents to facilitate grocery stores to locate within the planning area.**
2. There is an abundance of unhealthy food sources in Fowler compared to healthy ones. **Prioritize/encourage the development of healthy food outlets**.
3. Once healthy food establishments, such as grocery stores or supermarkets are built, distribution of and access to those resources should also be evaluated. This can be accomplished as part of the visual assessment survey recommended in the **Physical Activity** section of this report.

SAFE AND SANITARY HOMES

Safe and sanitary housing considers three dimensions: housing conditions, housing affordability, and land-use compatibility. Toxic building materials, extreme temperature variation, poor air quality, moisture intrusion, and overcrowding are all aspects of housing condition that can impact residents' health. Residents of DACs tend to live in older housing stock which is more susceptible to these issues. Cost-burdened households have reduced resources available for other necessities such as health care or food. Finally, housing next to incompatible land uses can compound issues related to unsafe housing conditions. While housing condition and affordability are discussed in this section, incompatible land uses are considered in **Pollution Exposure** and **Public Facilities**.

Methodology

To analyze access to safe and sanitary housing, jurisdictions must assess indoor conditions and housing affordability. Age of housing stock is an important indicator for toxic substances, as regulation that reduces the use of those substances has increased over time. Additionally, census data on issues such as overcrowding can indicate indoor housing condition. Housing affordability is traditionally measured according to percentage of income spent on housing. Cost-burdened households spend more than 30% of their income on housing. However, recent studies have indicated that a more holistic approach that considers the affordability of other household expenditures beyond the cost of housing alone is more accurate. Tools such as the Family Budget Calculator, prepared by the Economic Policy Institute, can be used to determine affordability.

Analysis

Toxic Substances

There are known risks associated with substances such as lead, asbestos, mold, and other contaminants that are often present in older homes. In 1978, the United States banned the consumer use of lead-based paint.[36] Structures built prior to the passing of that legislation tend to contain higher levels of lead than newer buildings. When lead-based paint begins to chip, exposure to the substance increases and presents a hazard. Additionally, these homes may contain plumbing components made from lead which can infuse drinking water with the substance. Children are especially at-risk for lead poisoning, although people of all

[36] (Protect Your Famly from Exposures to Lead 2019)

ages may face serious health problems when exposed to lead. Of the 1,636 housing units identified in Fowler as part of the 2016 Fresno County Multi-Jurisdictional Housing Element, 965 units were built prior to 1980 meaning that more than half (59%) of the housing units are likely at-risk for containing lead-based paint.

Asbestos is a fiber that occurs in rock and soil and has been used in a wide range of building construction materials and manufactured goods, including products like shingles, floor tiles, heat-resistant fabrics, and automobile parts.[37] Primarily, exposure occurs only after disturbance or damage releases the asbestos fibers into the air. While asbestos is not banned, legislation has granted the EPA greater oversight of products that contain the fiber and partially ban asbestos in certain products.[38] Asbestos causes three major health effects: lung cancer; mesothelioma; and asbestosis, a long-term, non-cancer lung disease.[39] Homes in a state of disrepair can put residents at greater risk for asbestos exposure. This is especially true for older homes, as regulation of asbestos has increased over time.

While mold is not usually a problem indoors, excessive moisture combined with poor ventilation can increase the possibility of mold in homes. Molds can produce allergens and irritants that can cause health problems, especially for more sensitive populations such as those with mold allergies or asthma. Mold can also cause allergy symptoms for people who are not allergic.[40] Older housing stock with poor ventilation tends to experience excessive moisture build-up and conditions conducive to mold growth.

Rodents and Pests

Rodents and other pests, aside from being a nuisance, can also contribute to unsafe housing conditions. While rodents may carry viruses or bacteria that cause diseases in humans, other pests like insects and cockroaches can carry allergens and trigger asthma attacks. Pest invasion is more likely to occur in older or run-down homes that are more susceptible to such an invasion. There were no problem areas for pests identified in Fowler.

Overcrowding

Overcrowded housing units increase health and safety concerns for the community. Additionally, highly overcrowded areas put increased stress on the condition of housing stock and infrastructure. The California Department of Housing and Community Development defines overcrowding as a unit occupied by more than 1.01 persons per room, not limited to bedrooms but excluding bathrooms and kitchens. Severely overcrowded units are occupied by more than 1.5 persons per room.[41] Overcrowding tends to result from a lack of affordable housing or units of adequate size and can impact both owners and renters, though renters tend to be impacted more significantly.[42] The incidence of overcrowded units in Fowler is broken down in Table 2: Overcrowding in the City of Fowler.

[37] (Learn About Asbestos 2018)
[38] (EPA Actions to Protect the Public from Exposure to Asbestos 2019)
[39] (Learn About Asbestos 2018)
[40] (Mold and Health 2018)
[41] (Fresno Multi-Jurisdictional 2015-2023 Housing Element 2015)
[42] (Fresno Multi-Jurisdictional 2015-2023 Housing Element 2015)

Table 2: Overcrowding in the City of Fowler[43]

	Owner-Occupied Units		Renter-Occupied Units		Total	
	Overcrowded	Severely Overcrowded	Overcrowded	Severely Overcrowded	Overcrowded	Severely Overcrowded
Units	91	36	111	8	202	44
Percent	10.3%	4.1%	15.0%	1.1%	12.4%	2.7%

Housing Affordability

When households are cost-burdened they have fewer resources to put towards other living expenses such as healthcare or healthy food. Additionally, a restricted budget also restricts housing choice, meaning cost-burdened households are also more likely to be subjected to unsafe housing conditions and overcrowding. Housing farther from commercial and employment centers that is more affordable may also increase transportation costs. Lower-income households and renters tend to be more affected by high housing costs. There are two affordable housing complexes in Fowler: Magill Terrace and Ruby Court Apartments. Fresno County also operates programs designed to help rehabilitate single- and multi-family residences, connect residences to utilities, and assist in first-time home-buying. Housing affordability is broken down by income and tenure in Table 3: Housing Affordability in Fowler.

Table 3: Housing Affordability in Fowler[44]

Income Group	Owner Households			Renter Households			Total Households		
	Households	Overpaying[2]	Percent	Households	Overpaying	Percent	Households	Overpaying	Percent
Lower Income[1]	248	121	48.9%	464	334	72.0%	712	455	63.9%
Total	823	259	31.5%	678	344	50.7%	1,501	603	40.2%

1. *Where Lower Income applies to households earning 80% or less of the median household income for the County.*
2. *Where paying more than 30% of household income is considered overpaying.*

The Housing and Transportation Affordability Index determines the percent of income spent on both housing and transportation. According to the Housing and Transportation Affordability Index, Fowler residents spend more than half their income on housing and transportation. Specifically, a regional-typical household of 3.17 people with an income of $45,233 annually spends 56 percent of its income on housing and transportation: approximately 25 percent on housing and 32 percent on transportation.[45] A more moderate income assumption of $36,186 annually means households spend 65 percent of their income on housing and transportation: approximately 31 percent on housing and 35 percent on transportation.[46] 32.5 percent of households in Fowler earn less than $36,000 annually, suggesting that 32.5 percent of households are cost-burdened when using the typical standard of spending at least 30 percent of income on housing as a threshold.[47]

[43] (Fresno Council of Governments 2015)
[44] (Fresno Council of Governments 2015)
[45] (Center for Neighborhood Technology 2019)
[46] (Center for Neighborhood Technology 2019)
[47] (City of Fowler 2019)

Summary and Recommendations

Factor	Summary	Recommendation
Toxic Substances	There is likely some occurrence of toxic substances, including lead, asbestos, and mold in Fowler's housing stock, based on its age. When these homes are in a state of disrepair, exposure to these toxic substances tends to increase, also increasing the associated health risks.	Increase awareness of warning signs for presence of toxic substances.
Rodents and Pests	There is no known problem with rodents or pests in the City of Fowler.	No action required.
Overcrowding	There is some occurrence of overcrowding in Fowler, especially among low-income and renting households.	Encourage construction of affordable housing units and housing that can accommodate larger and multi-generational households.
Affordability	Approximately 32.5% of households in Fowler are cost-burdened and spending more than 30% of their income on housing.	Increase awareness of and participation in affordable housing programs and programs that assist in off-setting other living costs such as food and transportation. Encourage construction of affordable housing units.

PHYSICAL ACTIVITY

ACTIVE TRANSPORTATION
Active transportation refers to forms of transportation that are non-motorized, thus promoting physical activity.

The way we plan our cities impacts a community's ability to engage in physical activity. A city's open space and transportation network shapes its access to formal and informal recreation opportunities, which in turn impacts public health. In addition, because low income communities are more likely to depend on transit, walking, and bicycling for their transportation methods, promoting physical activity through active transportation policies not only provides health benefits but contributes to social equity as well. Therefore, an environmental justice framework on physical activity analyzes both the reach of active transportation networks and the distribution of parks and open space.[48]

Methodology

In order to evaluate Fowler's level of access to physical activity, it is necessary to establish the location of park and recreation facilities and the quality of its active transportation system. Best practices for environmental justice planning suggest utilizing several indicators to asses active transportation facilities and access to parks and open space:[49]

Indicators to assess pedestrian networks and bicycle facilities within a community:

- Accessibility per Americans with Disabilities Act (ADA) Standards and sidewalk hazards—path of travel, crosswalks, and curb ramps
- Bicycle and pedestrian collision locations and other traffic hazards

[48] (California Environmental Justice Alliance, Placeworks 2018)
[49] (California Environmental Justice Alliance, Placeworks 2018)

- Public realm amenities—trash receptacles, benches, shade/shade structures, and lighting
- Landscaping—trees, landscaping, and shading along pedestrian routes
- Bicycle and pedestrian routes, facilities, infrastructure and connectivity
- Playing fields and spaces allowing for activities that are reflective of local community preferences

These indicators require an in-depth visual assessment, which is not part of the scope of this policy paper. A separate assessment effort is recommended as a next step in the General Plan update effort.

Indicators to assess the distribution of facilities conducive to physical activity:

- Accessibility to parks, open space, and/or recreation facilities by walking within half-mile distance, bicycling, driving, and transit
- Available amenities at each existing park, open space, and recreation facility
- Park acres per 1,000 residents

Analysis

Recreation Facilities, Parks, Open Space, and Trails

There are currently four City parks in Fowler, all of which are managed by the Department of Parks and Recreation. Of these four parks, two are facilities conducive to physical activity, mainly due to size. Panzak Park is approximately 2.5 acres and includes a covered picnic area, large shade trees, playground equipment, and tennis courts. The recently developed Donny Wright Park covers an area of approximately six acres and includes an expanse of irrigated lawn and trails for recreation. Margaret Cowings Park is an approximately 0.05-acre pocket park with an irrigated lawn and shade trees located on N. 9th Street between Merced and Tuolumne. Due to its size, Margaret Cowings Park is not considered a facility conducive to physical activity. Also considered a City park but not conducive to physical activity, the Fowler Veteran's Monument covers an area of approximately 0.1 acres and includes benches on paved surfaces, a fountain, several flag poles, ornamental hedges, and rose gardens. While not yet constructed, an eight-acre sports park west of SR 99 is in the planning and development stage. There are no State or regional parks located in the planning area. The City currently has a policy to develop 3.0 acres of park space for every 1,000 residents. While there can be many factors when calculating this ratio, for the purposes of this report, park space per 1,000 residents was calculated by totaling the acres of parks conducive to physical activity and dividing it by total residents, expressed per thousand. Based on California Department of Finance estimates, as of January 1, 2019 Fowler's population is 6,605. The two existing parks conducive to physical activity total 7.83 acres, for a ratio of 1.20 acres of park space per 1,000 residents. Once the eight-acre sports park is constructed west of SR 99, there will be a total ratio of 2.44 acres per 1,000 residents.

The City also has a memorandum of understanding in place with the Fowler Unified School District for the use of school facilities after hours for youth sports and community recreation. The City provides the School District funds from its utility users account intended for supplementary maintenance to school facilities related to the added usage.

Transit and Active Transportation Facilities

As shown in **Figure 15: Physical Activity Accessibility Map,** the City of Fowler is bisected by State Route (SR) 99, which is the major north/south transportation and goods movement route through the San Joaquin Valley. While SR 99 provides three entry/exits points for the City, it acts as a dominant physical barrier, separating the east and west sides of the City. Most land area within the Fowler City limits lies on the east side of the freeway; however, substantial residential land uses exist west of SR 99. Only Merced Street, Adams Avenue, and Manning Avenue provide access across the highway, limiting the flow of automobile, bicycle, and pedestrian traffic between the east and west sides of Fowler.

While there have been some recent additions to bicycle and pedestrian facilities, the City does not have an extensive system of bike lanes, bike paths, or walking trails. The ease of bicycling, walking and driving in Fowler varies depending on the area. The downtown area is more walkable due to its short blocks, moderate density, occurrence of mature trees for shading, and the proximity of a variety of destinations. In addition, there is a class II bicycle lane along Adams Avenue from Vista to Temperance and Golden State Boulevard. The disconnected nature of bicycle and pedestrian infrastructure in Fowler discourages its use as a form of active transportation.

BIKE LANE CLASSIFICATIONS

Class I: Completely separated right of way for exclusive use of cyclists and pedestrians.

Class II: On-Street striped lane for one-way bike travel.

Class III: Shared on-street facility, commonly identified by pavement markings or signage.

Class IV Separated Bikeway: Physically separated bicycle facilities that are distinct from the sidewalk and designed for exclusive use by bicyclists. Also commonly known as cycle tracks.

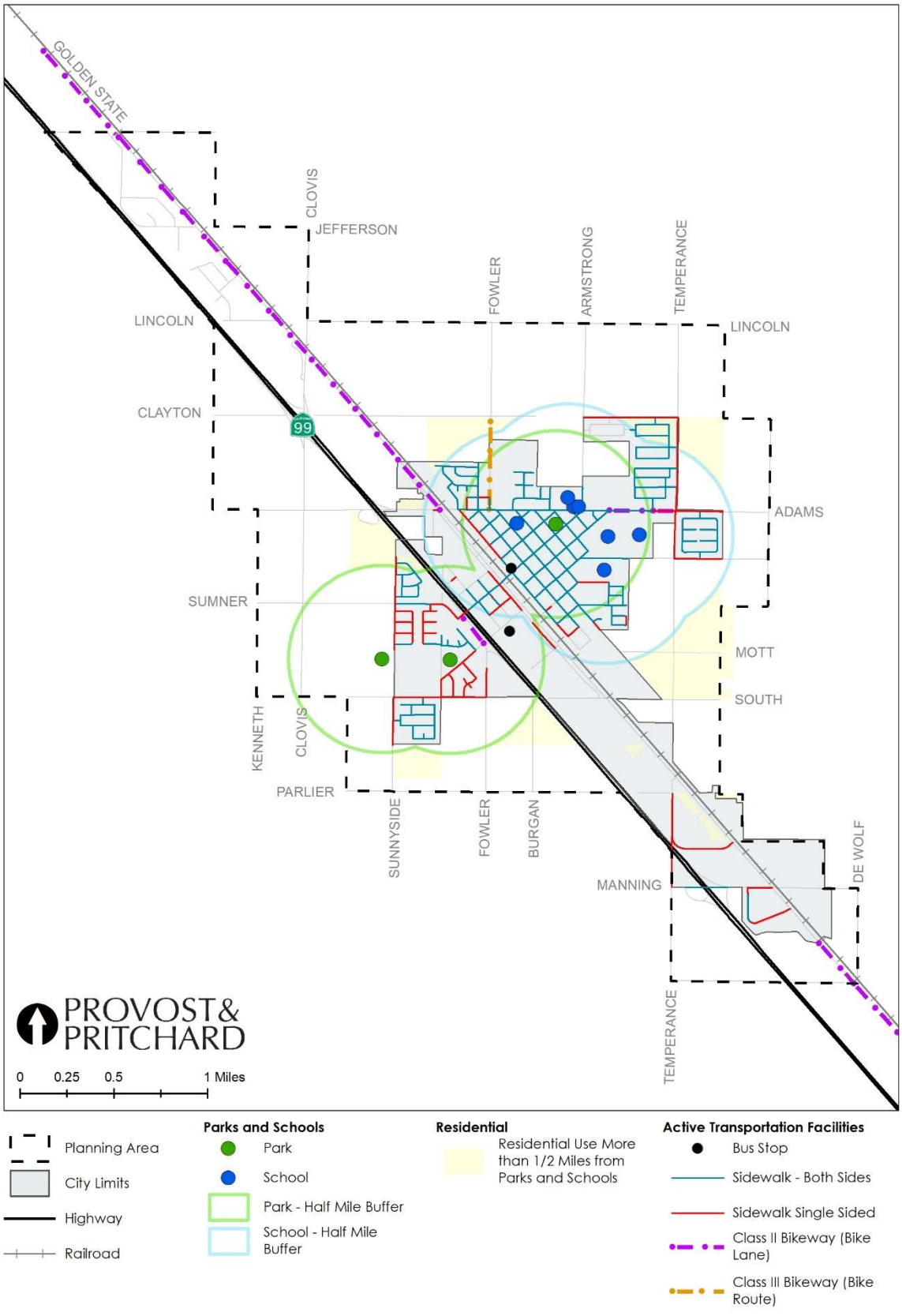
The Fresno Regional Active Transportation Plan (ATP), adopted by the Fresno COG Policy Board on February 22, 2018, identifies the following challenges which impact the safety and comfort of biking and walking in Fowler:

- Irregular intersections where the railroad grid creates challenges for bicyclists and pedestrians;
- Sidewalk gaps, high curbs, lack of curb ramps, and angled intersections on Adams Avenue; and
- Challenges crossing Merced Street at 10th Street due to proximity to SR 99 interchange ramps.

Public transit services are also limited. Transit service in Fowler is provided by The Fresno County Rural Transit Agency (FCRTA). FCRTA services, amenities, and routes are summarized in the above section titled Public Facilities.

The limited nature of transit service in the planning area reduces the likelihood that residents will use transit and other forms of active transportation as a viable means of travel. Increasing availability of transit services and establishing bike and pedestrian infrastructure leading to and from transit stops will increase social equity and expand opportunities for physical activity in Fowler. **Figure 15: Physical Activity Accessibility Map** provides an overview of the City of Fowler's distribution of and access to facilities conducive to physical activity, including parks, open space, and recreation facilities as well as its active transportation network. In order to establish whether residents have access to these locations by foot, ½-mile buffers were established around each park or school. Residential land uses shown on this map are those residences which fall outside of that ½ mile buffer. By isolating these residential uses, it is possible to see which homes are located outside of a walkable distance as well as which of those residences have access to pedestrian infrastructure.

Figure 15: Physical Activity Accessibility Map



Summary and Recommendations

1. There are substantial residential land uses on the west side of SR99, while most schools, destinations, and City amenities are located east of SR99. **Prioritize pedestrian-friendly infrastructure linking the east and west sides of the city.**
2. Bicycle and pedestrian friendly infrastructure is limited within the planning area. **Prioritize the construction of this infrastructure in locations that will close key gaps and link residential uses with schools, shopping, entertainment, recreational and employment centers within the planning area.**
3. Transit services are limited within the planning area. **Facilitate additional transit stops and prioritize active transportation infrastructure leading to and from transit stops.**
4. While the physical activity mapping effort identified the location of bicycle and pedestrian infrastructure, it does not reflect quality assessments or identify whether these facilities incorporate design elements which make walking or biking a comfortable or viable mode of travel, nor does it assess adherence to current ADA standards. **In order to determine the efficacy of existing active transportation improvements, a visual quality assessment of bike and pedestrian facilities should be conducted.** This survey should also evaluate access to healthy food outlets, as recommended in the **Food Access** section of this report.

CIVIL ENGAGEMENT

A core part of environmental justice is listening to the people who are most impacted. The most effective community engagement strategies represent all stakeholders, including those who are directly impacted and the public at large.

The current procedures employed in public engagement in the City of Fowler present some challenges to participation, especially for DACs. Nearly all public meetings are held in the City Council chambers. This is in part due to the fact that there are only a few large public meeting spaces available in Fowler. City Hall may be inaccessible for those without a personal vehicle living on the edges of town. Meetings are often held at 4 P.M., which is not conducive to many work schedules. It is also difficult for many people to find information about meeting dates and times, as the information is primarily posted on the City website. People without consistent access to the internet or knowledge about where to find meeting schedules are likely to be unaware of important public engagement events. Finally, the City rarely offers childcare and bilingual services, which may exclude parents of young children and individuals with limited English skills from participating.

Summary and Recommendations

1. Meeting times and locations may not be conducive to public participation. **Reassess meeting times and locations to ensure the majority of stakeholders are able to attend.**
2. Language barriers and childcare needs may prevent residents from participating in public meetings. **Provide childcare and bilingual services at meetings so parents and individuals with limited English skills are able to participate.**

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Appendix B
Climate Adaptation Policy Paper & Vulnerability Assessment

CITY OF FOWLER
GENERAL PLAN UPDATE
APRIL 2020

CITY OF FOWLER
California

CLIMATE ADAPTATION POLICY PAPER & VULNERABILITY ASSESSMENT

GENERAL PLAN UPDATE

APRIL 2020

Prepared For:

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An Employee Owned Company

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PURPOSE

The purpose of this policy paper is to provide an overview of new general plan requirements, as outlined by Senate Bill (SB) 379, which require cities and counties to address the impacts of climate change in their communities. This paper will review the scientific context of climate change, the requirements of SB 379, and provide a vulnerability assessment: a five-step process that establishes the climate change exposures Fowler will face, summarizes likely impacts, and reviews risk and onset of each impact. The information in the vulnerability assessment will provide the basis for climate adaptation policy recommendations to be considered during the general plan update process.

BACKGROUND

SCIENTIFIC CONTEXT

The earth's climate has been warming for the past century. Scientific analysis of earth's historical climate shows that the climate system varies naturally over a wide range of timescales. In general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes. However, recent climate changes cannot be explained by natural causes alone.[1] It is understood that this warming trend is related to anthropogenic[2] releases of certain gases, known as greenhouse gases (GHG), into the atmosphere. GHGs absorb infrared energy that would otherwise escape from the Earth. As the infrared energy is absorbed, the air surrounding the Earth is heated. An overall warming trend has been recorded since the late 19th century, with the most rapid warming occurring over the past two decades.

Recent scientific analysis completed by the Intergovernmental Panel on Climate Change (IPCC) confirms that human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history.[3] This has led to atmospheric concentrations of carbon dioxide, methane, and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.[3]

In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate.[4] Some of these impacts include changes in

[1] (United States Environmental Protection Agency, 2017)
[2] Resulting from the influence of human beings.
[3] (Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014)
[4] (Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014)

extreme weather, precipitation, and melting snow which affect water resources, impact crop yields, and change wildlife geographic ranges and migratory patterns.[5]

Even after implementing measures to minimize how much the climate will change, communities around the world will experience new challenges due to the shifting climate. These impacts will vary from place to place, as will their intensity. In order to prepare for these changes, communities must determine what impacts they are most likely to face.

LEGISLATIVE CONTEXT (SENATE BILL 379)

In an effort to prepare for and mitigate climate change related impacts, new laws governing land use planning efforts have been enacted. SB 379 was passed in October of 2015 in reaction to increasing evidence that global climate change will have lasting impacts on the health and well-being of communities around the world.

SB 379 REQUIREMENTS

Long range planning documents must integrate climate adaptation and resiliency strategies, including:

1. **A vulnerability assessment** that identifies the risks climate change poses to the local jurisdiction and the geographic areas at risk from climate change.
2. **A set of adaptation and resilience goals, policies, and objectives** based on the information specified in the vulnerability assessment.
3. **A set of feasible implementation measures** designed to carry out the goals, policies, and objectives identified in the adaptation objectives.

SB 379 requires cities and counties to address climate change impacts either through their local hazard mitigation plan (LHMP) or general plan safety element. Jurisdictions must incorporate climate adaptation into their safety element once an LHMP is adopted on or after January 1, 2017, or, if they do not have an adopted LHMP, the safety element must be updated before January 1, 2022. These updates must include goals, policies, and objectives to address climate resilience in response to likely climate change vulnerabilities. These goals, policies, objectives, and implementation measures are based on a required vulnerability assessment. The vulnerability assessment will identify the risks that climate change poses to the jurisdiction by analyzing projected climactic shifts and the vital services, functions, and populations put at risk by those changes.

MITIGATION -VS- ADAPTATION

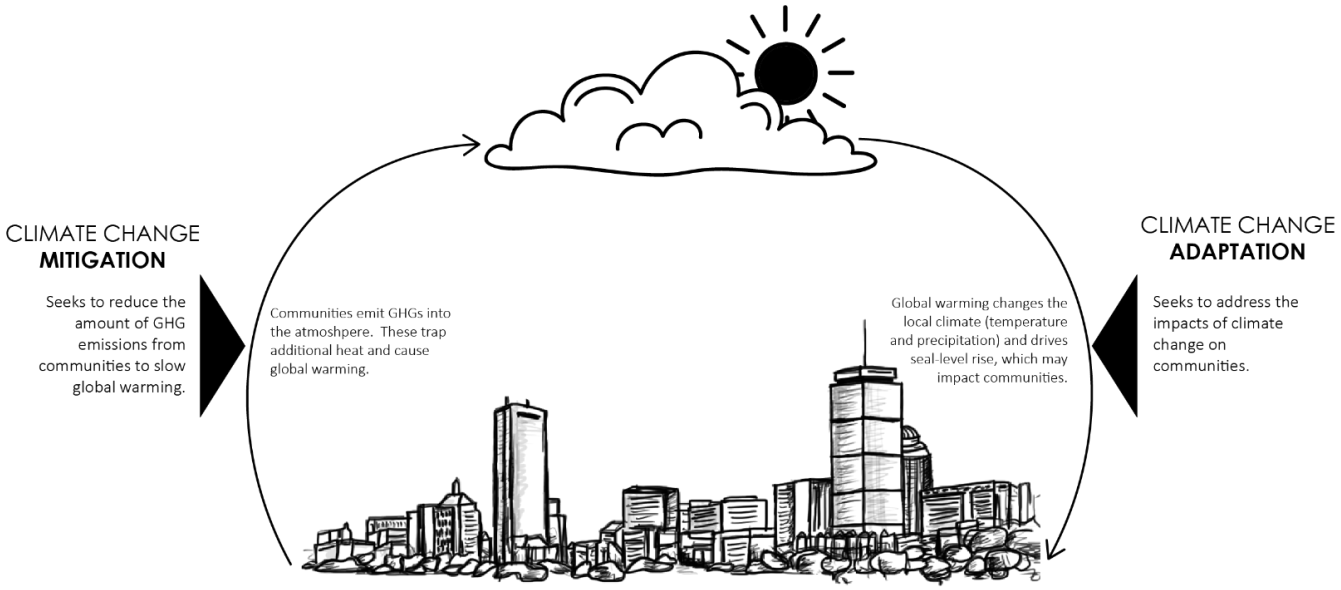
In the wake of new legislation pertaining to climate adaptation, it is necessary to distinguish the types of planning efforts undertaken to address climate change. Local planning efforts address climate change in two separate yet related ways. The first is through the reduction of greenhouse gas (GHG) emissions, also known as mitigation. The second is through adaptation planning, which is the subject of this policy paper. While these efforts are often pursued in parallel, there is a distinct difference between mitigation and adaptation. The purpose of mitigation is to slow the overall effects and consequences of climate change by reducing the amount of GHGs released into the atmosphere. Adaptation planning seeks to address the impacts of climate change on the vital structures, functions, and populations within a specific jurisdiction.

[5] (Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014)

Adaptation planning assesses climate change risks and provides coping strategies to help communities adapt to the changing environment regardless of how effectively GHG emissions may be curbed.

These parallel planning efforts are also handled through two different regulatory landscapes. Mitigation is often dealt with through environmental compliance documents regulated by the California Environmental Quality Act (CEQA), while adaptation planning is addressed through long range planning documents such as local hazard mitigation plans (LHMPs), general plans, or climate action plans.

Figure 1: Climate Change Mitigation -vs- Adaptation



(California Emergency Management Agency, California Natural Resources Agency, 2012)

CLIMATE ADAPTATION PLANNING PROCESS

The primary resource outlining best practices for climate adaptation planning is the California Adaptation Planning Guide (APG). The APG was developed by the California Emergency Management Agency (CEMA) and the California Natural Resources Agency (CNRA) in order to help guide climate adaptation planning at the local level. The guide is a four-part series which introduces the basis for climate adaptation planning, provides a step-by-step process for conducting local vulnerability assessments, and outlines strategies for creating local adaptation plans. The APG breaks down climate adaptation planning into nine distinct tasks categorized into two phases, as shown in Figure 2: Adaptation Planning Development.

Figure 2: Adaptation Planning Development

(California Emergency Management Agency, California Natural Resources Agency, 2012)

Phase one of this process is conducting a vulnerability assessment. The vulnerability assessment will identify:

1. ***Exposure*** the community will experience due to the effects of climate change.
2. ***Sensitivity*** of key community structures, functions, and populations that are potentially susceptible to each exposure.
3. ***Potential Impacts*** likely to occur to the structures, functions, and populations within a community due to climate change exposures.
4. ***Adaptive Capacity*** of the community, or its ability to cope with and address projected impacts.
5. ***Risk and Onset***, including necessary adjustments to address the likely occurrence and timing of the projected impacts.

These first five steps are covered in this paper and inform its structure.

Phase two of the planning process is known as adaptation strategy development. This process includes steps six through nine:

6. ***Prioritize Adaptive Needs*** based on the findings in the vulnerability assessment.
7. ***Identify Strategies*** to address the highest priority adaptation needs.

8. ***Evaluate and Prioritize*** those strategies based on the projected onset of the impacts, cost, co-benefits, and feasibility.
9. ***Phase and Implement*** adaptation strategies and develop a monitoring system to assess effectiveness.

As noted in the **Purpose** section above, climate adaptation strategies identified during phase two (steps six through nine) will be addressed during future stages of the general plan update process. The adaptation strategies will result in climate adaptation policy recommendations to be considered in the general plan update. The information contained in phase one, the vulnerability assessment, will provide the data and research basis for those recommendations

UNDERSTANDING THE EFFECTS OF CLIMATE CHANGE

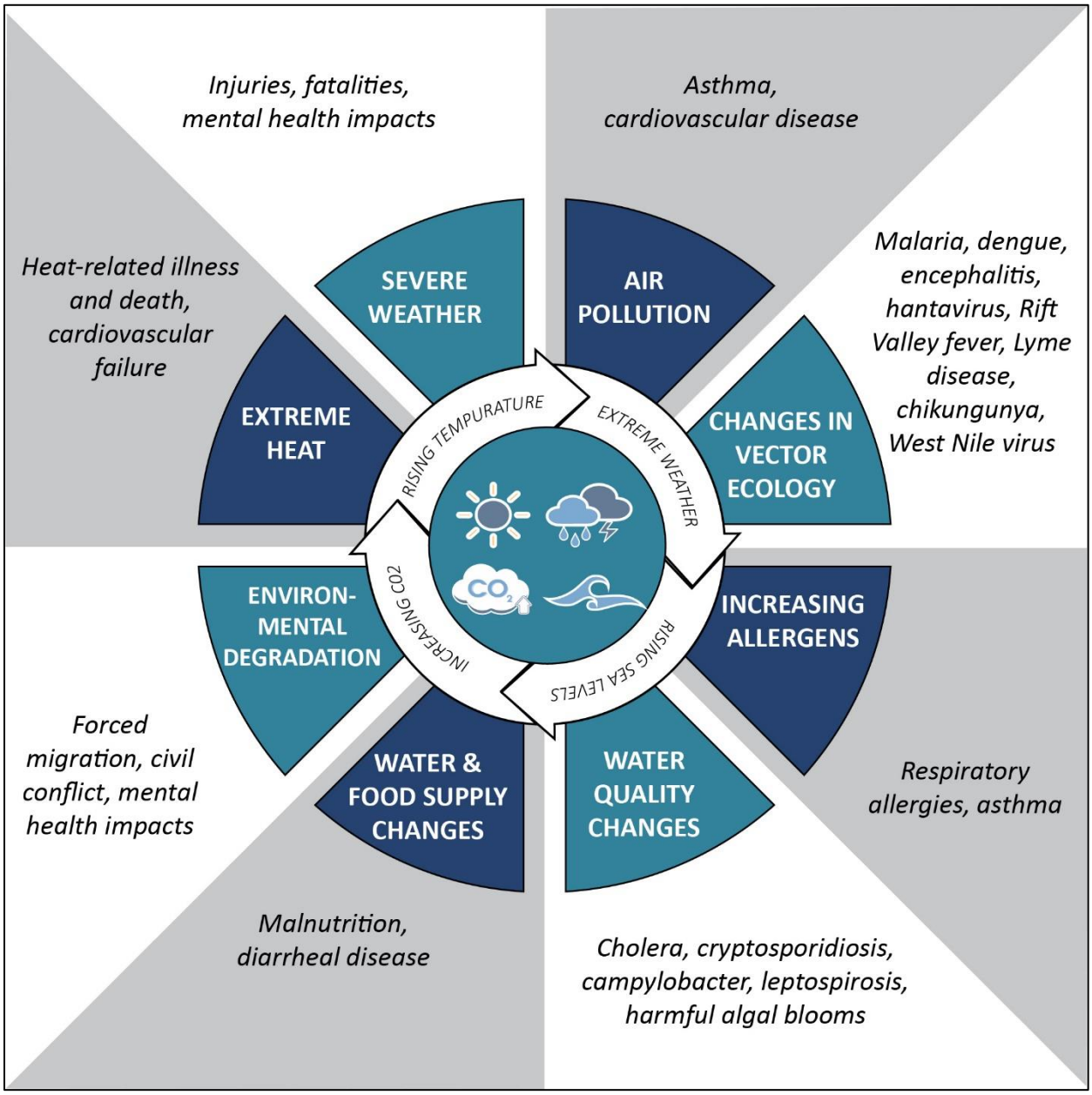
The discussions in this report provide descriptions of both primary and secondary effects of climate change. Primary effects result from direct exposures such as temperature and precipitation changes, sea level rise, and the occurrence of severe storms. Secondary effects occur as a result of primary effects, and may include phenomenon such as heat waves, changed seasonal patterns, and coastal erosion. A list of primary effects and commonly associated secondary effects may be seen in **Table 1: Primary Versus Secondary Effects of Climate Change.** Public health impacts must also be evaluated in order to determine and prioritize the adaptive needs of a community. The relationship between associated health effects of climate change is illustrated in **Figure 3: Associated Effects of Climate Change on Human Health**.

Table 1: Primary Versus Secondary Effects of Climate Change[6]

Primary Impact	Associated Secondary Impacts
Sea level rise	Inundation or long-term waterline change
	Coastal Erosion
	Extreme high tide
	Saltwater intrusion
Changed temperature/precipitation patterns/severe storms	Changed seasonal patterns
	Wildfire
	Drought
	Reduced Snowpack
	Heatwaves
	Landslide

[6] (California Emergency Management Agency, California Natural Resources Agency, 2012)

Figure 3: Associated Effects of Climate Change on Human Health



(Federal Centers for Disease Control)

METHODOLOGY AND DATA SOURCES

In California, Cal-Adapt provides climate change predictions downscaled to the most appropriate jurisdictional level, producing data for a number of potential exposure types under different climate scenarios. Nationwide and regional climate reports predicting potential climate change effects were used to supplement Cal-Adapt data and additional state and local documents were utilized to help determine the effects of climate change in Fowler.

CAL-ADAPT

This policy paper primarily considers peer-reviewed climate change data from Cal-Adapt, a web-based, interactive visualization tool that synthesizes climate research into a series of charts, maps, and data points of observed and projected climate variables for California. Cal-Adapt was developed by UC Berkeley's Geospatial Innovation Facility and funded and advised by the California Energy Commission and California Strategic Growth Council. Cal-Adapt is particularly useful for identifying localized climate change predictions. Most climate change data exist on a global scale and are brought to the local level through a process called downscaling. Cal-Adapt downscales for several boundaries related to environmental, census, and planning regions. This report uses the incorporated and census designated place boundary of Fowler whenever downscaling is appropriate.

Cal-Adapt uses two climate change scenarios, called Representative Concentration Pathways (RCP). RCP 4.5 is a moderate scenario where GHG emissions are curbed and peak in 2040. RCP 8.5 assumes emissions continue as usual and rise throughout the 21st century. Because Cal-Adapt considers both scenarios to be equally likely, both are discussed in this report. Cal-Adapt combines several models to form its pathway predictions. How the climate will change depends on human action and feedback loops, so averaging models helps to account for this uncertainty. More information about the models can be found on the Cal-Adapt website. The charts used in this report to demonstrate trends and the variation between scenarios use only the average simulation for ease of reference.

SUMMARY REPORTS

This report also considers analysis from climate change experts. While Cal-Adapt can provide powerful insight to how the climate will change in a particular place, it cannot explain how those changes will impact the structures, functions, and populations of that place. To better understand the potential impacts on these features in Fowler, Cal-Adapt data was supplemented with national and state summary documents, which provided additional analysis on how these exposures may impact Fowler and the region.

The Fourth National Climate Assessment first identifies climate change impacts the United States is likely to face. It then narrows its scope to discuss what will impact various regions. Fowler is located in the Southwest region, consisting of California, Nevada, Utah, Colorado, Arizona, and New Mexico. The regional

predictions of climate change impacts outlined in the Fourth National Climate Assessment help to bridge the gap between how the climate will change, as documented through the Cal-Adapt tool, and what impacts it will have on life in the Southwest region.

This vulnerability assessment also considers documents produced by California State agencies. California's Fourth Climate Change Assessment Statewide Summary Report identifies which climate changes California is most susceptible to and which populations are likely to be affected. Other reports provide more specialized analysis for specific regions, such as the Climate Change and Health Profile Report for Fresno County, prepared by the California Department of Public Health.

VULNERABILITY ASSESSMENT

As described in the above section titled **Climate Adaptation Planning Process**, Fowler must conduct a vulnerability assessment to:

1. Determine what effects of climate change are likely to occur in Fowler;
2. Identify sensitive structures, functions, and populations within the City;
3. Determine likely impacts;
4. Evaluate current capacity to adapt to the shifting climate; and
5. Assess the risk and onset of the impacts likely to occur.

The topics in the following sections include these five steps and, together, make up the vulnerability assessment for the City of Fowler.

EXPOSURE ASSESSMENT

The City of Fowler, located in the southern San Joaquin Valley, will be exposed to a variety of natural hazards that are likely to become more frequent and severe due to climate change. Primarily, Fowler will face temperature and precipitation changes, but severe weather and wildfire will also be of concern.

The following exposures are divided into primary and secondary effects, while the individual topics addressed in each category are primarily organized around those identified in the Cal-Adapt tool.

RELATIVE CONCENTRATION PATHWAYS (RCP)

Cal-Adapt uses two climate change scenarios, called Representative Concentration Pathways (RCP). **RCP 4.5** is a moderate scenario where GHG emissions are curbed and peak in 2040. **RCP 8.5** assumes emissions continue as usual and rise throughout the 21st century. Both scenarios are considered equally likely and thus are both discussed in this report.

Where possible, each exposure was evaluated under both the RCP 4.5 and RCP 8.5 Scenarios.

Primary Effects of Climate Change

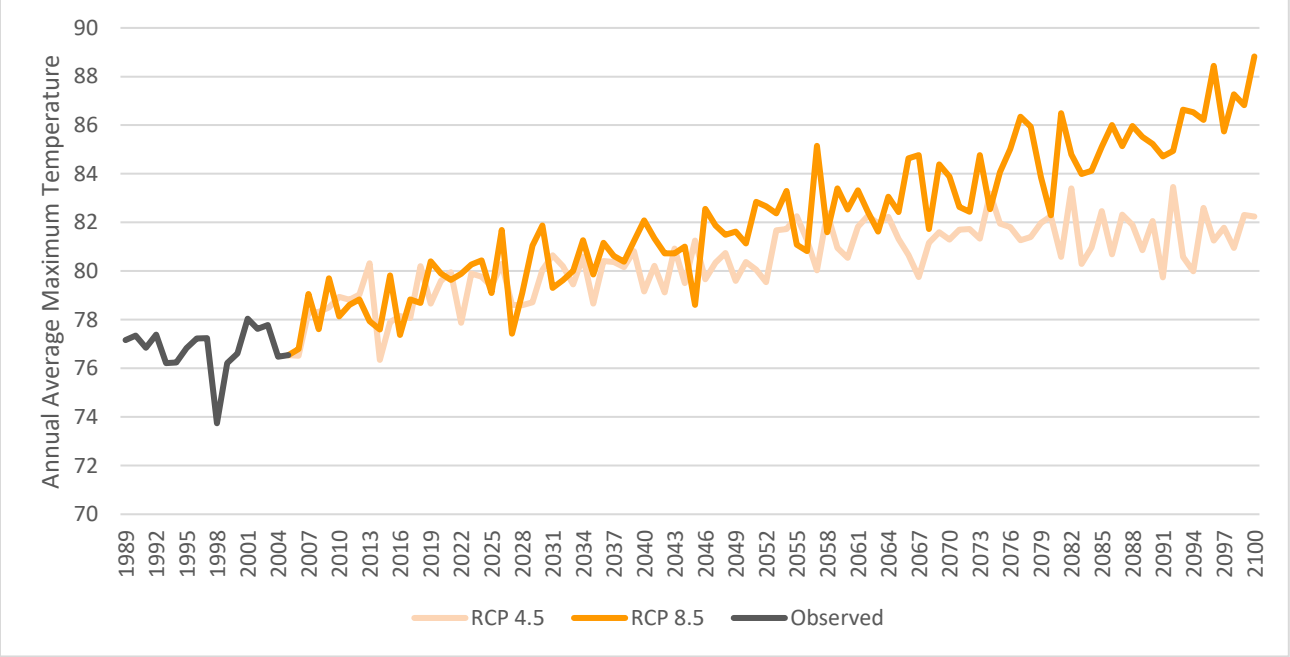
Sea Level Rise

Fowler is in the San Joaquin Valley of California, deeply inland and surrounded by mountain ranges. Thus, it is unlikely to experience direct effects from sea-level rise. However, secondary effects of rising sea levels, such as population change, shifting job markets, and increased need for healthcare, may still affect Fowler. Although sea-level rise cannot be ignored as an impact for California, Fowler itself has low exposure to this effect of climate change.

Temperature Increase

Between 1961 and 1990, the average annual temperature in Fowler was approximately 76.5°F. The average temperature is expected to rise significantly in the coming decades. Between 1961 and 1990, the average annual temperature was approximately 76.5°F. The overall increase will depend on how much carbon is released into the atmosphere. In a low-emissions scenario, average annual maximum temperature will likely rise to around 82°F by 2099. If emissions are not curbed, it is likely that annual average maximum temperature in Fowler will increase to around 85°F.[7] **Figure 4: Predicted Annual Average Maximum Temperature in Fowler** demonstrates the expected increases in average maximum temperature for both scenarios. There is a high certainty that Fowler will be exposed to increasing average temperature.

Figure 4: Predicted Annual Average Maximum Temperature in Fowler[8]



[7] (Geospatial Innovation Facility and California Energy Commission, 2020)
[8] (Geospatial Innovation Facility and California Energy Commission, 2020)

Changing Precipitation

The San Joaquin Valley region as a whole will experience declines in annual precipitation of 1-2 inches by the year 2050 and as much as 3.5 inches by 2100. Areas of higher elevation are expected to experience precipitation declines up to 10 inches.[9] Under the RCP 4.5 scenario, the City of Fowler's expected minimum precipitation rates may decline from 6.7 inches per year to 2.1 inches from 2020 to 2040 and 3.3 inches per year through the last half of the century. Under the 8.5 RCP scenario, minimum precipitation rates may decline to 4.6 and 3.0 inches per year from 2020 to 2040 and 2040 to 2099, respectively. While minimum precipitation rates are likely to decline, maximum precipitation rates may increase, leading to relatively stable average precipitation under both scenarios. A summary of these scenarios can be seen in **Figure 5: Annual Average Precipitation under the RCP 4.5 Scenario** and **Figure 6: Annual Average Precipitation under the RCP 8.5 Scenario** below.

Figure 5: Annual Average Precipitation under the RCP 4.5 Scenario

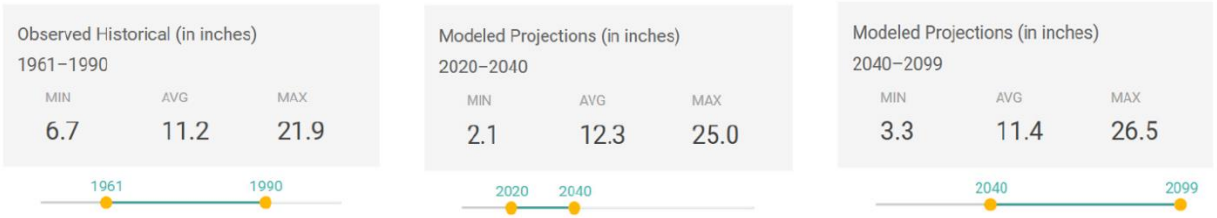
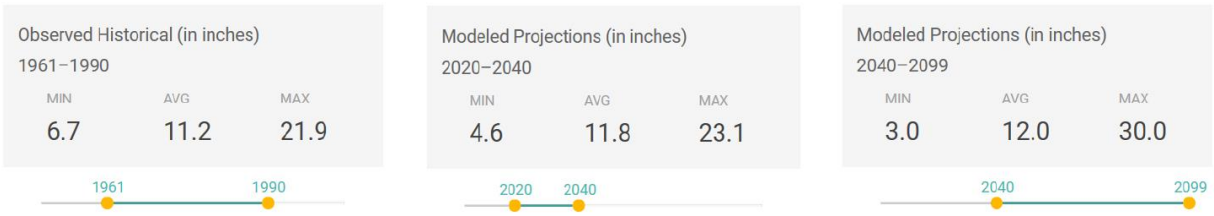


Figure 6: Annual Average Precipitation under the RCP 8.5 Scenario



Secondary Effects of Climate Change

Drought, Snowpack and Water Supply

The state of California has seen temperatures increase steadily since 1895, with accelerated warming rates since the 1970s.[10] As winter temperatures increase, freezing elevations[11] have risen by approximately 500 feet and winter chill time has decreased.[12] These warming trends have led to more and more mountain

[10] (California Department of Water Resources, n.d.)
[11] The freezing elevation is the altitude at which the temperature is at 0 °C (32°F).
[12] (California Department of Water Resources, n.d.)

precipitation falling as rain instead of snow, decreasing snowpack and causing snowmelt to occur earlier in the year.[13]

In very dry years, the possibility of drought will become a more frequent reality. Drought is a gradual phenomenon, occurring slowly over a period of time, and is defined based on impacts to water users.[14] California's extensive system of water supply infrastructure can mitigate the effects of a short-term dry period, but the changing climate will stress jurisdictions' ability to meet their longer-term water needs.[15] In addition, as precipitation decreases, soil is more likely to become parched. Parched soil absorbs less water, increasing runoff and stressing water storage infrastructure, which may lead to dam failure and worsened drought conditions.

Extreme Heat

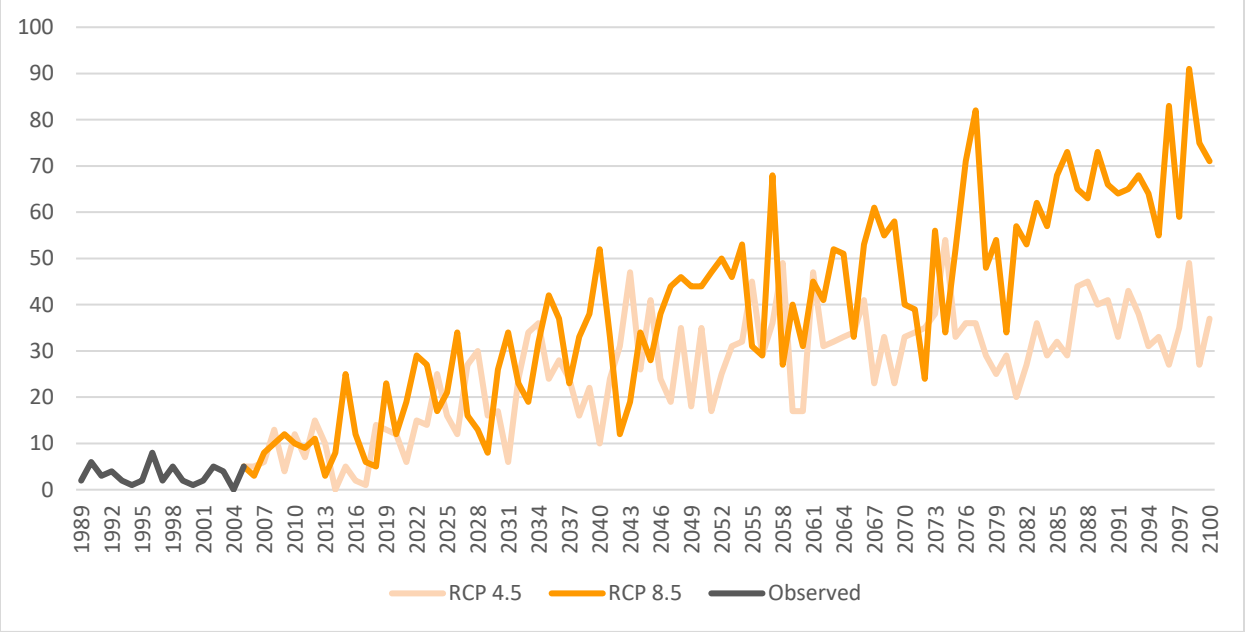
Both the frequency and severity of extreme heat events are increasing.[16] Intense heat is a hazard on its own, but it also increases the risk of other extreme weather such as wildfire or drought. Historically, the City of Fowler experienced, on average, four extreme heat days each year.[17] That number is expected to rise to 30 extreme heat days per year by 2099 in RCP 4.5 and to 46 extreme heat days per year in RCP 8.5 as shown in **Figure 7: Extreme Heat Days under the RCP 4.5 Scenario** and **Figure 8: Extreme Heat Day under the RCP 8.5 Scenario**. Future predictions are charted in **Figure 9: Predicted Annual Extreme Heat Days in Fowler**.

[13] (Fresno County, Amec Foster Wheeler, 2018)
[14] (California Department of Water Resources, n.d.)
[15] (Fresno County, Amec Foster Wheeler, 2018)
[16] (Center for Disease Control)
[17] From 1950-2000, where an extreme heat day is one when the maximum temperature is above 103.9°F, the 98th historical percentile of daily maximum/minimum temperatures based on observed historical data from 1961-1990 between April and October; (California Department of Water Resources, n.d.)

Figure 7: Extreme Heat Days under the RCP 4.5 Scenario

Figure 8: Extreme Heat Days under the RCP 8.5 Scenario

Figure 9: Predicted Annual Extreme Heat Days in Fowler[18]



Flooding

Natural floods are usually caused by weather events and can pose a substantial threat to property and human safety. Floods may also be caused by structural failures at reservoirs and dams. In some instances,

[18] (Geospatial Innovation Facility and California Energy Commission, 2020)

climate change will affect the likelihood of a structural failure due to a combination of drought and severe storm events. In addition to facing more intense rain events with higher than normal maximum precipitation, Fowler will also experience drought conditions which can contribute to parched soil, where the ground is less able to absorb water during storms and floods. Together, these phenomena may contribute to increased runoff during storm events and a decreased ability to contain stormwater, further stressing water storage infrastructure and increasing the likelihood of failure.

With the changing climate causing an increase in severe weather events, flooding may pose a greater risk than it has historically. A small portion of the City of Fowler is within the 100-year floodplain designated by FEMA. Due to its location primarily outside of flood zones, Fowler has little to no exposure to climate-related flood risks. The greatest risk for flooding in Fowler remains the Pine Flat Dam, located approximately 23 miles northeast of Fowler. Although increased drought conditions and other climate change effects have the potential to stress dam infrastructure, it is not anticipated that climate change would greatly impact the likelihood of the Pine Flat Dam failing.

Severe Weather

Severe weather includes any destructive weather event, such as fog, hail, and severe thunderstorms. The Fresno County Multi-Jurisdictional Hazard Plan identified the most common severe weather events as:

- Fog;
- Heavy rain, thunderstorms, hail, lightning, and wind; and
- Tornados.[19]

Fog

Fog occurrence in Fowler can be expected to decrease as a result of climate change. Already, warming temperatures have resulted in a significant drop in the number of fog days being recorded.[20] Fog limits visibility, which poses a distinct threat to drivers and pedestrians. While fewer fog days may be good for public safety, the warmer temperatures indicated by the decrease in fog may result in reduced agricultural productivity from many orchard crops.[21] Fowler is already exposed to fog that threatens public safety, but climate change is expected to decrease its occurrence. Decreased fog is a secondary effect of rising temperature, which is covered in the Extreme Heat section of this report.

Storms

Storms are characterized by heavy rain and are often accompanied by strong winds, lightning, and hail. These storms will likely increase in both frequency and severity. The number of rainy and snowy days in Fresno County is expected to increase from 25-40 days annually to 35-55.[22] These storms will carry greater amounts of precipitation and reach extreme levels more frequently as the climate continues to change. Fowler is likely to be exposed to more intense storms due to climate change.

[19] (Fresno County, Amec Foster Wheeler, 2018)
[20] (Fresno County, Amec Foster Wheeler, 2018)
[21] (Fresno County, Amec Foster Wheeler, 2018)
[22] (Fresno County, Amec Foster Wheeler, 2018)

Tornados

Historically, most tornados in Fresno County have been minor, registering as F0 or F1 on the Fujita scale.[23] Tornados can form in storms that have a certain type of wind shear, though meteorologists are unsure why only some of these storms generate tornados. An increase in the frequency of severe storms would increase the potential for tornado-generating conditions.[24] In 2007 the Fujita Scale was revised to reflect more accurate wind speed estimates. This is known as the Enhanced Fujita Scale. Should the County experience a tornado that registers as a four or five on the Enhanced Fujita scale, severe property and crop damage would occur. Loss of life would also be likely. Older and poorly constructed homes would experience the most damage and put those residents in the most risk for injury or death.[25] Fowler is likely to be exposed to more storms with tornado-generating strength, but exposure to tornados is not a primary climate change concern for the City.

FUJITA SCALE

The Fujita Scale determines tornado strength based on structural damage. The Enhanced Fujita Scale was implemented in 2007 and uses the same potential damage to produce more accurate wind speed predictions.

F0	Broken branches, sign damage
F1	Roof damage, mobile homes and cars shifted
F2	Roof torn off, cars lifted off ground, large trees uprooted
F3	Roof and some walls missing, most trees uprooted, cars thrown
F4	Houses leveled, large missiles generated and thrown 100+ yards
F5	Strong homes leveled, trees debarked, complete destruction

Wildfire

Wildfires occur primarily in areas with abundant fuel, so heavily forested areas are especially at risk. Although there is a threat of wildfire throughout Fresno County, the City of Fowler is at low risk and has not historically experienced fires.[26] Cal-Adapt models do not predict Fowler will experience wildfire in either RCP 4.5 or RCP 8.5. Still, fires may occur in areas with little risk and climate change is likely to increase the occurrence of wildfire throughout the state. Drought, rising temperatures, and a lengthening fire season will all increase the risk of wildfire in Fowler. Not only can drought increase the risk of fire, water shortages may also limit Fowler's ability to fight wildfires. Additionally, increased wind due to climate change, coupled with hot, dry conditions, can worsen fire risk.

Fowler is much more likely to be exposed to the indirect effects of wildfire, such as the release of smoke and air pollution capable of traveling long distances. As fire occurrence in the rest of the state increases, smoke and ash will likely cause Fowler to experience greater air pollution and decreased air quality. The San Joaquin Valley has experienced decreased air quality due to large fires burning in all parts of California.[27] Though Fowler is unlikely to be directly exposed to a wildfire, the City will be exposed to the effects of fires elsewhere in the state.

[23] (NOAA, 2014)
[24] (Fresno County, Amec Foster Wheeler, 2018)
[25] (Fresno County, Amec Foster Wheeler, 2018)
[26] (Fresno County, Amec Foster Wheeler, 2018)
[27] (San Joaquin Valley Air Pollution Control District, 2018-19)

Streamflow

Climate change is expected to cause streamflow to vary more frequently between extremely high and low flows. Because Fresno County and the San Joaquin Valley are located in a primarily arid climate, most streamflow in the region occurs in channelized and controlled streams. It is not expected that streamflow would vary to the extreme levels that it might in a natural stream, as it is already heavily controlled by man-made systems. Therefore, Fowler is unlikely to be exposed to changes in streamflow due to climate change.

SENSITIVE COMMUNITY ASSETS AND POTENTIAL IMPACTS

The next step in completing a vulnerability assessment is to create an inventory of sensitive community assets potentially affected by climate change exposures. Once an inventory of these assets is completed, likely impacts can be analyzed.

The impacts a community will face are the combination of climate change exposures and how those exposures affect sensitive community assets. Understanding both concepts is key to evaluating climate change impacts at a community level.

Sensitive Community Assets

When inventorying sensitive assets, the APG suggests sorting each asset into one of three categories:

1. Structures. Structures include critical infrastructure such as roads, communications systems, and utility systems including potable water, wastewater, natural gas, fuel, and electric power. Critical structures also include hazardous materials facilities and high potential loss facilities. These structures house toxic, flammable, explosive, and/or radioactive materials, and may include nuclear power plants, dams, military installations, industrial buildings, and other structures which critically impact the environment, public health, or safety in the event of damage.

2. Functions. The essential functions of a community include services that maintain government continuity and public safety, including emergency operations like healthcare, police, fire services, evacuation shelters, and schools. These functions are always important to the health and welfare of a community but are especially critical following climate-related hazard events.

3. Vulnerable populations. Often, the populations most sensitive to climate change exposures are those experiencing high levels of social vulnerability. Social vulnerability refers to the characteristics of a person or group that influence their capacity to anticipate, cope with, resist, or recover from the effects of climate change. Characteristics which inform social vulnerability include age, health, income, linguistic isolation, mobility, and more. These characteristics often align with indicators used in environmental justice analysis, or the establishment of Disadvantaged Communities (DACs) as defined by SB 1000. As a result, populations identified as Disadvantaged Communities may also be considered the most sensitive to climate change.

In order to aid jurisdictions in identifying sensitive community assets, the APG has provided sensitivity checklists outlining the structures, functions, and populations which should be evaluated. These checklists can be seen in **Figure 10: Fowler's Sensitive Community Assets** below.

Figure 10: Fowler's Sensitive Community Assets

Items which are marked with an "x" exist within the Fowler planning area.

POTENTIALL SENSITIVE FUNCTIONS	POTENTIALL SENSITIVE STRUCTURES	POTENTIALL SENSITIVE POPULATIONS
☐ Government continuity	☒ Residential	☒ Seniors
☒ Water/sewer/solid waste	☒ Commercial	☒ Children
☒ Energy delivery	☒ Industrial	☒ Individuals with disabilities
☒ Emergency services	☒ Institutional (schools, churches, hospitals, prisons, etc.)	☒ Individuals with compromised immune systems
☒ Public safety	☒ Parks and Open Space	☒ Chronically ill individuals
☒ Public health	☒ Recreational facilities	☒ Individuals without access to lifelines (e.g. car or transit, telephones)
☒ Emotional and mental health	☒ Transportation facilities and infrastructure	☒ Non-white communities
☒ Business continuity	☐ Marine Facilities	☒ Low-income, unemployed, or underemployed communities
☒ Housing access	☒ Communication Infrastructure	☒ Individuals with limited English skills
☒ Food security	☐ Dikes and levees	☒ Renters
☒Mobility/transportation/access	☒ Water treatment plant and delivery infrastructure	☒ Students
☒ Quality of life	☒ Wastewater treatment plant and collection infrastructure	☐ Seasonal Residents
☒ Social services		☒ Individuals uncertain about available resources because of citizenship status
☐ Ecological function		
☐ Tourism		
☒ Recreation		
☒ Agriculture, forest, and fishery productivity		
☒ Industrial operations		

Potential Impacts as a Result of Local Exposures

Extreme Heat

Decreased Public Health

Exposure to extreme heat can pose a serious health threat, causing discomfort and fatigue and, in severe cases, hospitalization and death.[28] Specifically, heat can compromise the cardiovascular and respiratory systems and especially impacts populations with other health conditions or that do not have access to cool spaces.[29]

The populations most likely to be impacted by extreme heat include:

[28] (Center for Disease Control)
[29] (Katharine Burgess, 2019)

- Seniors
- Children
- Individuals without access to lifelines (e.g., car or transit, telephones)
- Low-income, unemployed, or underemployed communities
- Individuals with limited English skills
- Individuals who work outdoors

Infrastructure Damage and Impaired Services

Rapid changes in temperature and extreme heat can compromise the integrity of road infrastructure, causing physical damage such as road buckling.[30] When temperatures reach certain levels, people are also unwilling to use alternative modes of transportation, such as biking or walking, putting additional stress on roadway and public transit infrastructure. Additionally, extreme heat puts stress on utility infrastructure due to the high energy demand associated with air conditioning and other cooling needs. Increased health needs due to high temperature can also put stress on emergency response and medical functions.

The economy of the San Joaquin Valley is primarily based on agricultural production. Increased temperatures will vary the growing season and the types of crops that can be grown in the region. Additionally, higher temperatures may increase water demand for both agricultural and urban use. With less water available and increased demand, California cities will have trouble meeting their water needs.

The functions and structures most likely to be impacted by extreme heat in Fowler include:

- Energy delivery
- Emergency services
- Public health
- Mobility/transportation/access
- Transportation facilities and infrastructure
- Agriculture, forest, and fishery productivity
- Water treatment and delivery infrastructure

Severe Weather

Severe weather associated with climate change can cause significant damage to property and crops. Storms also pose a threat to people who are unable to find adequate shelter. Extremely wet events, especially in arid climates like the San Joaquin Valley, can overstress water infrastructure and cause flooding and property damage.

The populations, functions, and structures most likely to be impacted by storm events in Fowler are:

- Individuals experiencing homelessness

[30] (Katharine Burgess, 2019)

- Public safety
- Built structures
- Water collection and storage infrastructure

Wildfire

Wildfires pose significant threat to property and human safety. Should a fire burn through Fowler, built structures and agricultural activities as well as public safety would be at risk. Though fire risk is increasing in California as a whole, it is unlikely to impact Fowler directly. Fowler is primarily at risk from the indirect effects of wildfire, such as air pollution and smoke. Smoke carries particulate matter, carbon monoxide, nitrogen oxides, and volatile organic compounds, all of which can significantly reduce air quality.[31] Exposure to smoke can negatively impact the respiratory and cardiovascular systems, increase hospitalizations, and agitate medical issues such as asthma.

The air quality in the San Joaquin Valley is already poor. It exceeds federal and State standards for both particulate matter at 2.5 microns and ozone, as well as State standards for particulate matter at 10 microns.[32] Wildfire smoke contains both particulate matter and ozone. Wildfire smoke is becoming increasingly impactful on Fowler's air quality and it can be expected that individuals *not* already predisposed to health risks from poor air quality would begin to be affected. Particulate matter and ozone can cause several health effects including coughing, wheezing, chest pain, headaches, nausea, fatigue, and, on a prolonged timeline, dementia. Individuals whose jobs require them to spend more time outside or do intense physical labor are significantly more likely to be impacted by poor air quality.

The populations and functions most likely to be impacted by wildfire in Fowler are:

- Seniors
- Children
- Individuals with compromised immune systems
- Individuals who are chronically ill
- Outdoor workers
- Business continuity

Drought, Snowpack and Water Supply

The expected reduction in snowpack coupled with more frequent extreme heat events indicate that climate change will decrease water supply while increasing demand throughout California. Regulations and water rights further limit the availability of water when conditions in the mountains change resulting in reduced snowpack. Drought especially impacts agricultural and urban functions, as both of those uses rely on large amounts of water. Other secondary impacts of drought, such as wildfire, dust storms, and flash floods, can pose serious risk to health and property.

[31] (Centers for Disease Control and Prevention, 2019)
[32] (City of Fowler, 2019)

Decreased Public Health

Dust storms associated with drought carry particulate matter that degrades air quality and can increase the incidence of coccidioidomycosis, or valley fever.[33] Drought is also associated with increased risk of disease from both groundwater and surface water sources, especially for those with chronic health conditions.[34] While air quality issues are especially impactful for people with respiratory illnesses, those with immune disorders are more likely to be affected by decreased water quality.

The populations most likely to be impacted by drought in Fowler are:

- Individuals with compromised immune systems
- Individuals who are chronically ill
- Individuals who work in conditions where they are exposed to dust

Infrastructure Damage and Impaired Services

Groundwater levels in the Fowler area have dropped from approximately 33 feet below ground surface in 1967 to about 60 feet below ground surface in 2019, with large swings in the water table occurring in response to hydrologically wet and dry periods.[35] During hydrologically dry periods there is less surface water available, causing increased reliance on ground water. Historic trends in water depths indicate that groundwater levels may fall more drastically in drought conditions.[36] The City of Fowler currently relies solely on groundwater to serve its municipal functions. As climate change exposures increase the likelihood of drought, there may be a need to address chronic lowering of groundwater levels.

Drought not only decreases the availability of water; it decreases its quality as well. Negative impacts to water sheds may arise as drought-fueled wildfires lead to increased landslides, mudslides, or sediment in run-off that reduce water quality. In addition, higher water temperatures and levels of sediment decrease water oxygen levels, which can kill aquatic life and put drinking water availability into question.[37] Lack of surface water for irrigation can reduce farm productivity, a major economic driver for the San Joaquin Valley. Furthermore, it can cause food insecurity as the San Joaquin Valley produces food for the rest of the country.

The functions and structures most likely to be impacted by drought and snowpack and water supply changes in Fowler include:

- Public health
- Food security
- Agriculture, forest, and fishery productivity
- Water treatment and delivery infrastructure

[33] (Centers for Disease Control and Prevention, 2019)
[34] (Centers for Disease Control and Prevention, 2020)
[35] (Provost & Pritchard Conulting Group, 2019)
[36] (Provost & Pritchard Conulting Group, 2019)
[37] (Centers for Disease Control and Prevention, 2020)

ADAPTIVE CAPACITY

Adaptive capacity is the ability of a community to address climate change impacts. In order to determine Fowler's adaptive capacity, it is necessary to evaluate the extent to which potential impacts are already being addressed. This is done through a review of climate change related policies, plans, and programs, that are either in place or can be easily implemented. Once complete, adaptive capacity is rated as either low, medium, or high to indicate level of preparedness. High capacity indicates that adaptive measures are already implemented, and low capacity indicates that a community is unprepared for the impacts it may face.

For the purposes of this effort, a document review has been completed wherein local planning documents were reviewed for responsiveness to the most likely impacts facing Fowler. A list of documents, their applicability to the City of Fowler, and the year they were completed can be found in **Table 2: Planning Documents, Standards, Ordinance, and Programs Addressing Climate Change.** The most likely climate change impacts facing Fowler include decreased public health, infrastructure damage, and impaired public services as a result of:

- Drought, reduced snowpack, and reduced water supply;
- Extreme heat;
- Severe weather; and
- Wildfire.

A more detailed description of these impacts may be reviewed in the section above, entitled **Sensitive Community Assets and Potential Impacts.**

Table 2: Planning Documents, Standards, Ordinance, and Programs Addressing Climate Change

Document Type	Applicable (yes/no)	Title and Year Completed	Agency
Planning Documents			
General Plan	Y	2025 General Plan, 2004 *(update currently underway)*	City of Fowler
Climate Action Plan	N		
Climate Adaptation Plan	N		
Area and Specific Plans	N	Central Fowler Revitalization Plan (Downtown Plan), 2007	City of Fowler
Local Hazard Mitigation Plans	Y	Fresno County Multi-Jurisdictional Hazard Mitigation Plan, 2018	Fresno County
Local Coastal Plan	N	*Not Applicable	
Urban Water Management Plan	N	*Not Required	
Ground Water Sustainability Plan	Y	South Kings Groundwater Sustainability Plan, 2019	South Kings Groundwater Sustainability Agency
Integrated Regional Water Management Plan	Y	Kings Basin Integrated Regional Water Management Plan, 2016	Kings Basin Water Authority

Document Type	Applicable (yes/no)	Title and Year Completed	Agency
Transit Plan	Y	Fresno County Regional Long Range Transit Plan 2019-2050, 2019	Fresno Council of Governments
Sustainable Community Plans (SB 375)	Y	Regional Transportation Plan, Sustainable Communities Strategy, 2018	Fresno Council of Governments
Regional Transportation Plans	Y	Regional Transportation Plan, Sustainable Communities Strategy, 2018	Fresno Council of Governments
Standards, Ordinance and Programs			
Capital Improvement Program	Y	Currently Underway	
Zoning Code	Y	City of Fowler Zoning Ordinance, 2009	City of Fowler
Building Code	Y	California Building Standards Code, 2019	California Building Standards Commission
Fire Code	Y	California Fire Code, 2019	California Building Standards Commission
Tree Ordinance	N		
Stormwater Management Plan	N		
Floodplain Ordinance	Y	Fowler Municipal Code, Chapter 8, 2009	City of Fowler

Planning Documents

General Plan[38]

A general plan is a comprehensive, long-range planning document that forms the basis of land use decisions and envisions how a community will grow. It addresses issues that impact the entire city, such as how land is used, the locations of roads and parks, safety, noise, and more. Every other planning document adopted by the city must be consistent with the goals and policies of the general plan.

Fowler's operating General Plan was adopted in 2004 and establishes a planning horizon of 2025. Topics covered include land use, circulation, housing, economic development, environmental resources management, and public facilities elements. Since its adoption, the General Plan has been revised and amended but not comprehensively updated. The General Plan is currently in the process of being comprehensively updated.

As part of the update process, existing General Plan policies have been reviewed for consistency with new legislative requirements and current community needs. Currently, there are no policies that deal directly with climate change resiliency. There are some policies that emphasize sustainability, growth management, and active transportation, all of which have co-benefits with climate adaptation needs. While there are some policies relevant to climate adaptation, they do not directly address climate change exposures and impacts most relevant to Fowler. Focused climate change adaptation policies will need to be developed as part of ongoing update efforts.

[38] (City of Fowler, Land Use Associates, 2004)

Local Hazard Mitigation Plans[39]

The Local Hazard Mitigation Plan (LHMP) is intended to reduce the long-term risk of environmental hazards such as severe weather or drought. Fresno County has a multi-jurisdictional plan which addresses hazards at a more regional scale and Fowler contributed an annex to that document which examines more local impacts. The plan identifies which hazards pose a risk to the County, what the impacts of such hazards would be, and how to mitigate and lessen the impacts of hazards. With the risk of many of these hazards increasing due to climate change, the mitigation measures identified in the LHMP are closely related to the beneficial actions of climate adaptation planning. The LHMP is identified as a document that can be used to implement SB 379; however, while it includes mutually beneficial measures, it does not directly address the necessary actions Fowler will need to take to address climate change.

Groundwater Sustainability Plan[40]

In 2014, the California Sustainable Groundwater Management Act (SGMA) was signed into law in order to provide a statutory framework for sustainable local management of groundwater basins. SGMA requires certain governments and water agencies to bring groundwater basins into balanced levels of pumping and recharge. The City of Fowler falls within the South Kings Groundwater Sustainability Agency (SKGSA) boundary. As part of a critically over-drafted sub basin, the SKGSA's goal is to ensure sustainable management by the year 2040. The primary planning document outlining sustainable management practices is the Groundwater Sustainability Plan (GSP). Climate change related impacts are a consistent consideration throughout the South Kings GSP. Sustainable water management practices in the face of changing seasonal patterns, reduced snowpack, flooding, and drought potential are covered within the South Kings GSP. It is also important to note that GSPs must be consistent with local general plans.

Integrated Regional Water Management Plan[41]

Integrated Regional Water Management (IRWM) practices began in 2002, with the passing of the Regional Water Management Planning Act (SB 1672). In some ways, IWRM is considered the precursor to SGMA. IRWM seeks to build collaborative water management solutions across jurisdictional boundaries. The City of Fowler lies within the Kings Basin IRWM Plan (IRWMP) Area. The IRWMP for this area covers many interrelated water management topics, including predicted impacts from climate change, a vulnerability assessment for the Kings Basin, proposed adaptation measures, and monitoring plans. The information contained within this report is a valuable resource for predicting the effects of climate change on Fowler's water resources.

Downtown Plan (Central Fowler Revitalization Plan)[42]

The Central Fowler Revitalization Plan was adopted in 2007 as a method of creating a set of guiding design principles to revitalize Fowler's downtown commercial core. The primary focus of this document is economic development, coupled with urban design principles to facilitate economic development. The design concepts discussed within the Central Fowler Revitalization Plan focus on connectivity, walkability,

[39] (Fresno County, Amec Foster Wheeler, 2018)
[40] (South Kings Groundwater Sustainability Agency, 2019)
[41] (Kings Basin Water Authority, 2018)
[42] (Local Government Commission, Opticos Design, 2007)

and community character. While these concepts may parallel some adaptive strategies, this document does not incorporate climate change discussions, nor does it address climate resiliency as a primary goal.

Transit Plan[43]

Fowler is currently served by Fresno County Rural Transit Authority which has a long-range plan that considers transit operations through 2050. Environmental responsibility is identified as a goal for the transit system and several projects intended to increase the environmental sustainability of the system have been proposed. However, these projects focus on mitigating greenhouse gas emissions rather than adapting to predicted changes.

Regional Transportation Plan[44]

The Fresno Council of Governments' Regional Transportation Plan (RTP) looks at all types of transportation, travel, and goods movement in Fresno County. The most recent version of this plan was adopted in 2018 and looks forward to 2042. The plan also includes a Sustainable Communities Strategy that integrates land use and transportation planning to meet greenhouse gas emission reduction targets. The Policy Element of the RTP outlines several goals, objectives, and policies related to curbing emissions and mitigating climate change. However, it does not contain policies for adapting to predicted changes in the climate.

Sustainable Community Plans (SB 375)[45]

The Fresno Council of Governments' Regional Transportation Plan includes a Sustainable Communities Strategy (SCS) that fulfills the requirements of SB 375. The goal of the SCS Element is to increase sustainability through land use and transportation planning. The strategy identifies ways climate change will affect the transportation system and the need to prepare transportation infrastructure for those changes. However, it has not yet identified specific policies related to mitigating the effects of climate change on transportation infrastructure.

Standards, Ordinance, and Programs

Capital Improvement Program

Fowler is in the process of drafting and approving a Capital Improvement Program, which is anticipated for adoption by July 1, 2020. The program, once implemented, will assist in prioritizing capital improvement projects, many of which will support Fowler's adaptation to the effects of climate change.

Zoning Code[46]

Fowler's Zoning Code implements the General Plan through regulating allowed uses and development standards such as setbacks, building height, lot coverage, fencing, and parking requirements. Fowler's Code does not prescribe additional efficiency, safety, or green building requirements above what is required from the California Building Code, nor does it implement design standards with the intent of reducing the effects of climate change. However, Fowler's Zoning Code is currently in the early stages of a comprehensive

[43] (Fresno Council of Governments, 2019)
[44] (Fresno Council of Governments, 2018)
[45] (Fresno Council of Governments, 2018)
[46] (City of Fowler, 2017)

update process. At this time, it is not anticipated that climate change related design standards will be part of this comprehensive update.

Building Code[47]

The California Code of Regulations, Title 24, also known as the California Building Standards Code, is published in its entirety every three years by order of the California Legislature. The purpose of building codes is to protect the health, safety, and welfare of the public through regulating how structures are built. Building codes also establish energy efficiency standards. In addition to typical code requirements, the state of California adopted the California Green Building Standards Code (CALGreen) as part of Title 24 in the year 2007. CALGreen is the first of its kind in the United States, and mandates green building standards. Adoption of CALGreen was primarily an effort to meet the goals of Assembly Bill 32 (AB 32), also known as the Global Warming Solutions Act. Passed in 2006, AB 32 established a program to reduce GHGs to 1990 levels by the year 2020.

While the CALGreen Code is an integral part of California's effort to reduce GHG emissions that contribute to climate change, it does not focus on safety measures geared towards resilience in the face of an already changing climate. A local jurisdiction may establish more restrictive building standards as necessary to adjust to local climactic, topographic, or geological conditions. At this time the City of Fowler has not adopted such regulations.

Fire Code[48]

The City of Fowler enforces the California Fire Code, last updated in 2019. The Code covers fire prevention and resistance standards. While the policies may relate to or attempt to mitigate the impacts of the increased fire risk associated with climate change, the Code does not directly mention climate change.

Floodplain Management Ordinance[49]

Fowler's Floodplain Management Ordinance will be a useful tool for preparing for the effects of increased flooding due to climate change. While the ordinance does not mention climate change or increasing risk factors, the requirements for construction within floodplains will help protect those buildings from damage due to flooding.

Summary and Recommendations

While some of Fowler's adopted planning documents, standards, ordinances, and programs address aspects of climate change, there are improvements that can be made to increase preparedness, specifically in response to the effects that will be most impactful to the health, safety, and welfare of the community. Table 3: Summary of Adaptive Capacity below summarizes the most relevant potential local effects of climate change in Fowler, as well as associated levels of preparedness based on the document inventory above. Recommendations on how to improve Fowler's adaptive capacity will be reflected in the climate adaptation strategies identified during future stages of the general plan update process.

[47] (California Building Standards Commission, 2019)
[48] (California Building Standards Commission, 2019)
[49] (City of Fowler, 2017)

Table 3: Summary of Adaptive Capacity

Effects of Climate Change in Fowler	Level of Preparedness
Extreme heat	Low
Severe weather	Low
Wildfire	Low
Drought, reduced snowpack and water supply	Medium

RISK AND ONSET

The fifth step of a vulnerability assessment is determining the risk and onset of potential climate change effects relevant to Fowler. The APG defines risk as the probability that a certain effect will occur. An assessment of risk considers both the certainty of the science projecting climate change effects and the certainty of local sensitivity. Climate change effects with higher probability are considered more of a risk, and therefore a higher priority for action. In comparison, onset predicts *when* the effect is likely to occur. Estimates of timeframe are not precise; however, it is possible to categorize the onset of climate change effects in the following terms:

- **Current:** Effects already happening
- **Near-term:** 2020-2040
- **Mid-term:** 2040-2070
- **Long-term:** 2070-2100

An evaluation of both risk and onset is critical to help communities with the second phase of the adaptation process, prioritizing their adaptive needs. In doing so, jurisdictions will be able to consider what impacts require the most immediate action. The International Panel on Climate Change (IPCC) continuously releases reports on climate change science, including estimations of risk and onset. Using this information will help Fowler determine adaptive priorities moving forward. Below, **Table 4: Summary of Risk and Onset** provides an overview of the predicted risk and onset of climate change exposures and associated impacts. Anticipated onset included in these tables are sourced from Cal Adapt data. For a more detailed summary of anticipated exposures, including minimums, maximums, and averages during each timeframe for both RCP 4.5 and 8.5, please see the above section entitled **Exposure Assessment .**

Table 4: Summary of Risk and Onset

Exposure	Risk[1]	Onset
Temperature Change	High	Near Term
Precipitation Change	Medium	Near Term
Extreme Heat	High	Near Term
Drought	Medium	Near Term
Reduced Snowpack	High	Near Term
Severe Weather	Medium	Near Term
Wildfire	Medium	Near Term
[1] *Risk has been estimated from probability based on global models provided by the IPCC.*		

(California Emergency Management Agency, California Natural Resources Agency, 2012); (Geospatial Innovation Facility and California Energy Commission, 2020)

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