District's 468 kW-sized photovoltaic solar system, annually saving the equivalent of 590 metric tons of CO2 (2010).

CLIMATE ACTION PLAN
January 2019

Oro Loma Sanitary District

Climate Change

Agencies and districts engaged in providing utility service involving water resources must be diligent in planning for, adapting to, and mitigating the potential impacts of climate change on current and future utility system operations. The District is doing its part for future generations.

Oro Loma Sanitary District Board of Directors
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I. SECTION 1 – INTRODUCTION AND PURPOSE

A. Introduction

Climate change is a local, state, national and international issue that is well documented and must be addressed by agencies who are responsible for managing water resources (water, wastewater and storm water). The California Department of Water Resources indicates that climate change is already impacting resource agencies in the State due to concerns about declining snowpack, increasing weather extremes, and rising sea level. Although the full impact of climate change is still unknown, the Oro Loma Sanitary District ("District") must plan for climate change to ensure that it can provide reliable wastewater services to its customers with the highest quality effluent discharge and lowest Greenhouse Gas ("GHG") Emissions to the environment. The District's General Manager will involve the organization in the development and implementation of the Climate Action Plan ("CAP").

Once the District's Board of Directors has approved this Climate Action Plan, the District's Strategic Plan will be modified consistent with the CAP to ensure the District plans for the potential impacts of climate change and works to mitigate the District's impact on climate change.

B. Purpose

The purpose of this document is to act as a policy document, thereby assisting the District to better define and understand potential climate change impacts, facilitate mitigation of District GHG emissions that contribute to climate change, and discuss current climate change priorities. The science of climate change is still developing, necessitating the need for periodic District updates to the CAP and adaptation of mitigation measures as more information becomes known about climate change impacts to, and caused by, the District.

The District's response to climate change has focused on the following elements:

1. Staying updated on evolving climate change science and potential impacts on District assets.
2. Determining wastewater system and infrastructure vulnerabilities.
3. Reducing GHG emissions caused by District operations.
4. Integrating climate change into strategic planning and budget decisions.
5. Developing mitigation and adaptation strategies for inclusion in the climate action plan.

The District's CAP provides a policy level framework to inform decisions about wastewater system and infrastructure investments consistent with the District's climate change priorities.

Current climate change priorities are as follows:

- Prepare District Climate Action Plan to meet future GHG emission reduction targets.

- Formalize and document the District's GHG emissions inventory.
- Incorporate climate change considerations into the District's Capital Improvements Plan ("CIP") planning (including alternatives analyses) and implementation (project construction and operations).
- Continue to update the District's energy portfolio, building on it's existing renewable energy sources by improving efficiencies and optimizing performance, thereby reducing District GHG emissions.
- Identify operational efficiencies and District land use decisions to facilitate mitigation of District emissions.
- Develop transportation and building improvements related to GHG emission reductions.

C. Accomplishments to Date

The District is at the forefront of combating climate change including implementation of the following projects that have been constructed with climate change benefits:

1. The Photovoltaic Solar System Project whose climate change benefits include:
    a. Generation of renewable energy to reduce direct GHG Emissions
    b. Offsetting power demand from Pacific Gas & Electric (PG&E), reducing indirect GHG emissions from fossil fuel generated PG&E power
2. The Horizontal Levee Project whose climate change benefits include:
    a. Testing adaptive strategies to address climate change including
        i. Levee design and use of various native plants to combat sea level rise and San Francisco Bay storm surge events.

In addition, the District is improving the existing wastewater treatment plant and planning on upgrading existing Anaerobic Digestion and cogeneration facilities to further limit GHG emissions.

The District takes climate change seriously and will continue to take steps to address and mitigate its climate change contribution.

II. SECTION 2 – CLIMATE CHANGE ASSESSMENT

A. Assessment

The District recognizes and accepts the findings to date that indicate climate change is a real issue that could have negative consequences on water resources, the environment, and society. A summary of observed changes in climate based on recent studies are presented below as a starting point for how the District will adapt to and mitigate climate change impacts.

Below is a summary of findings from the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5)[1] based on direct measurements and remote sensing from satellites and other platforms:

- Warming of the climate system is unequivocal and many of the observed changes since the 1950s are unprecedented over decades to millennia.
- Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850.
- Over the last two decades, the Greenland and Antarctic ice sheets have been losing mass, glaciers have continued to shrink almost worldwide, and Arctic sea ice and Northern Hemisphere spring snow cover have continued to decrease in extent.
- The rate of sea level rise since the mid-19th century has been larger than the mean rate during the previous two millennia.
- The largest contribution to total radiative forcing (the difference between the energy absorbed by the earth and the energy radiated back to space) is caused by the increase in the atmospheric concentration of CO2 since 1750.
- The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification.

Below is a summary of findings from the 2014 US National Climate Assessment Report[2]:

- Global climate change is apparent across the United States and the warming in the past 50 years is primarily due to human activities, predominantly the burning of fossil fuels.

[1] IPCC, 2014: Climate Change 2014: *Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

[2] Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment*. U.S. Global Change Research Program, 841 pp.

- Some extreme weather and climate events have increased in recent decades, and evidence confirms that some of these increases are related to human activities.
- Human-induced climate change will accelerate significantly if global emissions of heat-trapping gases continue to increase.
- Water quality and water supply reliability are jeopardized by climate change.
- The capacity of ecosystems to buffer the impacts of extreme events like fires, floods and severe storms is being overwhelmed.
- Current adaptation and mitigation efforts are insufficient to avoid increasingly negative social, environmental and economic consequences.

B. Impact on District

The District recognizes that on-going climate change assessment will be required to successfully adapt to and mitigate climate change impacts. This will focus on monitoring and tracking climate change impacts on water resources in California and the San Francisco Bay Area. The District will maintain close coordination with other agencies engaged in managing water resources to stay up to date on climate change impacts in the region and state that could impact the District. This will provide the District with more flexibility in responding to potential climate change impacts that may be observed with District managed water resources.

Climate change is projected to have many potential impacts on the District. This section provides a brief assessment of the potential impacts to the District, which is covered in greater detail in Section 3 of this plan.

WATER SUPPLY AND DEMAND

- **Water Supply.** Impacts that result in changes in wastewater system quality, treatment, and/or discharge requirements and effectiveness.
- **Water Demand.** Impacts that result in lower wastewater system flows, leading to higher concentrations of constituents of concern, low flow conditions, and higher residence time.

WATER QUALITY AND THE ENVIRONMENT

- **Water Quality.** Decrease in water quality due to warmer water temperatures, higher salinity or sedimentation, or other factors.
- **Wastewater.** Challenges managing more extreme and/or concentrated flows, increased risk of flooding and peak wet weather flows due to infiltration and inflow associated with high intensity storm events or sea level rise.

FLOOD CONTROL

- **Flooding.** Increase in storm surge flood events as a result of sea level rise.

- **Flood Control Management.** Challenges managing flood control as a result of the timing of the runoff and increasing peak flow runoff.

INFRASTRUCTURE

- **Infrastructure Impacts.** Impacts to infrastructure in the San Francisco Bay and near the shore due to sea level rise and peak wet weather flows. Primary concerns for the District include the potential inundation and flooding of the Wastewater Treatment Plant ("WWTP") and ability to handle peak wet weather flows with no sanitary sewer overflows, WWTP upsets and/or discharge violations.

ENERGY

- **Electricity Transmission.** Transmission lines lose 7 to 8 percent of transmitting capacity in high temperatures. There could result from extended drought and high temperature conditions or exposure of major transmission lines to wildfire exposure.
- **Energy Demand.** Climate change will increase the demand for heating in the cooler season and cooling in the warmer season. This will be a function of the future District energy portfolio.

The proximity of the District's WWTP adjacent to the San Francisco Bay makes it more susceptible to climate change impacts associated with rising sea level and more intense wet weather storm events. The District will need to assess future infrastructure plans to avoid or mitigate possible climate change impacts from these factors to ensure adaptation to changing conditions that could impact the District's wastewater service level and cost. The District is also potentially more susceptible to upper watershed water supply and quality changes that could impact water quality in the processing of its wastewater influent and storm water flow and discharges. This could impact future wastewater treatment plant design and construction decisions to avoid or mitigate certain water quality challenges that may arise from water supply related climate change effects.

III. SECTION 3 – IMPACTS/VULNERABILITIES/ADAPTATIONS

This section evaluates the District services and operations that could potentially be impacted by climate change, identifies potential vulnerabilities to the District's facilities, and identifies possible adaptation measures.

A. Impacts

Climate change may have the following impacts on the District based on climate change findings to date summarized in Section 2 (Assessment:):

- Increasing average atmospheric temperature
- Increasing or decreasing precipitation
- More extreme precipitation events
- Sea level rise
- Reduced Spring snow-covered area that may impact wastewater quality
- Increased variability in runoff patterns
- Increasing heat wave duration, frequency, and intensity
- Changes in indoor water demands
- Shifting jet stream
- Increasing forest fires

These effects may result in the following changes:

- Increased average annual atmospheric temperatures and heat wave days
- Increased water temperatures
- Changes in water demand that may impact wastewater quality
- Changes in the timing, intensity, location, and amount of precipitation
- Increased evaporation
- Long-term changes in watershed vegetation
- Changes in source water quality
- Changes in wastewater system water quality

The potential local climate change impacts on District water resources and operations and services are identified and summarized in Tables 3.1 and 3.2 respectively. Table 3.1 focuses on the potential water resource impacts and potential consequences of climate change the District would assess and monitor over time. Table 3.2 highlights how potential climate change impacts on water resources could impact District wastewater system operations and services. Potential climate change impacts on District operations and services could impact wastewater system collection and treatment, discharge, regulatory compliance strategies, and long-term CIP planning priorities.

Table 3.1 Potential Water Resource Impacts and Potential Consequences

Potential Water Resource Impact	Potential Consequences
Increased temperatures and heat wave days	• Potential changes in source water quality affecting District water quality and treatment
Changes in storm event timing, intensity, location and precipitation volumes	• Potential increased storm intensity and increased potential for sanitary sewer overflow and flooding; increased peak storm water flow discharges through wastewater facility • Possible increased drought frequency, intensity and duration of droughts, demand reductions, and wastewater system flow challenges • Increase in % of critically dry years and lower wastewater system flows and velocities
Increased evaporation	• To the extent District wastewater quality and discharge is impacted
Long term changes in watershed vegetation	• To the extent District wastewater quality and discharge is negatively impacted
Sea level rise	• Inundation of coastal marshes and estuaries, potentially affecting the District's solar drying beds • Increased San Francisco Bay system salinity • Increased flooding potential which could affect the District WWTP

	• Impacts on District WWTP outfalls or backflow effects • Potential impact on customer base
Increase in water temperatures	• Possible effects on listed and sensitive species • Potential adverse changes in water quality, including the reduction of dissolved oxygen levels and increased nutrients
Increased wild fires	• To the extent District water quality and discharge is negatively impacted • Potential adverse changes in water quality including increased sediment and nutrients

Table 3.2 Potential Impacts and Consequences on District Operations and Services

Potential Impacts	District Operations & Services	Potential Consequence
Sea level rise and Changes in storm intensity	Wastewater Collection	• Increased energy use due to increased infiltration and inflow • Increased corrosion due to lower wastewater flows and higher collection system residence times • Increased vulnerability to sanitary sewer overflows due to increases in storm event intensity
Increased temperature and Changes in storm intensity	Wastewater Treatment	• Increased concentrations of contaminants due to lower wastewater flows • Higher peak flows at wastewater plants due to increased storm intensity
Increased temperatures Changes in storm intensity	Wastewater Discharge	• More stringent discharge requirements due to lower freshwater flows

Sea level rise		• Increased saltwater infiltration for collection systems in low lying areas which may cause increases in wastewater total dissolved solids and potential for plant upsets

B. Vulnerabilities

The District evaluated the vulnerability of its wastewater system to determine how the system would be most vulnerable to changing climate factors. The District identified the high priority areas of vulnerability to potential climate change effects as follows:

- Vulnerable to high storm flows if rainfall intensity increases: pumping stations, wet weather treatment facilities, influent pump station, effluent pump station, and interceptor capacity (resulting in sanitary sewer overflows).
- Vulnerable to lower sewage flows during droughts: wastewater interceptor system (due to increased corrosion and additional maintenance due to solids buildup) and biological wastewater treatment processes (e.g., secondary activated sludge due to more concentrated contaminants).
- Vulnerable to higher sea levels: low lying facilities (WWPT, de-chlorination facility that District can discharge to, overflow structures) and wet weather facilities are susceptible to inundation and biological wastewater treatment processes (e.g., secondary activated sludge or clarifier upsets due to higher dissolved solids concentrations).
- Vulnerabilities to changing watershed/drinking water quality that impacts wastewater water quality and corresponding wastewater treatment and discharges.

The District will continue to assess the potential vulnerabilities to climate change effects and plan to address these vulnerabilities accordingly as more information becomes available.

C. Adaptation

The District is developing adaptation strategies to address climate change. As discussed in Section 1, the District has already begun implementing adaption strategies including the Solar Array project. This section discusses some initial adaptation ideas being considered. These strategies will be revised over time as the Districts understanding of climate change and its impacts are better understood.

The recommended adaptation approach to climate change is to adjust and upgrade the District's wastewater system assets as the impacts of climate change becomes evident over time. The Board will consider developing short and long-term adaptation strategies based on a range of possible climate change outcomes that are most likely to impact District facilities, operations and services.

The District will consider climate change when developing its long-term CIP to ensure that the District has the ability to adapt to potential climate change effects. The goal of its wastewater system investments will be to minimize the need to upgrade wastewater collection, treatment, and discharge assets to meet service needs while adapting to observed climate change impacts. The District will consider climate change in evaluating project alternatives when identifying a preferred project for a given CIP project, and account for the construction and operational impacts in meeting District emission reduction targets. This will provide the District with CIP projects that are consistent with plan goals.

OTHER DISTRICT ADAPTATION NEEDS

Short-term measures

- Incorporate climate change considerations into capital improvement planning.
- Incorporate potential climate change impacts in wastewater system management plans.
- Monitor changes in drinking water quality that may impact wastewater quality.
- Continue to monitor influent total dissolved solids concentrations to prevent impacts to the secondary treatment process at the wastewater treatment plant.
- Collaborate with other agencies on assessing climate change vulnerabilities and adaptation strategies that can tailored to the District's needs and conditions.
- Approve the Climate Action Plan to guide future District climate change policy decisions.

Long-term measures

- Consider a range of climate change outcomes that could occur as the basis for identifying climate change actions, strategies and measures.
- Monitor changes in drinking water quality entering the District's wastewater system.

- Employ measures to reduce sediment from entering the sewer collection system resulting from climate change.
- Reduce inflow and infiltration to the collection system to reduce the impact of high intensity storm events on the wastewater collection and treatment systems.
- Develop corrosion prevention plans and/or evaluate alternative materials as necessary to mitigate water quality concerns.
- Coordinate with other wastewater agencies on long-term protection strategies for the wastewater collection system, wastewater treatment plant, and wet weather facilities.

IV. SECTION 4 – GHG MITIGATION STRATEGIES AND ACTIONS

A. GHG Mitigation

The sources of GHG emissions for the District are primarily related to wastewater system electrical energy generation (pumping conveyance and treatment processes), transportation, and buildings. According to the IPCC AR5 Report, mitigation, in the context of climate change, is human intervention to reduce the sources or enhance the sinks of GHGs. The goal is to achieve stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic climate change impacts.

For most water resource agencies involved in larger scale operations such as the District, climate change management will likely involve a combination of voluntary and mandatory emission reducing actions to reliably meet its long term GHG emission reduction targets. Adaptation and mitigation are closely linked. Adaptation efforts will require forethought and early implementation to position the District to avoid more difficult and costly mitigation actions if not implemented proactively.

The climate will continue to change over the next few decades due to emissions already introduced into the climate system. The benefits of avoided climate change will only accrue beyond the near future. Emission reductions and carbon sequestration have a time value (i.e., early actions have a greater long-term benefit). Over longer planning horizons, mitigation investments have a greater potential to reduce climate change damage. New technologies may improve efficiencies and reduce operating costs.

District GHG Mitigation Goals

The District's GHG emissions are relatively small compared to those of many other industries, and compared to state, national, and global emissions. While the District cannot have a significant impact on global climate change, it will take steps to reduce its carbon footprint because:

1. The District desires to mitigate its GHG emissions to minimize its impact on the environment.
2. The District has already implemented significant emission reduction measures (See Section 1).
3. Mitigating climate change primarily involves reducing energy use or making operations more efficient which ultimately reduces District operating costs.

The first step in effectively managing emissions is establishing a measurable goal. There are two basic kinds of goals: absolute and intensity based.

ABSOLUTE TARGETS

Absolute targets reduce total emissions over a specific time period. The advantage of this kind of goal is it defines a specific quantity of emissions that is measurable and unambiguous. The disadvantage is it can indicate a reduction in emissions just by reducing wastewater flows and not necessarily due to gains in efficiency. For example, the District's overall emissions in some years may decline due to drought induced water demand reductions that temporarily reduce wastewater flows and corresponding wastewater system emissions. External factors should be considered when establishing absolute targets.

GHG INTENSITY

GHG intensity allows an agency to account for changes in wastewater flow and treatment over time. GHG intensity is the ratio of GHG emissions divided by a normalizing factor (e.g., million gallons of wastewater treated). The advantages of GHG intensity are the goal is independent of wastewater flows and is a measure of efficiency. The disadvantages are the goal does not indicate whether total emissions are increasing overall, and the quantity of emissions generated must be related to GHG emitting activities for the goal to be relevant.

DISTRICT GOALS AND EVALUATING PROGRESS

Selection of a goal must be pertinent to the District's operations and organization. The sectors that describe District emissions have different characteristics. Emissions from some operations (Wastewater System) are directly related to wastewater flows and the District has some control over improvements. Some operations have no relationship to wastewater flows (Buildings and Fleet). Consequently, GHG intensity is a more appropriate method to evaluate the Wastewater sector and absolute goals are more appropriate for the Fleet and Buildings sectors.

The District's Climate Action Plan goals, with the objective to identify projects and programs that mitigate climate change impacts and reduce GHG emissions, are as follows:

- Be carbon free for indirect GHG emissions by 2040; and
- Achieve a 50 percent reduction in direct GHG emissions compared to 2000 levels by 2040.

The ultimate goal is to be carbon free meaning the District has reduced its indirect GHG emissions to the maximum extent feasible and to offset any unavoidable emissions by purchasing GHG offsets or Renewable Energy Credits (RECs) as necessary to augment other mitigation measures. The General Manager will periodically report progress towards these goals to the Board of Directors and other stakeholders.

Emissions Inventories

In general, GHG emissions are not measured directly. Emission estimates are derived from protocols that provide guidance on estimating emissions based on energy use (e.g., electricity, natural gas, etc.) and operations (e.g., wastewater system and treatment). The use of protocols provides a level of transparency, consistency, and credibility for GHG emission reporting.

Emissions are generally divided according to an internationally recognized standard into certain groups. Direct GHG emissions are emissions from sources within the organizational boundary that the District owns or controls. These emissions are primarily from stationary combustion, mobile combustion, process related emissions, or fugitive emission. Indirect GHG emissions are those emissions occurring outside the District from the production of electricity that is used by the District.

VOLUNTARY EMISSIONS REPORTING

The Climate Registry was formed in March 2006 to continue voluntary reporting of GHG emission data throughout North America. The Climate Registry (www.theclimateregistry.org) is a nonprofit collaboration among North American states, provinces, territories and Native Sovereign Nations to set consistent and transparent standards for the calculation, verification and public reporting of GHG emissions into a single registry.

Emissions Inventory Boundary

The first step in completing a GHG emissions inventory is to determine the content of the inventory. The District will only monitor and report GHG emissions created by operation of facilities and equipment that are owned and operated by the District.

Greenhouse Gases

As established in the Kyoto Protocol developed by the United Nations Convention on Climate Change, the following gases are generally included in an emission inventory: Carbon Dioxide (CO2), Methane (CH4), Nitrous Oxide (N20), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF6)

Each gas has a different ability to trap heat in the atmosphere. This characteristic is represented by the Global Warming Potential (GWP) relative to CO2. For example, methane has approximately 25 times more capacity to trap heat in the atmosphere than carbon dioxide. Therefore, the GWP for methane is 25. Nitrous Oxide is even more potent than methane, with a GWP of 310. The GWP is used to convert the amount of each gas (usually in tons) to a carbon dioxide equivalent (CO2-e) for ease of comparison.

The District's inventory only includes carbon dioxide for the following reasons:

- Consistency with the District's baseline and early inventories. Carbon dioxide was the only gas required until the 2008 reporting period.
- Collecting additional data to report on all six gases (e.g., vehicle mileage by type, location and maintenance history for refrigerants, and location and maintenance history for SF6) is labor intensive and would not likely yield significant changes to inventories.

Future inventories may include all six gases should the District determine or suspect GHGs other than carbon dioxide will make a significant contribution to its inventory.

Anthropogenic Versus Biogenic Emissions

Anthropogenic emissions result from carbon released in fossil fuels that have been trapped in geologic formations for millennia. Biogenic emissions are from carbon in biomass recently contained in living organic matter, such as combustion of biogas at the District's wastewater treatment facility. Biogenic CO2 emissions will be tracked and reported separately from anthropogenic emissions consistent with Guidelines for National Greenhouse Gas Inventories policy.

Emissions Calculations

Although there are some minor emissions from process activities and fugitive emissions, the District's direct emissions are primarily from stationary and mobile combustion. Direct emissions from combustion are calculated using the total annual fuel consumption multiplied by an emissions factor for that specific fuel (natural gas, gasoline or diesel).

The District's indirect emissions result primarily from the use of electricity for the wastewater inventory sector. To calculate the emissions from electrical use, the annual electrical use is multiplied by an electrical emissions factor for the electricity source. The emissions factor is derived based on the electrical utility's mix of generation.

GREENHOUSE GAS INVENTORY

The District's GHG emissions will be inventoried by sector as indicated above (Wastewater, Transportation, and Buildings) with GHG emissions totaled in Metric Tons (MT) of carbon dioxide. The District will update its baseline inventories for each Sector document as a percentage of the total inventory.

Emissions Sectors

A GHG inventory for a wastewater utility is more meaningful if the data are broken down into sectors associated with specific activities or sectors resulting in emissions. The following sectors allow more detailed emissions: analysis, inter-agency comparison, and tracking over time.

- Wastewater System – all anthropogenic (i.e., caused by humans) emissions resulting from operation of the District's wastewater collection and treatment facilities. Emissions from combustion of digester gas are considered biogenic (i.e., part of the normal carbon cycle) and not included in the inventory.
- Buildings – emissions resulting from operation of facilities not associated with wastewater operations like Admin. Buildings, Maintenance Centers, and service yards.
- Transportation (Fleet) – emissions associated with energy use in District vehicles and mobile equipment including cars, trucks, heavy equipment, portable pumps and generators.

Each sector has different drivers for emissions and data monitoring protocols will be established for each sector to ensure accurate inventory calculations and baselines for assessing emission reduction targets over time.

INDIRECT EMISSIONS REDUCTIONS

The majority of the District's emissions are indirect from use of electrical energy. Power is one of the largest controllable operating costs and sources of GHG emissions. The process of managing electrical energy use is best handled by a plan-do-check-act process. The basic process is:

- **Plan.** Establish and prioritize energy conservation targets
- **Do.** Implement specific practices to meet these targets
- **Check.** Monitor and measure energy performance improvements and cost savings
- **Act.** Periodically review progress and make adjustments to energy programs

The District evaluates individual projects to conserve energy or create renewable energy. The District has developed opportunities to serve its facilities with onsite renewable generation under a net energy metering agreement such as the DRI Energy 468 kW-sized solar photovoltaic (PV) project at its wastewater treatment facility. Examples of projects to be evaluated include:

- Installing submetering at process facilities (e.g., water and wastewater treatment facilities) to better manage larger electrical loads.
- Regularly performing pump efficiency tests to evaluate efficiency degradation over time.
- Replace low efficiency pumps/motors with higher efficiency equipment.
- Install variable frequency drive units where applicable.
- Institute operational changes to reduce energy use at the wastewater treatment plant.
- Include minimizing GHG emissions as a goal in planning new projects.
- Reduce water use at District facilities through equipment upgrades and metering.
- Reviewing the District's master equipment specifications to ensure energy efficient systems are appropriately procured.

DIRECT EMISSIONS REDUCTIONS

Fleet operations (vehicles and portable equipment) and buildings comprise most of the District's total direct emissions. Other sources of direct emissions may include stationary generators and the WWTP cogeneration facility.

Examples of actions that will be considered to reduce the District's direct emissions are:

- Procuring alternative fueled (e.g., LNG, CNG, biodiesel) engines, hybrid electric vehicles, plug-in hybrid vehicles, or electric vehicles.
- Reducing energy use in District buildings through proven efficiency measures and renewable energy sources.
- Downsizing vehicles/engines/fleet size.
- Partnering with agencies/companies/etc. to develop new applications for existing technology (e.g., hybrid electric drives for service trucks).
- Employee outreach programs to promote best practices for operating efficiencies (e.g., proper tire inflation and minimized idling).
- Actions that reduce the vehicle miles traveled for District business activities.
- More efficient lean-burn WWTP cogeneration facilities.

Table 4.1 Planned District Emission Mitigation Actions

Mitigation Sector	Mitigation Type	Potential Consequence
Wastewater System	Indirect Emissions	• Retrofitting existing mechanical surface aerators with high speed Turbo Blowers and Ovivo Aerostrip diffusers • Increase diameter of some key stretches of force main to reduce energy pumping costs • Eliminate energy demands from digesters (1, 2, 4 and 5) for heating, recirculation, and mixing • Install more efficient Co-generation system • Thicken dewatered sludge to reduce dozer hours in ponds by 20%
Buildings	Direct Emissions	• New O&M locker room with energy efficient lighting, low flow water fixtures, and other measures as warranted • New training facilities
Transportation (Fleet)	Direct Emissions	• Install EV charging station by 2030 for electric vehicles • Upgrade fleet vehicles over normal replacement cycle with lower net emissions

The District will update its plan mitigation measures and prioritization based on accomplishments achieved, new regulatory requirements, status of meeting District GHG emission reduction targets, and other factors as deemed appropriate by the General Manager.

The District has already implemented emission mitigation measures reducing its annual GHG emissions by more than 600 metric tons of CO2, primarily due to the solar array (starting in 2011) and the biogas-fired cogeneration facilities (starting in 1991), with future mitigation measures planned to be net energy neutral.

V. SECTION 5 – LEGISLATIVE/REGULATORY OVERVIEW

A. Legislative/Regulatory Overview

The California Global Warming Solutions Act of 2006 (AB 32), is the dominant legislative initiative on climate change both statewide and nationally. While California's GHG emissions constitute only about 1.4 percent of the global total (and 6.2 percent of the U.S. total), the Legislature and Governor determined that California should take a leadership role in advancing technological and political solutions that could be adopted by other states.

AB 32 was the first comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions in GHG emissions by major industrial sources in California. AB 32 built on previous state legislation (AB 1493, passed in 2002) which required automakers to reduce GHG emissions from new cars and trucks sold in the state beginning in 2009 more than a year before AB 32 was signed into law. The Governor took climate change action via Executive Order to establish California GHG emission reductions to:

- 2000 levels by 2010 (11 percent below business as usual).
- 1990 levels by 2020 (25 percent below business as usual).
- 80 percent below 1990 levels by 2050.
- California's new goal of no carbon emissions by 2040.

The centerpiece of AB 32 was the requirement for the state to achieve a reduction in GHGs emitted in California to 1990 levels by 2020. In quantitative terms, this was 174 million metric tons of CO2 equivalent (174 MMT CO2E). This reduction will be accomplished through an enforceable statewide cap on GHGs that began implementation in January 2012. Under the authority of AB 32, the California Air Resources Board (ARB) developed appropriate regulations and has established a mandatory reporting system to track and monitor GHG emissions levels. In January 2009, ARB adopted the AB 32 Scoping Plan, which serves as the state's policy blueprint containing the broad overview of the programs, measures, and approaches to comply with AB 32. In developing the Plan, ARB was advised by the Climate Action Team (CAT), comprised of 14 state agencies and divided into 11 subgroups that address specific issue areas. The Water/Energy subgroup (WETCAT) was dedicated to examining the GHG reduction benefits from increased water use efficiency, given the energy demands of treating and distributing water; however, other subgroups such as the Land Use subgroup evaluated actions that could have a bearing on water/wastewater industry operations.

In December 2011 the CPUC issued a final decision in the Renewable Portfolio Standard (RPS) proceedings regarding renewable energy credits (RECs). The RPS required investor-owned and publicly-owned utilities to procure at least 33% of their energy from qualified renewable energy sources by the year 2020. RECs are an accounting tool the utilities use to demonstrate

compliance with the RPS and there are three REC categories. The final decision made some important distinctions among REC categories, including the third category for Tradable RECs or TRECs. The final decision clearly defines TRECs as being unbundled and limits their use for utility compliance with the RPS. This has the effect of reducing the value and potential revenue for treatment facilities with renewable energy sources dedicated to powering treatment facilities.

The Cap-and-Trade Rule became effective in 2012 which triggered market-based auctions for entities seeking energy credits and other climate change benefits. Currently the rule covers electricity (including imports) and large industrial facilities emitting more than 25,000 MTCO2e per year. Cap and trade is expected to expand and includes transportation fuel suppliers. Capped facilities will be allocated a certain amount of emissions per year and will be required to either reduce their emissions or purchase offsets annually. The current emissions limit for large industrial facilities excludes emissions from biogenic sources. The majority of the District's wastewater treatment plant emissions have been reduced significantly or meets the carbon neutral objective due to the installation of its 468-kW sized photovoltaic solar system and use of the WWTP's digester gas-fired cogeneration facilities, considered a biogenic source. The District's WWTP is currently excluded from the cap. Although the Rule has been active for several years and is well established, it continues to be challenged in courts. Some level of cap and trade market activity in California will persist as one of the key mechanisms for achieving the AB 32 emission reduction targets. Legislation and regulatory changes could occur at any time in this area and should be closely monitored by the District and its resource partners.

In February 2014, the ARB released its "Proposed First Update to the Climate Change Scoping Plan: Building on the Framework", as required by AB 32 on a recurrent five-year cycle, noting that the state was on track to meet the 20% GHG emission reduction goal by 2020.

Recent State legislation has encouraged water use efficiency, water recycling, and storm water capture and re-use projects to be incorporated into regional Integrated Regional Water Management Plan (IRWMP) programs throughout California to help meet carbon emission reduction targets. Recent legislation has also incentivized the water sector with preferences for funding IRWMP projects that achieve lower emissions with numeric targets; development of SWRCB green infrastructure permits to treat and capture urban runoff for local use; and development of a comprehensive groundwater management strategy by the SWRCB. These policies impact future wastewater flows for facilities throughout California.

The California Public Utilities Commission ("CPUC") did complete water-energy nexus rulemaking by 2016 and continues implementation of joint water-energy utility efficiency programs and partnerships to leverage co-funding opportunities between the electricity and water sectors for efficiency projects that achieve both energy and water savings. There is a reference to the concept of a "loading order", based on CPUC requirements for the electricity sector that prioritizes investments in energy efficiency ahead of developing new power supplies. Future legislative and regulatory actions will likely stress "the conservation-first" policy approach to be implemented through legislation or joint-agency action". The

conservation first mandate will need to be incorporated into regional integrated resource portfolios being developed state-wide in the water industry with some flexibility to account for hydrologic variation.

The District will continue to monitor legislative activity and collaborate with various entities who monitor, assess, and comment on proposals resulting from the AB 32 process. This may include, but is not limited to, the following agencies:

Water Environment Federation (WEF)
California Association Sanitation Agencies (CASA)
CA-NV Section AWWA
State Water Resources Control Board
California Department of Water Resources
California Water Environment Association (CWEA)
American Water Works Association (AWWA)
Association Metropolitan Water Agencies (AMWA)
California Urban Water Agencies (CUWA)

The District will evaluate the potential impacts of current and future climate change related legislation and assess impacts on plan adaptation and mitigation strategies. The District will update its Climate Action Plan as required to meet its emission reduction targets.

VI. SECTION 6 – DISTRICT AND PUBLIC EDUCATION

A. **DISTRICT**

Development and implementation of the District's CAP will involve participation from the entire organization. The Board will be responsible for approving the plan and authorizing resources to implement strategies and actions to accomplish plan goals and objectives. Employees will be involved in identifying cost-effective emission reduction opportunities and strategies that will enable the District to meet is emission reduction targets over time.

District staff will be provided with updates on the CAP which may include staff presentations, status reports at staff meetings, discussions at safety meetings, and other staff communication and engagement opportunities as needed to engage and involve employees in the climate action process.

District staff will also be key players in incorporating climate change into the District's CIP program and identifying operational efficiencies and practices that reduce emissions. Staff education on the topic of climate change and employee recognition for assisting the District meet plan goals and objectives will be part of the overall District outreach and education effort.

The District will accomplish effective communications within the organization regarding the Climate Action Plan using the following methods:

- Periodic Board Meeting updates
- Discussion at staff meetings
- Staff education/training
- Staff recognition for good ideas and recommendations
- Email communications and updates
- Staff assignments in support of Climate Action Plan implementation

Distract staff will stay abreast of advancements in climate change science and assessment tools for assisting agencies implement climate change programs and policies. This may include participation in professional organizations involved with climate change policy and strategies.

B. **PUBLIC EDUCATION**

The District will continue to inform the public and customers about climate change, potential impacts to the District, and actions the District is taking to reduce its emission levels. Having a Climate Action Plan in place will inform the public that climate change is a serious issue for the District to consider and mitigate in how its provides sustainable services to the community.

The District will use its website to share information about its climate action plan and document actions the District is taking to reduce its emissions. The website will provide plan updates as measures are implemented and new programs established, as well as other information on climate change. The District will accomplish effective communications with customers and the public regarding the District's Climate Action Plan using the following methods:

- Periodic communications (e.g. newsletters, Board meeting agenda items).
- Website information sharing and updates (plan updates, accomplishments).
- Receive climate change ideas and suggestions from customers and the public (online).

Oro Loma Sanitary District

Climate Action Plan

Appendix A – Glossary and Acronyms

AB32

Assembly Bill 32 (California Global Warming Solutions Act).

Adaptation

Initiatives and measures to reduce the vulnerability of natural and human systems to actual or expected climate change effects. Various types of adaptation exist, e.g. anticipatory and reactive, private and public, and autonomous and planned.

Afforestation

Direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources. See also Re- and Deforestation.

AMWA

Association of Metropolitan Water Agencies

Anthropogenic

Resulting from or produced by human actions

AR5

IPCC Fifth Assessment Report

AWWA

American Water Works Association

BCDC

Bay Conservation and Development Commission

Biofuel

Any liquid, gaseous, or solid fuel produced from plant or animal organic matter e.g. soybean oil, alcohol from fermented sugar, black liquor from the paper manufacturing process, wood as fuel, etc. Second-generation biofuels are products such as ethanol and biodiesel derived from ligno-cellulosic biomass by chemical or biological processes.

Biogenic

Resulting from or produced by biological processes.

Biomass

The total mass of living organisms in a given area or volume; dead plant material can be included as dead biomass.

Cap

Mandated restraint as an upper limit on emissions. The Kyoto Protocol mandates emissions caps in a scheduled timeframe on the anthropogenic GHG emissions released by Annex B countries. By 2008-2012 the EU e.g. must reduce its CO2- equivalent emissions of six greenhouse gases to a level 8 percent lower than the 1990-level.

Carbon Cycle

The set of processes such as photosynthesis, respiration, decomposition, and air-sea exchange, by which carbon continuously cycles through various reservoirs, such as the atmosphere, living organisms, soils, and oceans.

Carbon Offset

A carbon offset represents a quantity of GHG emission reductions, measured in units (usually metric tons) of carbon dioxide–that occur as a result of a discrete project.

CARB

California Air Resources Board

CAT

Climate Action Team

CCAR

California Climate Action Registry

CFC

Chlorofluorocarbon

CH_4

Methane

Climate Change

As defined in the IPCC AR4 report, climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity.

CNG

Compressed Natural Gas - Natural gas that has been compressed under high pressures, typically between 2000 and 3600 psi, and held in a container.

CO_2 Equivalent

The amount of CO_2 emission that would cause the same radiative forcing as an emitted amount of well-mixed greenhouse gas, or a mixture of well mixed greenhouse gases, all multiplied by their respective Global Warming Potentials to take into account the differing times they remain in the atmosphere.

DWR

Department of Water Resources

Emissions Trading

A market-based approach to achieving environmental and air quality objectives. It allows those reducing GHG emissions below their emission cap to use or trade the excess reductions to offset emissions at another source inside or outside the country. In general, trading can occur at the intra-company, domestic, and international levels. The Second Assessment Report by the IPCC adopted the convention of using permits for domestic trading systems and quotas for international trading systems. Emissions trading under Article 17 of the Kyoto Protocol is a tradable quota system based on the assigned amounts calculated from the emission reduction and limitation commitments listed in Annex B of the Protocol.

GHG

Greenhouse Gas - Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. This property causes the greenhouse effect. Water vapor, carbon dioxide, nitrous oxide, methane, and ozone are the primary greenhouse gases in the earth's atmosphere. There are also a number of human-made greenhouse gases in the atmosphere, such as halocarbons and other chlorine- and bromine-containing substances dealt with under the Montreal Protocol. Besides carbon dioxide, nitrous oxide and methane, the Kyoto Protocol deals with the greenhouse gases sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons.

Global Warming

Global warming refers to the gradual increase, observed or projected, in global surface temperature, as one of the consequences of radiative forcing caused by anthropogenic emissions.

Greenhouse Effect

Greenhouse gases effectively absorb infrared radiation, emitted by the Earth's surface, by the atmosphere itself due to the same gases and by clouds. Atmospheric radiation is emitted to all sides, including downward to the Earth's surface. Thus, greenhouse gases trap heat within the surface-troposphere system. This is called the greenhouse effect. Thermal infrared radiation in the troposphere is strongly coupled to the temperature at the altitude at which it is emitted. In the troposphere, the temperature generally decreases with height. Effectively, infrared radiation emitted to space originates from an altitude with a temperature of, on average, –19°C, in balance with the net incoming solar radiation, whereas the Earth's surface is kept at a much higher temperature of, on average, +14°C. An increase in the concentration of greenhouse gases leads to an increased infrared opacity of the atmosphere and therefore to an effective radiation into space from a higher altitude at a lower temperature. This causes a radiative forcing that leads to an enhancement of the greenhouse effect, the so-called enhanced greenhouse effect.

GWP

Global Warming Potential - The GWP is used to convert the amount of each gas (usually in tons) to a carbon dioxide equivalent (CO2-e) for ease of comparison.

HCFC

Hydrochlorofluorocarbon

IPCC

Intergovernmental Panel on Climate Change

IRWMP

Integrated Regional Water Management Plan

LNG

Liquified Natural Gas - Natural gas liquified either by refrigeration or by pressure.

Market Based Regulation

Regulatory approaches using price mechanisms (e.g., taxes and auctioned tradable permits), among other instruments, to reduce GHG emissions.

MGD

Millions of gallons per day

Mitigation

Technological change and substitution that reduce resource inputs and emissions per unit of output. Although several social, economic and technological policies would produce an emission reduction, with respect to climate change, mitigation means implementing policies to reduce GHG emissions and enhance sinks.

MMT

Million Metric Tons

MT

Metric Tons

WWTP

District Wastewater Treatment Plant

NOAA

National Oceanic and Atmospheric Administration

NO2

Nitrous Oxide

NOx

Reactive nitrogen oxides (the sum of NO and NO2)

ppm

Parts per Million

PV

Photovoltaic

REC

Renewable Energy Credit is a commodity representing proof that one megawatt-hour (MWh) of electricity was generated from a renewable energy source.

Relative Sea Level

Sea level measured by a tide gauge with respect to the land upon which it is situated. Mean sea level is normally defined as the average relative sea level over a period, such as a month or a year, long enough to average out transients such as waves and tides. See Sea level change.

Sea Level Rise/Change

Sea level can change, both globally and locally, due to (i) changes in the shape of the ocean basins, (ii) changes in the total mass of water and (iii) changes in water density. Sea level changes induced by changes in water density are called steric. Density changes induced by temperature changes only are called thermosteric, while density changes induced by salinity changes are called halosteric. See also Relative Sea Level; Thermal expansion.

Sequestration

Carbon storage in terrestrial or marine reservoirs. Biological sequestration includes direct removal of CO2 from the atmosphere through land-use change, afforestation, reforestation, carbon storage in landfills and practices that enhance soil carbon in agriculture.

Thermal Expansion

In connection with sea level, this refers to the increase in volume (and decrease in density) that results from warming water. A warming of the ocean leads to an expansion of the ocean volume and hence an increase in sea level. See Sea level change.

TREC

A Tradable Renewable Energy Credit (TREC) is a transaction in which an entity procures only a REC (and not the underlying energy) from another entity.

VMT

Vehicle Miles Traveled

VOC

Volatile Organic Compound