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Project 21-10845

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Subject: Cupertino Climate Change Risk and Vulnerability Assessment Peer Review Memorandum

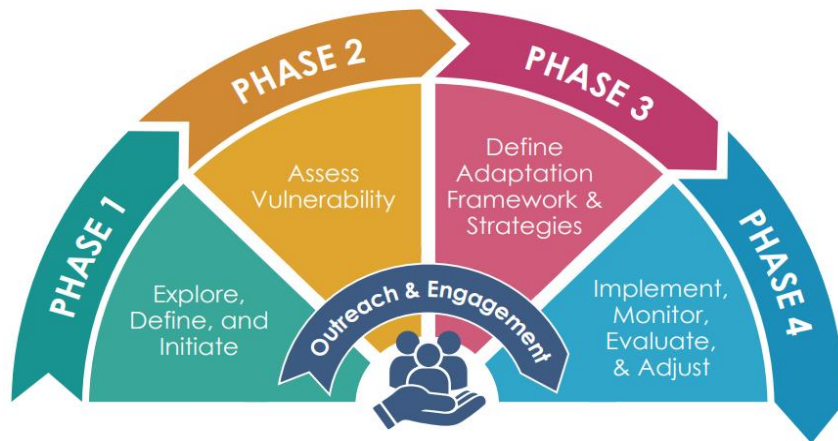
Purpose

As part of Task 5 of the Cupertino Climate Action Plan (CAP) Update, Rincon Consultants, Inc. (Rincon) is providing this consistency analysis to review the 2019 Cupertino Climate Change Risk and Vulnerability Assessment (CCRVA) against State climate change adaptation planning guidance. The Cupertino CCRVA identifies asset and population vulnerabilities to water scarcity, extreme heat, extreme precipitation events, flooding from sea level rise and rivers, and wildfires. The purpose of this analysis is to identify opportunities to align the Cupertino CCRVA with State guidance from the California Governor’s Office of Emergency Services (Cal OES) California Adaptation Planning Guide (APG) on preparing vulnerability assessments for purposes of adaptation planning. The recommendations provided in this analysis will allow the City to update the Cupertino CCRVA to bring it into alignment with the APG as part of the next Cupertino General Plan Safety Element Update.

Existing State Guidance

The APG was developed by Cal OES to support local government, regional organizations, and climate collaborative groups to integrate best practices and current science into adaptation and resilience planning efforts.¹In 2020, Cal OES updated the APG to meet requirements of Assembly Bill 246, which also established the Integrated Climate Adaptation and Resiliency Program to link the State’s climate adaptation strategies with local and regional efforts. Figure 1 illustrates the 2020 APG step-by-step process for communities to use as they plan for adaptation to ongoing and anticipated climate change.

Figure 1 2020 APG Adaptation Planning Process Phases

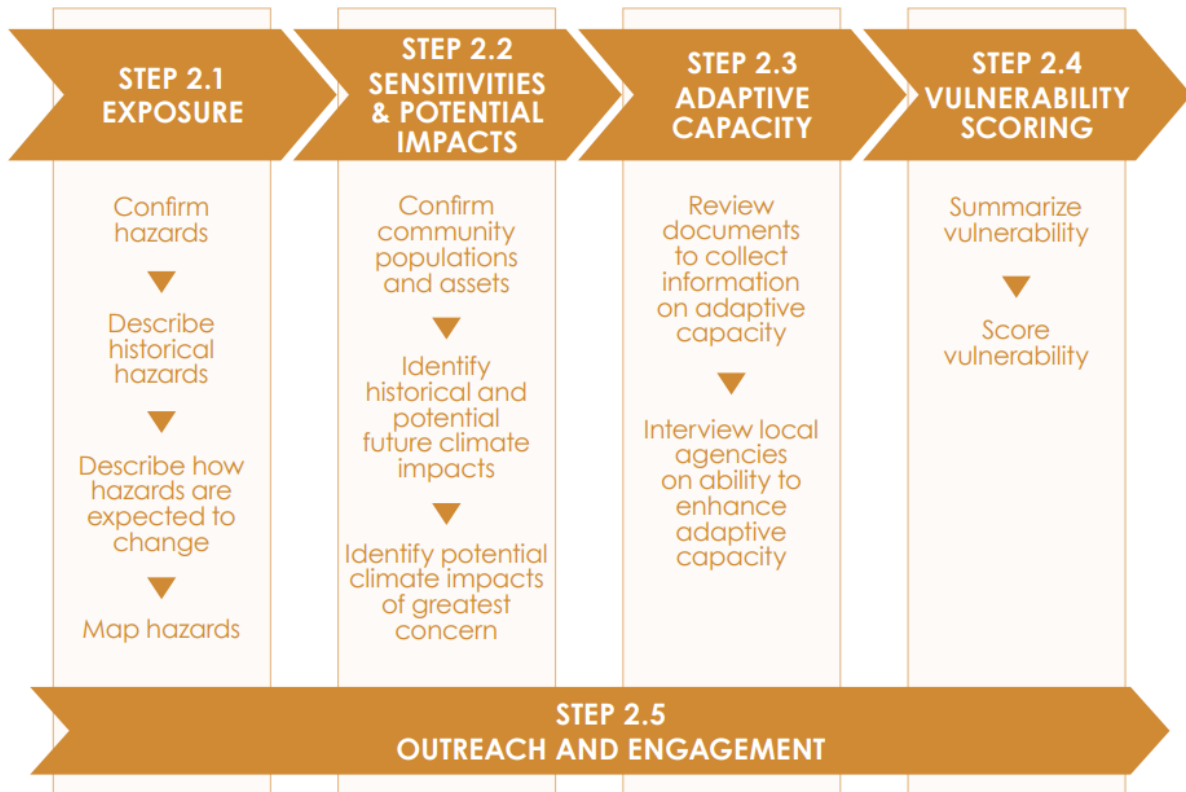


¹ Cal OES. 2020. California Adaptation Planning Guide. Available: <<https://www.caloes.ca.gov/HazardMitigationSite/Documents/CA-Adaptation-Planning-Guide-FINAL-June-2020-Accessible.pdf>>. Accessed May 14, 2021.



Vulnerability assessments are intended to identify and characterize the climate change hazards and other effects related to climate change within a specific community. As part of Adaptation Planning Process Phase 2 (Assess Vulnerability), the APG provides five distinct steps, shown in Figure 2. Completing each of the five steps gives jurisdictions a better understanding of the community’s main climate change vulnerabilities as well as which vulnerabilities to focus on when defining its adaptation framework and strategies as part of Adaptation Planning Process Phase 3.

Figure 2 Steps in APG Phase 2



Cupertino Climate Change Risk and Vulnerability Assessment

The City of Cupertino is a member of the Global Covenant of Mayors (GCoM), which consists of an international alliance of over 7,400 cities and partners committed to a shared long-term vision of combatting climate change. Participation in GCoM involves periodic reporting of Cupertino’s climate vulnerabilities. Consistent with the GCoM reporting standards, the City prepared a vulnerability assessment titled the City of Cupertino Cities Questionnaire 2019 CDP Report which documented community vulnerabilities related to water supply scarcity, extreme hot temperature, extreme precipitation, flooding, sea level rise, and wildfire. The report’s findings are based on a variety of sources, most notably Silicon Valley 2.0, a regional vulnerability assessment conducted for Santa Clara County and its member cities (including Cupertino). Specifically, Rincon reviewed the City of Cupertino Cities Questionnaire 2019 CDP Report for consistency with APG’s Phase 2 process for conducting vulnerability assessments. For purposes of this peer review, the City of Cupertino Cities Questionnaire 2019 CDP Report is also referred to as the Cupertino CCRVA.



APG Approach Consistency Review

Table 1 documents the consistency review analysis of the Cupertino CCRVA with the APG Phase 2 approach steps.

Table 1 APG Phase 2 Steps Consistency Review Analysis of Cupertino CCRVA

APG Phase 2 Step/Guidance	Relevant Content from the Cupertino CCRVA	Consistency Evaluation	Discussion
Step 2.1 Exposure			
Confirm hazards	The Cupertino CCRVA includes the following hazards: <ul style="list-style-type: none"> ▪ Water scarcity/drought ▪ Extreme hot temperature/ extreme hot days ▪ Extreme precipitation/ rainstorm ▪ Flood and sea level rise/ river flood ▪ Wildfire/forest fire 	Major hazards are addressed in the Cupertino CCRVA; however, the analysis is missing discussion on relevant topics.	The analysis is missing discussion of poor air quality impacts that can arise from wildfires burning in other counties and regions of the State and water quality degradation resulting from water temperature increases and decreased water flows. The analysis is also missing discussion of increasing ozone associated with increases in ambient temperatures. ²
Describe historical hazards	The Cupertino CCRVA describes the history of each identified climate hazard.	This sub-step is addressed in the Cupertino CCRVA.	There are no further recommendations.
Describe how hazards are expected to change	Projected changes from each identified climate hazard are described in the Cupertino CCRVA.	This recommendation is addressed in the Cupertino CCRVA; however, the source of the projection information and the representative concentration pathways (e.g., RCP 8.5 or RCP 4.5) are unclear.	Cal-Adapt ³ and California’s Fourth Climate Change Assessment – San Francisco Bay Area Region Report ⁴ are recommended sources. In some cases, the projections can be documented more specifically than what is currently discussed in the Cupertino CCRVA. For example: “The frequency of extreme heat days is predicted to increase dramatically” can instead say “Based on RCP 8.5, extreme heat days are projected to increase to an average of 8 days per year by mid-century and 19 days per year at end-of-century. This would be an increase of 60-280% per year, compared to the modeled historical frequency of 5 days per year on average (Cal Adapt).” This specificity shows the magnitude of projected climate change impacts and helps in prioritize adaptation strategies.
Map hazards	None of the identified hazards or assets at risk are mapped within the Cupertino CCRVA.	This step is not addressed in the CCRVA.	Mapping hazards helps visualize populations and assets that are projected to be the most impacted by climate change. Cal-Adapt provides free downloadable data in NetCDF, TIFF, and other formats for mapping hazards. ⁵ Overlaying community assets (i.e., hospitals, utility assets, transportation assets, etc.) and indices of

² University Corporation for Atmospheric Research. 2020. How Weather Affects Air Quality. Available: <<https://scied.ucar.edu/learning-zone/air-quality/how-weather-affects-air-quality>>. Accessed May 14, 2021.

³ Cal-Adapt. 2021. Available: <<https://cal-adapt.org/>>. Accessed May 14, 2021.

⁴ California, State of. 2018. California’s Fourth Climate Change Assessment – San Francisco Bay Area Region Report. Available: <https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-005_SanFranciscoBayArea_ADA.pdf>. Accessed May 14, 2021.

⁵ Cal-Adapt. 2021. Available: <<https://cal-adapt.org/data/download/>>. Accessed May 14, 2021.



			social vulnerability (i.e., CalEnviroScreen ⁶ and Healthy Places Index ⁷) is recommended.
Step 2.2 Sensitivities & Potential Impacts			
Confirm community populations and assets	<p>Areas/sectors covered by the Cupertino CCRVA:</p> <ul style="list-style-type: none"> ▪ Energy ▪ Water Supply & Sanitation ▪ Transport ▪ Food and agriculture ▪ Waste Management ▪ Information & Communications Technology ▪ Environment, Biodiversity and Forestry ▪ Industrial ▪ Commercial ▪ Residential ▪ Education ▪ Public health ▪ Emergency Management ▪ Land use planning <p>Vulnerable populations identified in the Cupertino CCRVA:</p> <ul style="list-style-type: none"> ▪ Low-income households ▪ Children & youth ▪ Elderly 	This sub-step is generally addressed in the Cupertino CCRVA; however, more detail would be valuable.	<p>The APG recognizes a variety of community asset categories and vulnerable population groups present in Cupertino. Many of these assets or populations are addressed in the Cupertino CCRVA, with the exception of:</p> <ul style="list-style-type: none"> ▪ Parks and Recreation ▪ Historic and cultural assets ▪ Public buildings and institutions ▪ Private institutions (private schools, religious facilities, childcare facilities) ▪ Communication (communication towers and lines) ▪ Non-English speakers ▪ Renters ▪ Non-white communities ▪ Veterans <p>There may be additional vulnerable populations that, although they do not appear to be present in Cupertino based on a score of 50 or less per the Healthy Places Index Tool, could indeed be present. Outreach to community-based organizations and relevant agencies and institutions could result in the identification of one or more of the following:</p> <ul style="list-style-type: none"> ▪ Homeless ▪ The unemployed or underemployed ▪ Students ▪ Visitors and seasonal residents ▪ Outdoor workers ▪ Single female heads of households ▪ Undocumented immigrants ▪ Tribal and indigenous communities ▪ Individuals with impaired health/disabilities ▪ Isolated individuals (e.g., no car or transit access) ▪ Individuals with no health insurance ▪ Individuals with educational attainment less than 4 years of college, and ▪ Individuals who live in areas of high crime, and ▪ Formerly incarcerated individuals.
Identify historical and potential future climate change impacts	The Cupertino CCRVA lists “social impact of hazard overall” and “most relevant assets/services affected overall.”	This sub-step is generally addressed in the Cupertino CCRVA; however, more detail would be valuable.	The Cupertino CCRVA describes historical or future climate change effects on identified populations or assets most affected, as recommended in the APG, however, the discussion is brief and does not evaluate impacts to each identified vulnerable population group and asset sector. For example, the impacts of extreme heat on low-income households or the elderly population were not assessed. Similarly, built assets, such as communication infrastructure, are not evaluated in detail. For example, communication

⁶ CalEnviroScreen 3.0. 2018. Available: <<https://oehha.ca.gov/calenviroscreen>>. Accessed May 14, 2021.

⁷ Public Health Alliance of Southern California. 2021. The California Healthy Places Index (HPI). Available: <<https://map.healthyplacesindex.org/>>. Accessed May 14, 2021.



			<p>infrastructure potentially damaged from flood or wildfire is not discussed.</p> <p>In addition to conducting desk research, the APG recommends interviewing stakeholders on historical and potential future climate change impacts.</p> <p>A more detailed description of if and how each climate hazard may affect each identified population group and each asset sector within the community is recommended.</p>
Identify potential climate change impacts of greatest concern	The Cupertino CCRVA does not identify the specific impacts that are of greatest concern to the community.	This sub-step is not addressed in the Cupertino CCRVA.	<p>The APG recommends reviewing the following questions when determining which impacts pose the greatest risk:</p> <ul style="list-style-type: none"> ▪ Which climate change impacts might result in loss of life or significant human health impacts? ▪ Which impacts might create disruptions or damages to essential facilities? ▪ Which impacts might generate significant losses for the local economy? ▪ Which impacts may create significant environmental impacts, such as release of hazardous materials? ▪ Are impacts of climate change effect short but acute, long term, or both? ▪ Could two or more impacts interact to result in a more severe impact (e.g., wildfires followed by extreme precipitation creating landslides)?
Step 2.3 Adaptive Capacity			
Review documents to collect information an adaptive capacity	The Cupertino CCRVA describes the main actions the City is taking to reduce the risk to and vulnerability of the city's infrastructure, services, and populations for each identified climate hazard.	This sub-step is generally addressed in the Cupertino CCRVA; however, more detail would be valuable.	<p>The Cupertino CCRVA provides one main action the City is taking for each identified climate hazard; however, the APG recommends reviewing documents that may outline policies, plans, or programs that already help manage climate change impacts or will in the future. Examples of adaptive capacity information missing in the Cupertino CCRVA include:</p> <ul style="list-style-type: none"> ▪ Recommended fire reduction projects in Cupertino wildland urban interface (WUI), described in the Santa Clara County Community Wildfire Protection Plan Annex 7 – City of Cupertino.⁸ ▪ Policies in Chapter 6: Environmental Resources and Sustainability Element of the General Plan (e.g., ES-2.1.5: Urban Forest – encourage the inclusion of additional shade trees, vegetated stormwater treatment and landscaping to reduce the “heat island effect” in development projects) ▪ Reference to efforts in the Emergency Operations Plan.⁹ ▪ Reference to strategies in the Santa Clara County Operational Area Hazard Mitigation Plan.¹⁰

⁸ Santa Clara County. 2017. Community Wildfire Protection Plan Annex 7 – City of Cupertino. Available: <https://www.sccfd.org/images/documents/fire_prevention/CWPP/Annex_7_City_of_Cupertino_2017.pdf>. Accessed May 14, 2021.

⁹ City of Cupertino. 2019. Emergency Operations Plan. Available: <<https://www.cupertino.org/home/showpublisheddocument?id=24990>>

¹⁰ Santa Clara County. 2017. Operational Area Hazard Mitigation Plan – Volume 2 – Planning Partnership Annexes. Available: <<https://www.sanjoseca.gov/home/showpublisheddocument?id=41887>>. Accessed May 14, 2021.



Interview local agencies on ability to enhance adaptive capacity	It is unclear whether the City interviewed local agencies on ability to enhance adaptive capacity as part of the Cupertino CCRVA.	This sub-step does not appear to be addressed in the Cupertino CCRVA.	<p>The APG recommends arranging interviews with local agencies to elicit information on existing and planned efforts to manage climate change impacts now and in the future, particularly the identified priority climate change impacts. Example interview questions include:</p> <p>Are there existing programs and policies that help the community manage climate change impacts?</p> <ul style="list-style-type: none"> ▪ How effective are they in managing present-day climate change impacts? ▪ Based on projected changes in climate, do you think they will be effective in managing future climate change impacts? ▪ Are there planned programs and policies that will help the community manage climate change impacts? ▪ How effective do you believe they will be in managing present-day climate change impacts? Future climate change impacts? ▪ What are the barriers to managing climate change impacts in the community? Are they related to institutional governance, attitudes and motivations, resources and funding, politics, leadership, expertise and technology, or other areas? <p>These interviews could serve as a starting point for developing Cupertino climate adaptation strategies.</p>
Step 2.4 Vulnerability Scoring			
Summarize vulnerability	The Cupertino CCRVA does not summarize the population and assets most vulnerable, climate change exposure, sensitivity and potential impact, or adaptive capacity.	This sub-step is not addressed in the Cupertino CCRVA.	The APG recommends summarizing the results of the Cupertino CCRVA in a table that describes vulnerability and consequence.
Score vulnerability	The Cupertino CCRVA does not score vulnerability.	This sub-step is not addressed in the Cupertino CCRVA.	The APG recommends scoring potential impact and adaptive capacity for each population and asset at risk for each climate change effect. These scores determine an overall vulnerability score that helps determine which vulnerabilities are most pressing and should be prioritized for adaptation action.
Step 2.5 Outreach and Engagement			
Collaborate with community members to identify neighborhood strengths, assets, and climate change effects	The Cupertino CCRVA does not document outreach and engagement activities conducted by the City on climate change vulnerability.	This sub-step is not addressed in the Cupertino CCRVA.	<p>The APG recommends:</p> <ul style="list-style-type: none"> ▪ Conducting targeted stakeholder interviews or focus groups to tap local knowledge, experience, and expertise, and understand historical climate hazards ▪ Developing storytelling timelines through personal narratives to engage with the community ▪ Participatory asset mapping to help residents understand the data behind the vulnerability assessment and projections. <p>Collecting information on how hazards have historically impacted built, natural, and community</p>



			assets by conducting interviews with asset managers and community-based organizations that serve vulnerable populations is recommended.
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Recommended Next Steps

Based on Rincon’s review of the Cupertino CCRVA with the APG, Rincon recommends the following updates to the Cupertino CCRVA with regard to APG Phase 2 approach steps as part of the next Cupertino General Plan Safety Element Update:

Step 2.1 Exposure

- a. Add air quality impacts of wildfire, water quality impacts of increased water temperature and decreased water supply, and increased ozone as a potential climate change hazard as part of Step 2 Exposure.
- b. Revise future impact of climate change hazard with projection data from Cal-Adapt and information from the California’s Fourth Climate Change Assessment San Francisco Bay Area Region Report.
- c. Map climate change hazards.
- d. Relevant resources include: Silicon Valley 2.0¹¹ and Cal-Adapt,¹² which provide local spatial data on climate change hazards

Step 2.2 Sensitivities & Potential Impacts

- a. Coordinate with Silicon Valley 2.0 Update to add identified vulnerable populations groups that are currently missing from the Cupertino CCRVA, including non-English speakers, renters, non-white communities, and veterans.
- b. Evaluate the impact climate hazards could have on the following asset categories that are currently missing from the assessment: parks and recreation, historic and cultural assets, public buildings and institutions, private institutions (private schools, religious facilities, childcare facilities), communication (communication towers and lines)
- c. Include a description of if and how each climate hazard has historically affected and may, in the future, affect each identified population group and asset in the community through desk research and interviewing stakeholders.
- d. Using the descriptions developed in Step 2.2b above, determining which climate change impacts pose the greatest risk.
- e. Relevant resources include: California Building Resilience Against Climate Effects (CalBRACE)¹³ and Healthy Places Index Tool.¹⁴

¹¹ Silicon Valley 2.0. <https://siliconvalleytwopointzero.org/vulnerability>

¹² Cal-Adapt. <https://cal-adapt.org/data/>

¹³ CalBRACE. <https://cdphdata.maps.arcgis.com/apps/MapSeries/index.html?appid=4093397556b4450ea563f23fcf353c64>

¹⁴ Healthy Places Index. <https://map.healthypacesindex.org/>



Step 2.3 Adaptive Capacity

- a. Review documents that may outline policies, plans, or programs that already help manage climate change impacts or will in the future, including:
 - Santa Clara County Community Wildfire Protection Plan Annex 7 – City of Cupertino
 - Cupertino General Plan Safety Element
 - Cupertino Emergency Operations Plan
 - Santa Clara County Operational Area Hazard Mitigation Plan
- b. Arrange interviews with local agencies and community-based organizations to elicit information on existing and planned efforts to manage climate change impacts now and in the future, particularly the identified priority climate change impacts.

Step 2.4 Vulnerability Scoring

- a. Summarize the results of the Cupertino CCRVA in a table that describes the vulnerability and corresponding consequence for each identified vulnerable population group/asset and climate change hazard.
- b. Score the vulnerability by scoring potential impact and adaptive capacity for each population and asset at risk for each climate change effect, as described in the APG. These scores determine an overall vulnerability score that helps determine which vulnerabilities are most pressing and should be prioritized for adaptation action.

Step 2.5 Outreach and Engagement

As part of the upcoming Cupertino Safety Element Update, conduct outreach and engagement through:

- a. targeted stakeholder outreach with long-standing, respected members of the community such as heads of local government agencies, residents from past planning processes, leaders of environmental partner organizations, and managers of hospitals or public health
- b. storytelling timelines of historical hazards using personal narratives, drawings, photos of past climate disasters and what the responses were
- c. participatory asset mapping through a GIS platform that allow residents to map their own content. This will help accurately capture local organizations, places, structures, and institutions that are most vulnerable to climate change impacts and can support resilience.