Crotch's Bumble Bee Avoidance Plan

Frank R. Bowerman Landfill Renewable Natural Gas Plant Project



Prepared for:

OC Waste & Recycling
11002 Bee Canyon Access Road
Irvine, CA 92602
Contact: Leila Barker, (714) 834-4013

Prepared by:

ECORP Consulting, Inc.
111 Academy Way, Suite 210
Irvine, CA 92617

August 2025

CONTENTS

1.0 INTRODUCTION 1
1.1 Project Location 1
1.2 Project Description 1
1.3 Crotch's Bumble Bee Natural History 1
1.4 Purpose and Need 2
2.0 CBB DISTRIBUTION WITHIN THE PROJECT 3
3.0 IMPACT ANALYSIS 3
4.0 CROTCH'S BUMBLE BEE AVOIDANCE MEASURES 4
5.0 REFERENCES 8

LIST OF APPENDICES

Appendix A – Figures

Appendix B – Orange County Fire Authority Plant Lists

Appendix C – Detailed Identification Photos for Training

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Definition
Bowerman Power	Bowerman Power LFG, LLC
CBB	Crotch's bumble bee
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
ECORP	ECORP Consulting, Inc.
ESA	Environmentally Sensitive Area
LFG	Landfill Gas
LFGTE	Landfill Gas to Energy
NCCP/HCP	Natural Communities Conservation Plan/Habitat Conservation Plan
OCFA	Orange County Fire Authority
OCWR	OC Waste & Recycling
RNG	Renewable Natural Gas
SoCalGas	Southern California Gas
Study Area	Project Site and 50-foot buffer

1.0 INTRODUCTION

ECORP Consulting, Inc. (ECORP) prepared this Crotch's bumble bee (CBB) Avoidance Plan for OC Waste & Recycling's (OCWR's) and Bowerman Power LFG, LLC's (Bowerman Power's) Frank R. Bowerman Landfill future Renewable Natural Gas (RNG) Plant (Project) in Orange County, California. The Project is anticipated to commence, starting with ground disturbances and vegetation removal in late 2025.

1.1 Project Location

The Project encompasses two primary areas of disturbance: the new RNG Plant and the new Southern California Gas (SoCalGas) pipeline (Appendix A, Figure 1). The RNG Plant will occupy 3.52 acres of undeveloped land on the eastern side of the Project site, adjacent to the existing Bowerman Power Plant and the FRB Landfill flare station. The proposed SoCalGas pipeline will span 2.4 miles, beginning at the RNG Plant and extending along Bee Canyon Access Road and Portola Parkway to connect with the existing pipeline infrastructure.

The Project is situated at the Frank R. Bowerman Landfill in Orange County, California and the site is bordered by Bee Canyon Access Road to the north and northeast, the existing Bowerman Power Landfill Gas to Energy (LFGTE) plant and flare station to the west, and open space and roads to the south. The Project site is surrounded by Orange County Central-Coastal Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP), Reserve open space. The site lies within the U.S. Geological Survey (USGS) El Toro 7.5-Minute Topographic Quadrangle Map. Surrounding land uses include other areas of Bowerman Landfill, open space, agricultural fields, residential areas, roads, and highways.

1.2 Project Description

The proposed Project would develop a RNG Plant and pipeline to process and transport landfill gas (LFG) that is produced by the Bowerman Landfill to the SoCalGas pipeline. The RNG Plant site would be approximately 3.52 acres in size and the proposed pipeline would extend approximately 2.4 miles. The RNG Plant would be designed to process a maximum of 6,000 standard cubic feet per minute of raw LFG at the inlet. The process would remove nitrogen, oxygen, carbon dioxide, sulfur hydroxide, hydrogen sulfide, volatile organic compounds, and other minor impurities to meet the specifications of SoCalGas.

1.3 Crotch's Bumble Bee Natural History

The CBB is found between San Diego and Redding in a variety of habitats including open grasslands, shrublands, chaparral, desert margins including Joshua tree and creosote scrub, and semi-urban settings. It is near endemic to California, with only a few records from Nevada and Mexico (CDFW 2022).

Similar to other bumble bee species, CBB is a generalist forager and visits a variety of flowering plants. It is a short-tongued bumble bee and is therefore best suited to forage on open flowers with short corollas (Hatfield et al. 2018). Plant families most commonly associated with CBB records in California include Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, Hydrophyllacae, Asclepiadaceae, and Boraginaceae (Hatfield et al. 2018). Other reports commonly associate CBB with plants in the genera *Antirrhinum*, *Phacelia*, *Clarkia*, *Cordylanthus*, *Dendromecon*, *Eschscholzia*, *Eriogonum*, *Hypericum*, *Lantana*, *Lupinus*,

Salvia, *Asclepias*, *Cirsium*, *Monardella*, *Keckiella*, *Acmispon*, *Euthamia*, *Ehrendorferia*, *Vicia*, *Trichostema, Chaenactis,* and/or *Medicago* as nectaring sources.

Bumble bees live in social colonies and have different division of labor (or castes) that include a queen (reproductive female), workers (nonreproductive females), drones (males), and gyne (females destined to become queens). The California Department of Fish and Wildlife's (CDFW's) survey considerations define the queen flight season as February through March, the gyne flight season as September through October, and the colony active period (highest detection probability) as April through August (CDFW 2023). For purposes of this CBB Avoidance Plan, the CBB nesting season is defined as March 15 to September 15 and the CBB overwintering season is defined as September 16 to March 14 of any given year.

CBB primarily nest underground, though colony sizes have not been well documented and may utilize similar nesting habitats as other *Bombus* species (Williams et al. 2014). In general, *Bombus* queens do not dig or make their own nests, but rather have been observed to occupy cavities in a variety of substrates including thatched grasses, abandoned rodent burrows or bird nests, brush piles, rock piles, and fallen logs (Alford 1975; Free and Gasking Butler 1959; Fussell and Corbet 1992; Lye et al. 2012; Sladen 1912; Williams et al. 2014) and have also been found nesting in human-made structures such as walls, rubble or abandoned furniture (Fussell and Corbet 1992; Williams et al. 2014). Bumble bee nests are annual and conclude with deaths of the queen, workers, and drones at the end of the season with only the mated gyne surviving the winter (overwintering) in order to emerge the following spring to start the next year's colony.

Very little is known about the overwintering habitat typically utilized by CBB. However, based on overwintering sites of other bumble bee species, it is possible that CBB overwinters in soft, disturbed soils or under leaf litter and other debris (Hatfield et al. 2018), and on grassy north-facing slopes (Liczner et al, 2019). Factors that have been identified as a substantial threat to the survival and reproduction of CBB include loss of habitat due to human landscape modifications (i.e., agricultural intensification, livestock grazing, urban development), increased use of herbicides and pesticides, competition, climate change, genetic factors, and disease and pathogen spillover (Hatfield et al. 2018).

1.4 Purpose and Need

The Crotch's bumble bee (*Bombus crotchii*; CBB) was petitioned for listing under the California Endangered Species Act (CESA) in October 2018 (Hatfield et al. 2018); it advanced to candidacy in June 2019 and was challenged in courts. The candidacy was temporarily stayed beginning in February 2021, and candidacy was reinstated in September 2022 (CDFW 2025a). As a state candidate species, CBB is afforded the same protections as a listed species under CESA. Although the Project is located within the Orange County Central-Coastal NCCP/HCP, CBB is not a Covered Species under the NCCP/HCP, therefore the OCWR does not have take coverage. Therefore, this CBB Avoidance Plan has been prepared to fully avoid direct impacts to CBB.

2.0 CBB DISTRIBUTION WITHIN THE PROJECT

ECORP conducted a literature review and ground truthing of mapped vegetation communities and land cover types (Appendix A, Figure 2), site photographs, and the plant list contained within the Biological Survey Report (Tetra Tech 2024) for their potential to provide suitable habitat for CBB. Suitable moderate- and high-quality foraging and nesting habitat is present within the disturbed and undisturbed sagebrush scrub communities, respectively (Appendix A; Figures 2 and 3). Low quality foraging and/or nesting habitat is also present within landscaped and disturbed habitat on either side of the paved roads within the 2.4-mile linear pipeline portion of the Project. The coast live oak and eucalyptus woodlands have low potential to provide foraging and nesting habitat due to the presence of a limited number of flowering annuals in the understory. Leaf litter in the understory, where present, may provide overwintering habitat.

Three focused CBB surveys were conducted in accordance with the CDFW approved CBB Survey Plan (ECORP 2025) on March 19, April 22, and May 7, 2025. The CBB technical report of findings is in the process of being prepared at the time of this Avoidance Plan. Prior to conducting focused CBB surveys, a database query of CDFW's California Natural Diversity Database (CNDDB; CDFW 2025b), and Xerces Society's Bumble Bee Watch (Xerces Society 2025) for historic and recent CBB occurrences within 5 miles of the Project was conducted. Two CNDDB, 23 iNaturalist, and six Bumble Bee Watch records have been recorded within 5 miles of the site. Two CBB queens were observed during focused surveys. The first CBB individual (CBB-1) was observed foraging in the maintained landscaping on a western redbud (*Cerces occidentalis*) between the landfill entry road and the offices within the 50-foot buffer of the proposed SoCalGas pipeline during the first focused CBB survey conducted on March 19, 2025 (Appendix A, Figure 3). The second CBB individual (CBB-2) was seen foraging on a black sage (*Salvia mellifera*), at the edge of the 50-foot buffer also along the proposed SoCalGas pipeline (Appendix A, Figure 3). Both CBB individuals were not collecting or carrying pollen. No CBB workers, males, or nests were detected during 2025 focused surveys.

3.0 IMPACT ANALYSIS

Suitable CBB habitat within the proposed RNG Plant is comprised primarily of sagebrush scrub with bands of coast live oak (*Quercus agrifolia*) habitat. The Project as currently designed will permanently impact 2.9 acres of sagebrush scrub in the Project site and Fuel Modification Area. The dominant shrub within this habitat is California sagebrush (*Artemisia californica*) which is not a CBB nectar resource. However, preferred nectaring resources are scattered throughout the sagebrush scrub including California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon*), white sage (*Salvia apiana*), black sage, Parry's phacelia (*Phacelia parryi*), and hairy vetch (*Vicia villosa*). A significant amount of landfill trash was present in the northeastern portion of the RNG Plant Project area on the southwest facing slope below Bee Canyon Access Road. Although the habitat quality was greatly diminished in this area at the time of the surveys, the sagebrush scrub as originally mapped is considered high quality habitat that could help support a nesting colony. Due to the presence of a variety of perennial and annual flowering resources that will come into flower at various times, the sagebrush scrub is considered high quality habitat that could help support a nesting colony. Coast live oak trees dominate along the slopes of the proposed RNG Plant with an understory of non-native grasses and some leaf litter. In addition, within the bounds of the

proposed RNG Plant is an approximately 35-foot-wide, unvegetated concrete channel. Multiple smaller concrete-lined channels of approximately one-foot width run downslope from the existing Bowerman Power Plant or Bee Canyon Road into the wider concrete channel. The concrete channels do not provide potential CBB habitat. Because the surrounding NCCP/HCP Reserve supports similar high-quality foraging, nesting, and overwintering habitat, the permanent loss of 2.9 acres of sagebrush scrub would not be significant as long as nests and overwintering queens are not directly affected. CBB choose nest and overwintering sites on an annual basis and locations cannot be determined beforehand based on presence of potential habitat. Should a nest or overwintering queen be present within the Project impact area at the time of construction, ground-disturbing activities may cause death or injury of bumble bees, eggs, and larva; burrow collapse; nest abandonment; and/or reduced nest success.

The proposed pipeline impact area will be limited to the existing developed roads that have been previously stabilized and will only require trenching during placement. Directly outside of the proposed pipeline area are some naturally occurring (i.e., sagebrush scrub) or naturalized habitats (i.e., eucalyptus [*Eucalyptus* sp.] grove), as well as artificial (i.e., ornamental trees) and disturbed habitats. Paved areas do not provide potential CBB habitat. A chain link fence occurs alongside much of the Bee Canyon Access Road, separating much of the surrounding habitat and steep terrain from the road. Ornamental trees included typical roadside species such as acacias (*Acacia* spp.) and conifers (*Pinus* spp.). Trenching activities, including stockpiling of dirt along road shoulders, parking, increased foot traffic, and traffic control associated with pipeline construction may result in temporary impacts, but would not result in significant impacts to CBB unless a CBB nest was present along the disturbed roadsides in locations where stockpiling, parking/staging, silt fence installation, or other ground disturbing activities would occur.

4.0 CROTCH'S BUMBLE BEE AVOIDANCE MEASURES

Biological Resources Mitigation Measures (MMs) identified by the Project's Draft Initial Study and Mitigated Negative Declaration (IS/MND) for the Bowerman Power Renewable Natural Gas Plant Project, SCH No. 2024100760 that would also help avoid, mitigate, and minimize impacts to potential Crotch bumble bee habitat include:

> **IS/MND BIO-1:** To address potential Project impacts to intermediate mariposa lily, an in-lieu fee shall be paid via minor amendment to the NCCP/HCP, as approved by USFWS [US Fish and Wildlife Service] and CDFW. The in-lieu fee will contribute to a management and monitoring program for rare plants in the Nature Reserve of Orange County.
>
> Silt fencing or flagging shall be installed under the guidance of a biological monitor along the limits of coastal sage scrub areas that are immediately outside of the grading/impact limits. The silt fencing/flagging shall be used to minimize impacts to sensitive natural resources including special-status plant species and native plant communities outside and immediately adjacent to the grading limits. Construction activities and personnel will be restricted within these adjacent coastal sage scrub areas and a biological monitor will be present during the silt fence/flagging installation and removal.

IS/MND BIO-2: Impacts to coastal sage scrub habitat shall occur outside the breeding and nesting season of the coastal California gnatcatcher (February 15 through July 15) to the extent practicable.

A pre-construction survey shall be conducted within the Project site and Fuel Modification Area to determine the presence/absence of coastal California gnatcatcher and coastal cactus wren prior to clearing or grading activities. The survey shall include a 100-foot buffer around the grading limits. Any coastal California gnatcatcher or coastal cactus wren observations shall be recorded and marked on the construction/grading plans.

All coastal sage scrub habitat outside of the Project impact area shall be fenced or marked with flagging materials prior to the commencement of grading. No construction access, parking, or storage of equipment or materials will be allowed within these areas.

A qualified biologist shall conduct and document a pre-construction meeting to educate construction staff (including supervisors, equipment operators, and other site employees) on all mitigation measures required for the Project.

A qualified biologist shall monitor the clearing of coastal sage scrub and oak woodland. USFWS/CDFW shall be notified at least 7 calendar days (preferably 14 calendar days) prior to clearing habitat occupied by Target/Identified Species, if observed. The qualified biologist shall ensure that clearing activities and earth-moving equipment do not harm coastal California gnatcatchers or coastal cactus wren. The biologist shall also ensure that these activities do not harm other species that may occur, including western spadefoot, orange-throated whiptail, red-diamond rattlesnake, and coast patch-nosed snake.

The access road(s) shall be sprayed with water on occasion to reduce dust accumulation on the leaves of coastal sage scrub species, as overseen by the biological monitor.

IS/MND BIO-3: Avoid ground-disturbing and vegetation removal activities during the nesting bird season (February 15 to September 15). If these activities must occur during the nesting season, a pre-construction nesting bird survey shall be conducted by a qualified biologist on and within 300 feet of the Project construction area. The survey shall be conducted no more than 10 days prior to initiation of ground-disturbance, vegetation clearing, or construction activities and repeated between delays of greater than 10 days during the nesting season.

If an active nest is found, an appropriate no-disturbance buffer for the species shall be visibly established in the field by a qualified biologist (e.g., flagging, staking, caution tape). No ground-disturbing or vegetation removal activities shall occur within the buffer until the nesting season has ended or the nest is vacated and juveniles have fledged, as determined by the qualified biologist. At the discretion of a qualified biologist, limited encroachment into the buffer may occur for non-listed bird species but no disturbance of active nests or nesting activities is allowed per the Migratory Bird Treaty Act.

In addition to the above applicable IS/MND mitigation measures, the following CBB specific avoidance and minimization measures are proposed for areas with potential CBB nesting, foraging, and

overwintering habitat. Within paved areas that have no CBB habitat such as the developed road where trenching of the pipeline will occur, no avoidance measures are required.

IS/MND BIO-4: For work occurring during Crotch's bumble bee nesting season between March 15 through September 15 where potential nesting habitat occurs, a pre-construction nesting survey shall occur prior to ground disturbing or vegetation trimming activities within the Project's work area and a 50-foot buffer. A qualified CBB biologist, whose resume has been submitted and approved by CDFW, will conduct a nest clearance survey within two weeks of ground disturbing construction activities. Surveys shall be conducted during daylight hours when ambient temperatures are between 60°F-90°F. In the event that a bumble bee nest is suspected (i.e. bumble bee was observed to have entered a burrow or tree cavity, or disappeared under a shrub or into thatch), the suspected nest location will be passively observed for at least 20 minutes to confirm the presence/absence of a nest. A minimum 50-foot no disturbance buffer will be established and visibly flagged for avoidance if a nest location is discovered and the discovery shall be reported to CDFW by the qualified CBB biologist within 24 hours of discovery. If CBB and/or CBB nests are detected, surveys should record the location of the nest, nest substrate, slope, aspect, and distance to nearest active foraging areas (if known), number of CBB observed, and vegetation used by individuals. During active construction, the qualified CBB biologist will monitor the nest on a weekly basis and will update the buffer size as necessary and in coordination with CDFW to ensure protection. Construction activities will not occur within the buffer until the nest is no longer active as determined by the qualified CBB biologist[1] and CDFW will be notified prior to deactivation of the avoidance buffer and commencement of construction activities in this area. The CBB qualified biologist shall submit results of preconstruction surveys to CDFW prior to start of vegetation removal activities and shall provide a weekly status update should a CBB nest no disturbance buffer be established and until the nest is determined to be no longer active.

IS/MND BIO-5: Herbicide and insecticide use shall be limited to spot spraying individual plants that are not in bloom and avoiding all rodent burrows to the greatest extent possible within suitable CBB nesting areas. The qualified CBB biologist will review the proposed spray areas with OCWR and contractor to ensure burrows and nectar sources are avoided to the greatest extent possible.

IS/MND BIO-6: Temporary impacts to nectar sources shall be restored in place through either broadcasting of appropriate CBB seed mix[2] or by incorporating the seed mix into a hydro-mulch

[1] Monitoring periods of 1 hour for 3 consecutive days shall be conducted by the qualified CBB biologist and shall be determined "no longer active" if no activity has been observed and supported by lack of observations of gynes and/or males foraging.

[2] Outside of fuel modification areas, the appropriate seed mix shall include at least one annual and perennial species of preferred nectar sources, that are region-specific herbs/shrubs from the following plant list: sages (*Salvia* spp.), buckwheat (*Eriogonum* spp.), lupines (*Lupinus* spp.), legumes (Fabaceae family), owl's clover (*Orthocarpus* spp.), and milkweed (*Asclepias* spp.). Within fuel modification areas, the seed mix will contain suitable nectar sources that are consistent with the Orange County Fire Authority (OCFA) Fuel Modification Zone Plant List (see Appendix B). The plant palette should be developed in conjunction with the CBB qualified biologist and the OCWR biologist and approved by CDFW to develop a seed mix that satisfies all restoration/stabilization requirements.

application. Minor vegetation trimming to preferred nectar sources, that are expected to recover naturally within one year, do not require restoration.

IS/MND BIO-7: A qualified CBB biologist shall attend the pre-construction meeting (see IS/MND BIO-2) to educate construction staff (including supervisors, equipment operators, other site employees, and biological monitors) on all CBB specific mitigation measures required by this CBB Avoidance Plan. Training Materials (tri-fold colored pamphlet) shall be provided at the training and shall include detailed photos that can be utilized as a reference for qualified biological monitors to identify CBB and implement the avoidance measures appropriately (Appendix C). Training Materials will assist in training contractor staff in recognizing bumble bees and inform them of potential penalties (aka monetary fines, project delays, jail time) for take of CBB or other CESA violations.

IS/MND BIO-8: CDFW shall be notified at least 14 calendar days prior to initial vegetation removal and ground disturbing activities in areas identified as potential CBB nesting, foraging, or overwintering habitat, regardless of time of year. All CBB detections shall be reported to CDFW via email within 24-hours of detection. A qualified biological monitor that has received the CBB training and is in possession of the Training Materials shall monitor the staking of limits, clearing and grubbing, and removal of stockpiled vegetation from the site until the site no longer provides potential CBB habitat. The biological monitor shall be responsible for monitoring CBB when they are detected and shall ensure active foraging patches are not removed until the CBB(s) leave the area on their own volition. The biological monitor, shall monitor the slow and methodical removal of vegetation in patches and by hand where necessary should CBB nesting or overwintering behavior be observed (scanning the ground instead of targeting flowering resources, seen entering a burrow or disappearing into thick vegetation and not re-emerging, sitting on the open ground), until it is confirmed that a CBB nest or overwintering site is not present. Should the project result in unpermitted take of a Crotch's bumble bee individual or nest, work shall immediately halt and CDFW shall be immediately notified by the CBB biologist.

5.0 REFERENCES

Alford, D. V. 1975. *Bumblebees*. Davis-Poynter, London.

California Department of Fish and Wildlife (CDFW). 2025a. State and Federally Listed Endangered and Threatened Animals of California. State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, California Natural Diversity Database (CNDDB). Published January 2025.

_____. 2025b. RareFind 5 (Internet), Online Version 5.2.14. Dated: March 10, 2025. California Natural Diversity Database. The Resources Agency, Sacramento.

_____. 2023. *Survey and Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species*. State of California, Natural Resources Agency, Department of Fish and Wildlife. Published June 2023.

_____. 2022. CDFW Seeks Public Comment Related to Crotch's Bumble Bee, Franklin's Bumble Bee, Suckley's Cuckoo Bumble Bee and Western Bumble Bee. Available from: https://wildlife.ca.gov/News/Archive/cdfw-seeks-public-comment-related-to-crotchs-bumble-bee-franklins-bumble-bee-suckleys-cuckoo-bumble-bee-and-western-bumble-bee#gsc.tab=0.

ECORP Consulting, Inc. [ECORP]. 2025. *Proposed Survey Plan for Crotch Bumble Bee Focused Surveys for the Frank R. Bowerman Landfill Renewable Natural Gas Plant, Orange County, California* dated March 5, 2025.

Free, J. B., and Colin Gasking Butler. 1959. *Bumblebees*. Collins.

Fussell, M., and S.A. Corbet. 1992. Flower Usage by Bumble-Bees: A Basis for Forage Plant Management. Source: *Journal of Applied Ecology*. Volume 29.

Hatfield, R., S. Jepsen, S. F. Jordan, M. Blackburn, and A. Code. 2018. *Petition to List Four Species of Bumble Bees as Endangered Species under the California Endangered Species Act*. Submitted by The Xerces Society for Invertebrate Conservation, Defenders of Wildlife, and Center for Food Safety.

Liczner, A.R., Colla, S.R. 2019. A systematic review of the nesting and overwintering habitat of bumble bees globally. J Insect Conserv 23, 787–801 (2019). https://doi.org/10.1007/s10841-019-00173-7.

Lye, G.C., J.L. Osborne, K.J. Park, and D. Goulson. 2012. Using citizen science to monitor *Bombus* populations in the UK; nesting ecology for and relative abundance in the urban environment. *Journal of Insect Conservation* 16:697-707.

OC Waste & Recycling [OCWR]. 2024. Initial Study/Mitigated Negative Declaration Bowerman Power Renewable Natural Gas Plant Project Frank R. Bowerman Landfill Orange County, CA. October 24, 2024. Available online at: https://oclandfills.com/page/bowerman-power-rng-ceqa.

Sladen, F.W. Lambert. 1912. *The Humble-bee: its Life-history and how to Domesticate it*. Macmillan and Company, limited.

Tetra Tech. 2024. Biological Survey Report Bowerman Power Renewable Natural Gas Plant Project Frank R. Bowerman Landfill Orange County, CA. October 24, 2024.

Williams, P. H., R. W. Thorp, L. L. Richardson, and S. R. Colla. 2014. *The Bumble Bees of North America: An Identification Guide*. Princeton University Press, Princeton.

Xerces Society. 2025. Wildlife Preservation Canada, York University, University of Ottawa, The Montreal Insectarium, The London Natural History Museum, BeeSpotter. 2021. Data accessed from Bumble Bee Watch,, a collaborative website to track and conserve North America's bumble bees. Available from http://www.bumblebeewatch.org/app/#/bees/lists (accessed March 10, 2025).

LIST OF APPENDICES

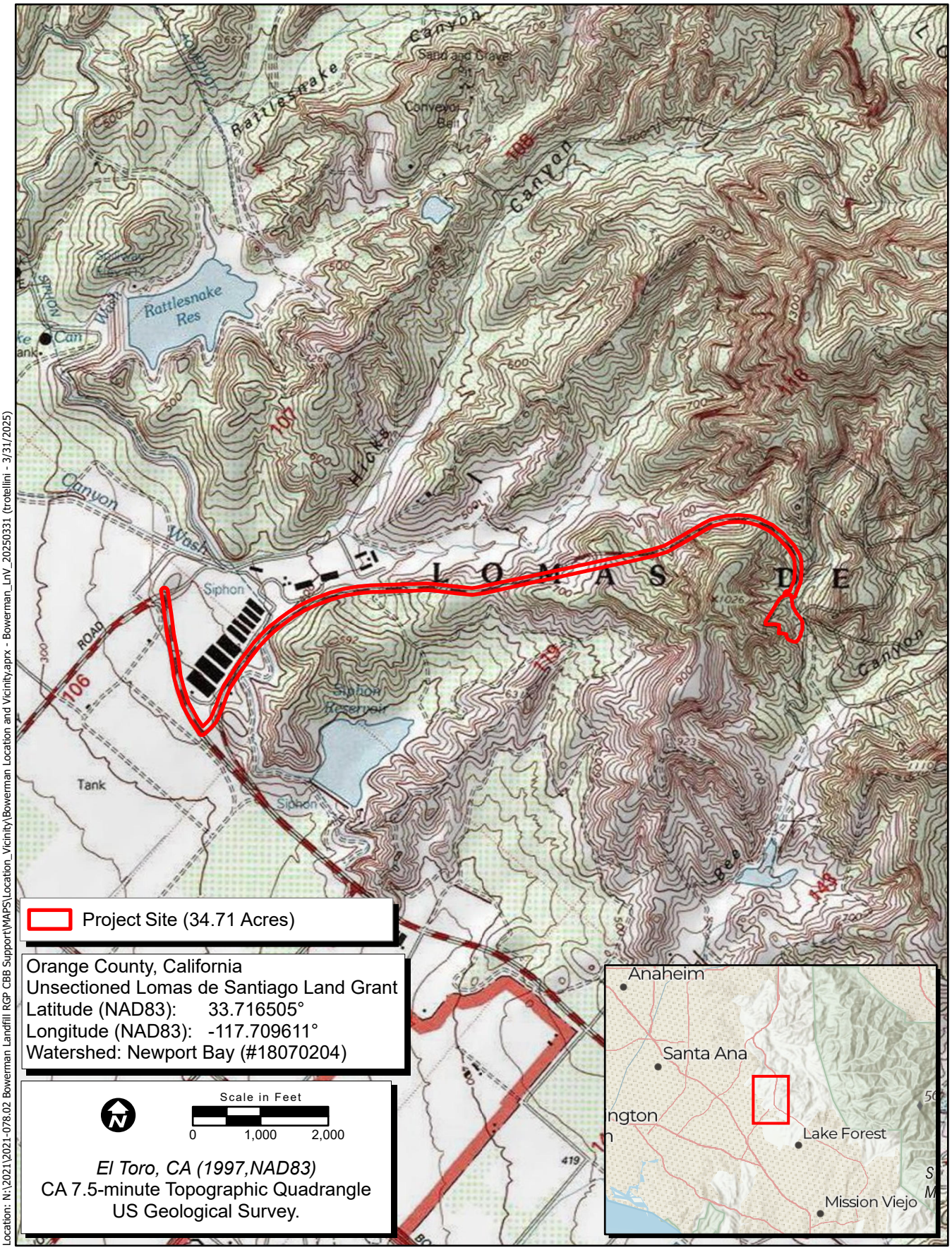
Appendix A – Figures

Appendix B – Orange County Fire Authority Plant Lists

Appendix C – Detailed Identification Photos for Training

APPENDIX A

Figures



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Location_Vicinity\Bowerman Location and Vicinity.aprx - Bowerman_LnV_20250331 (trotellini - 3/31/2025)

Map Date: 3/31/2025
Sources: ESRI, USGS

Figure 1. Project Location and Vicinity



Map Contents

- SoCalGas Pipeline Alignment

Vegetation Communities

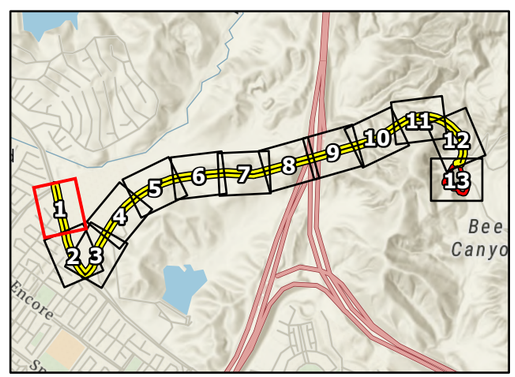
- Ornamental trees

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 1 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

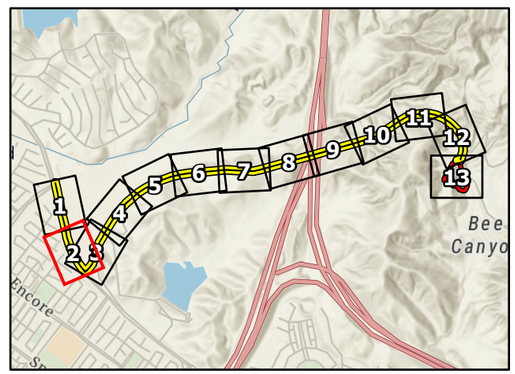
Vegetation Communities

- Eucalyptus
- Ornamental trees
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 2 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

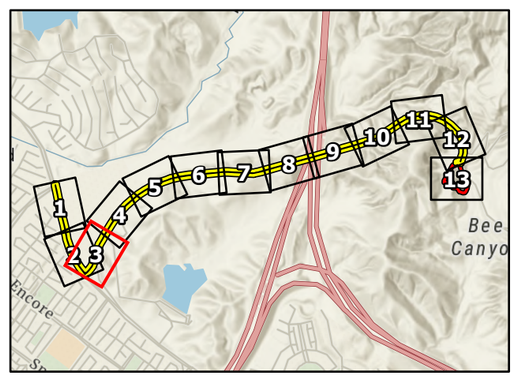
Vegetation Communities

- Eucalyptus
- Ornamental trees
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman_Vegetation_20250331 (kedwards - 8/13/2025).aprx - Bowerman_Vegetation

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 3 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

Eucalyptus

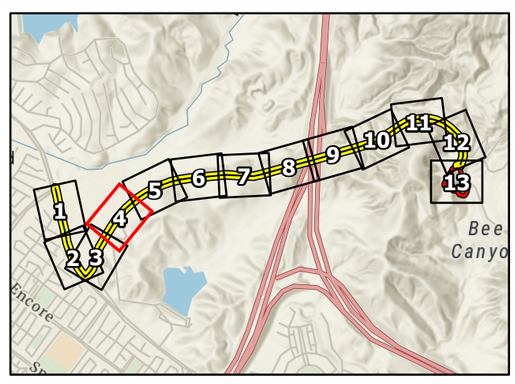
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 4 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

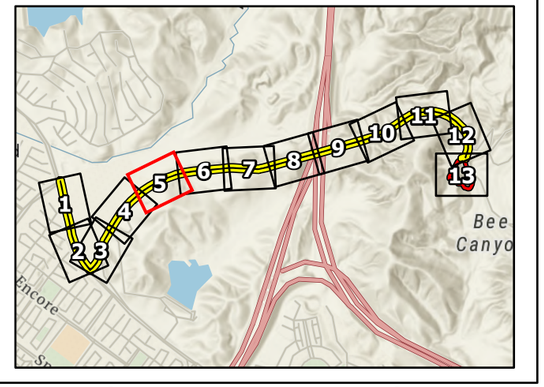
Eucalyptus

Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 5 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

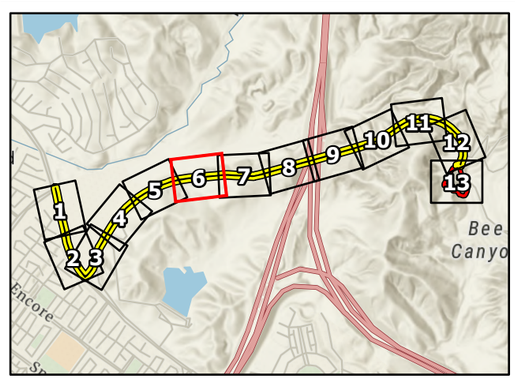
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 6 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

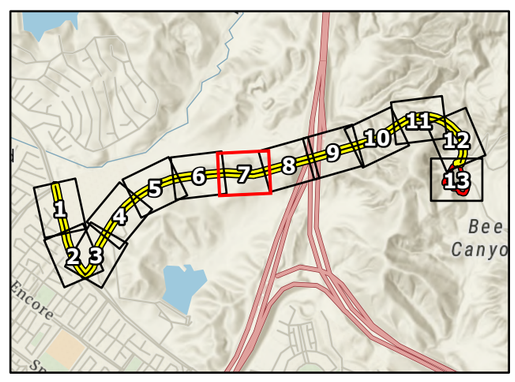
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 7 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

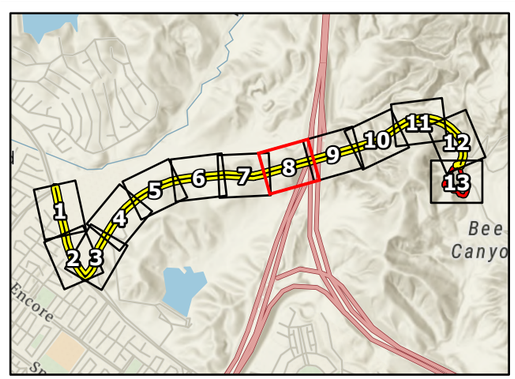
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 8 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

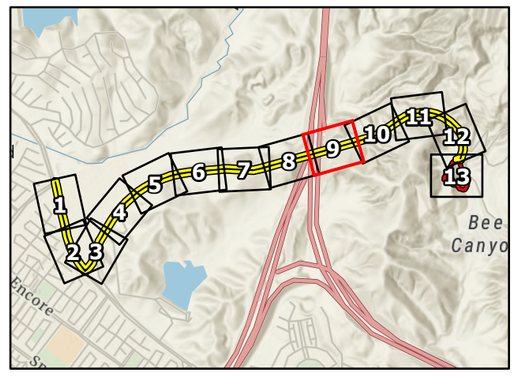
Vegetation Communities

- Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 9 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

Vegetation Communities

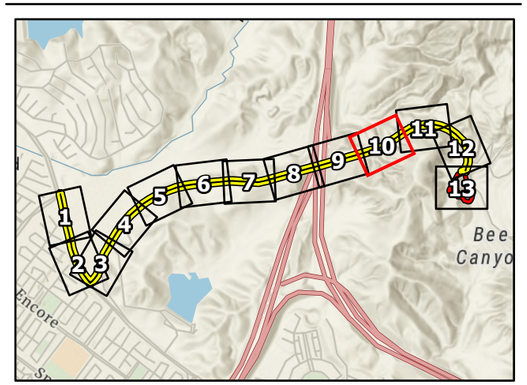
- Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 10 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

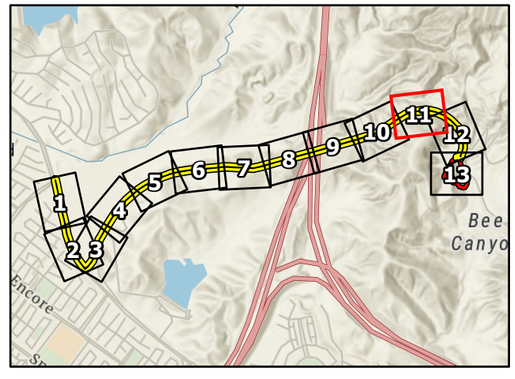
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 11 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

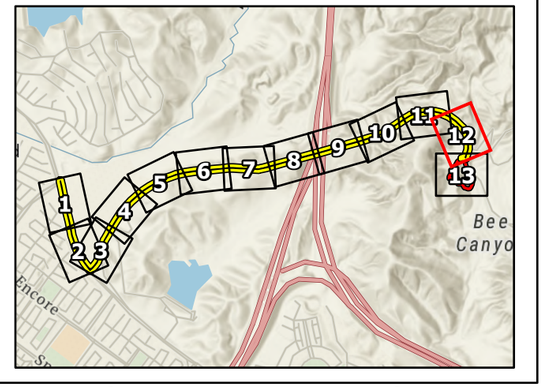
Vegetation Communities

- Sagebrush Scrub

Land Cover Types

- Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 12 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

Vegetation Communities

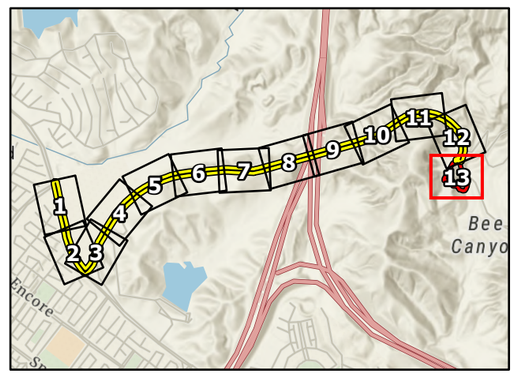
- Coast Live Oak
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 13 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

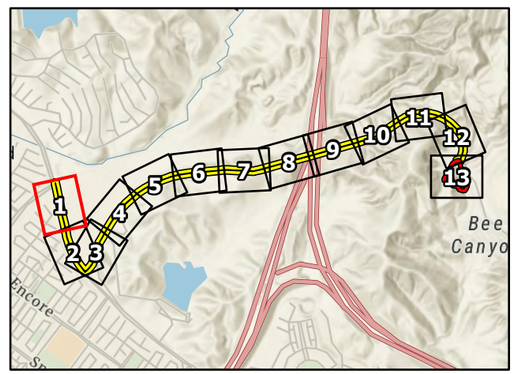
- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 1 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



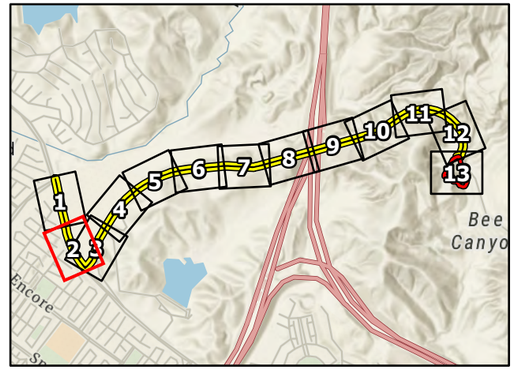
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 2 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



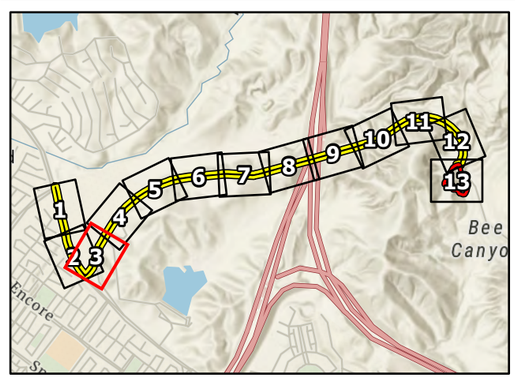
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 3 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

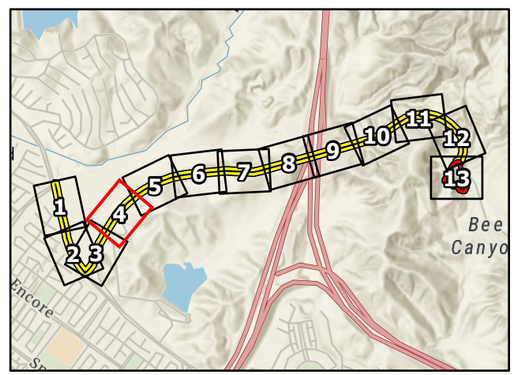
- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 4 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



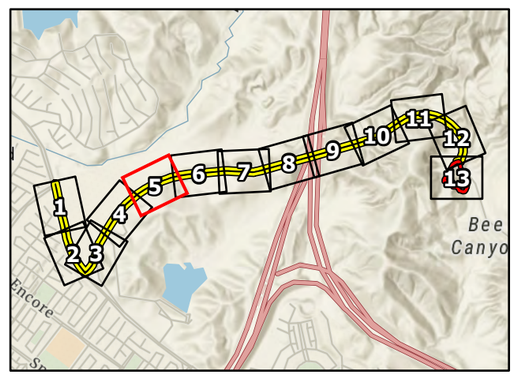
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 5 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

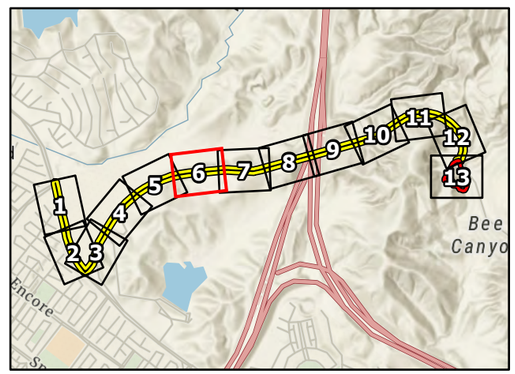
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 6 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Crotch's Bumble Bee Observations

Crotch's Bumble Bee Observation (5/7/2025)

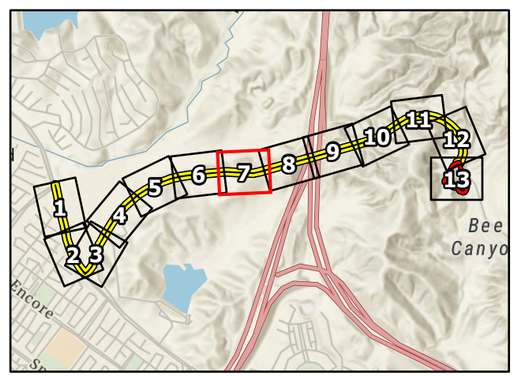
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 7 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

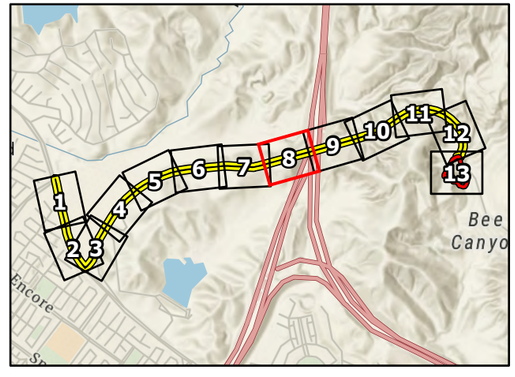
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 8 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



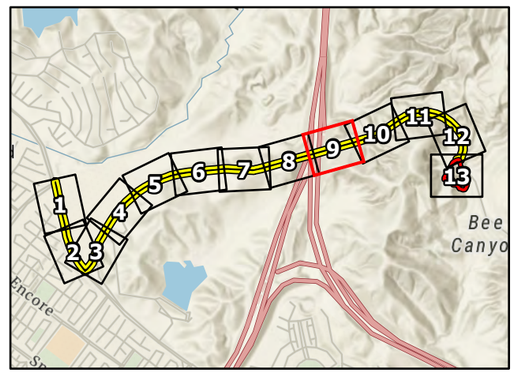
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 9 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



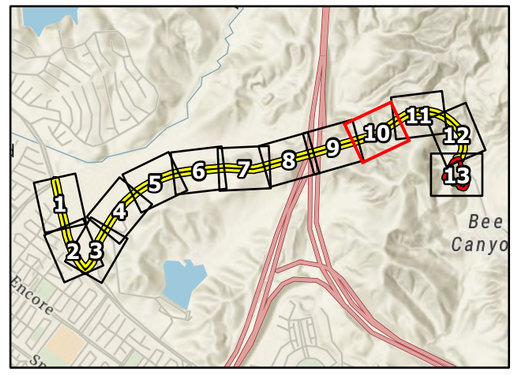
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



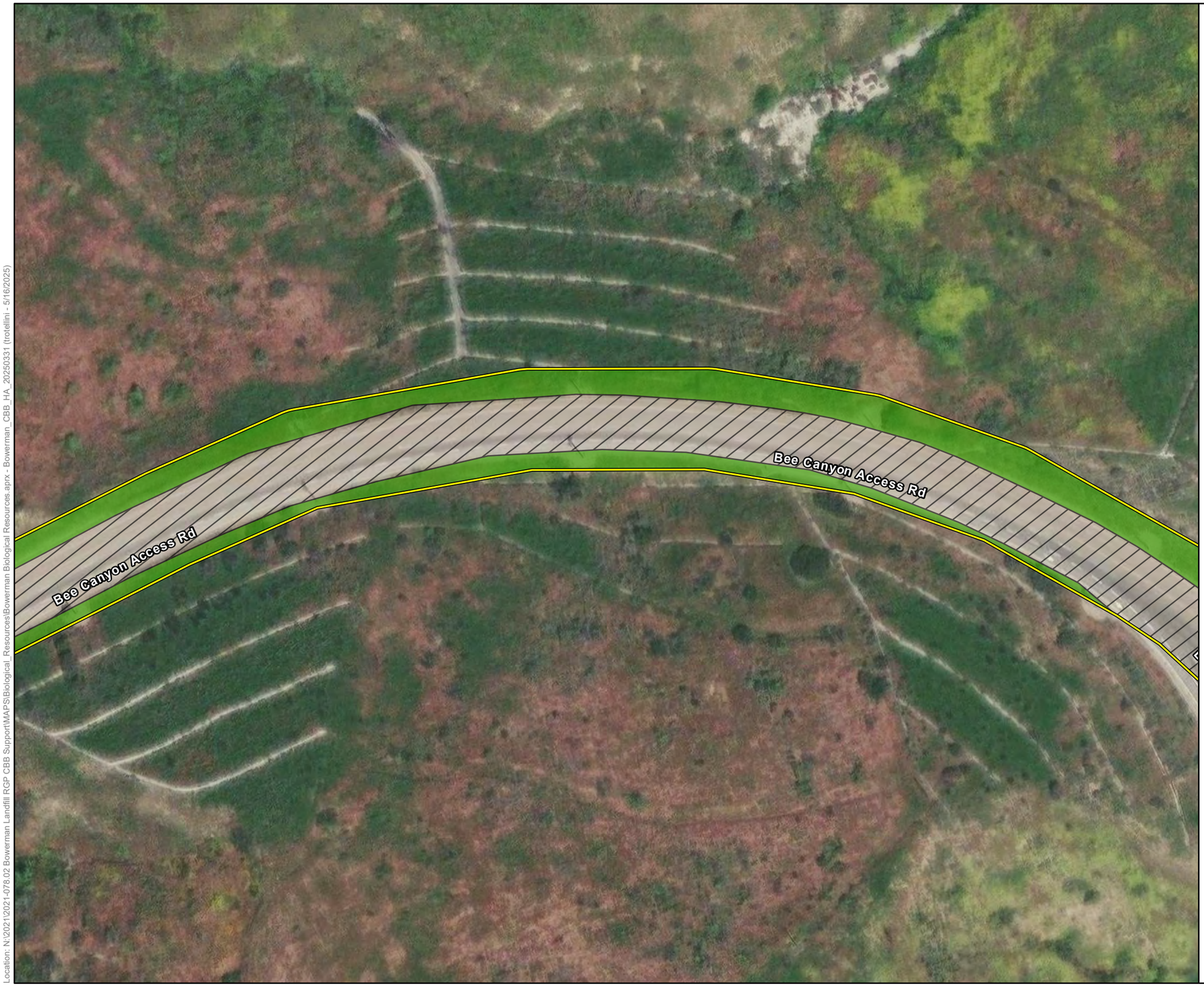
Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 10 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

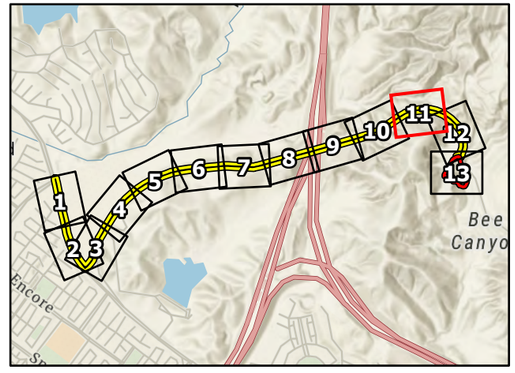
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 11 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

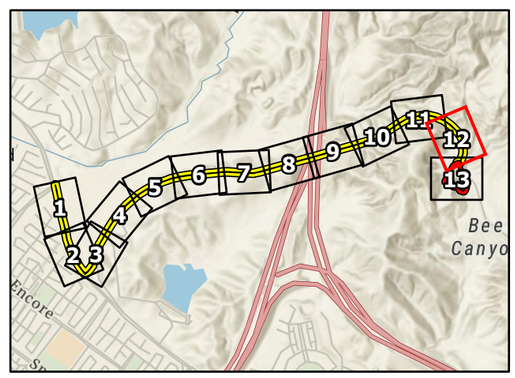
Crotch's Bumble Bee Observations

- Crotch's Bumble Bee Observation (3/19/2025)

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Medium Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 12 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



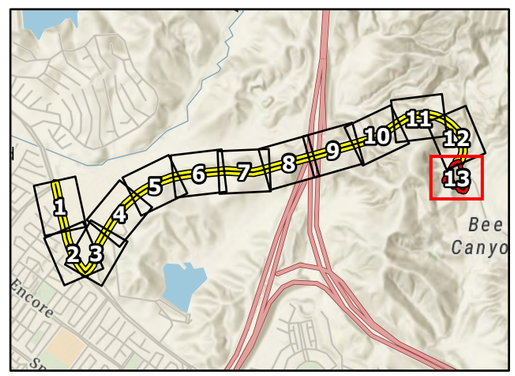
Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Medium Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 13 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

APPENDIX B

Orange County Fire Authority Plant Lists

ATTACHMENT 7

Undesirable and Invasive Plant Species

Certain plants are considered to be undesirable and invasive due to their physical or chemical characteristics. Physical properties that would contribute to high flammability include large amounts of dead material retained within the plant, rough or peeling bark, and the production of copious amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. Certain native plants are notorious for containing these volatile substances.

Plants with these characteristics shall not be planted in any fuel modification zones or anywhere within the area covered by Alternate Methods & Materials agreements (see Section 4: Alternate Materials & Methods). Should these species already exist within these areas, they shall be removed because of their invasiveness or potential threat they pose to structures.

PLANT SPECIES (MANDATORY REMOVAL)

Botanical Name	Common Name
Adenostoma Fasciculatum	Chamise
Adenostoma Sparsifolium	Red Shanks
Anthemix Cotula	Mayweed
Artemisia Californica	California Sagebrush
Brassica Nigra	Black Mustard
Brassica Rapa	Wild Turnip, Yellow Mustard, Field Mustard
Cardaria Draba	Hoary Cress, Perennial Peppergrass
Cirsium Vulgare	Wild Artichoke
Conyza Canadensis	Horseweed
Cynara Cardunculus	Artichoke Thistle
Eriogonum Fasciculatum	Common Buckwheat
Heterothaca Grandiflora	Telegraph Plant
Lactuca Serriola	Prickly Lettuce
Nassella/Stipa tenuissima	Mexican Feathergrass
Nicotiana Bigelevil	Indian Tobacco
Nicotiana Glauca	Tree Tobacco
Pennisetum alopecuroides	Fountain Grass
Ricinus Communis	Castor Bean Plant
Sacsola Austails	Russian Thistle/Tumbleweed
Salvia Mellifera	Black Sage
Silybum Marianum	Milk Thistle
Tamarix Ramosissima	Salt Cedar
Urtica Urens	Burning Nettle
Ornamental:	
Arecaceae (all palm species)	Palms
Cycas Revoluta	Sago Palms
Cortaderia	Pampas Grass
Cupressus sp	Cypress
Eucalyptus sp	Eucalyptus
Juniperus sp	Juniper
Pinus sp	Pine

ATTACHMENT 8
Fuel Modification Zone Plant List

Symbol Legend

X = Plant species prohibited in wet and dry FMZs adjacent to reserve lands. Acceptable on all other fuel modification locations and zones.

W = Plant species appropriate for use in wet FMZs adjacent to reserve lands. Acceptable in all other wet and irrigated dry (manufactured slopes) fuel modification locations and zones.

o = Plant species native to Orange County. Acceptable in all fuel modification wet and dry zones in all locations.

N = Plant species acceptable on a limited basis (maximum 30% of the area) in wet FMZs adjacent to reserve lands. Acceptable on all other FMZs.

* = If locally collected.

** = Not native but can be used in all zones.

n = Plant species acceptable on a limited use basis. Refer to qualification requirements following plant palette.

Yellow row = Plant species susceptible to Invasive Shot Hole Borers (ISHB) infestation.

	Code	Botanical Name	Common Name	Plant Form
1.	W	Abelia x grandiflora	Glossy Abelia	Shrub
2.	n	Acacia redolens desert carpet	Desert Carpet	Ground Cover
3.	o	Acer macrophyllum	Big Leaf Maple	Tree
4.	X	Achillea millefolium	Common Yarrow	Low Shrub
5.	W	Achillea tomentosa	Woolly Yarrow	Low Shrub
6.	X	Aeonium decorum	Aeonium	Ground cover
7.	X	Aeonium simsii	no common name	Ground cover
8.	W	Agave attenuata	Century Plant	Succulent
9.	W	Agave shawii	Shaw's Century Plant	Succulent
10.	N	Agave victoriae-reginae	no common name	Ground Cover
11.	X	Ajuga reptans	Carpet Bugle	Ground Cover
12.	W	Alnus cordata	Italian Alder	Tree
13.	o	Alnus rhombifolia	White Alder	Tree
14.	N	Aloe arborescens	Tree Aloe	Shrub
15.	N	Aloe aristata	no common name	Ground Cover
16.	N	Aloe brevifoli	no common name	Ground Cover
17.	W	Aloe Vera	Medicinal Aloe	Succulent
18.	W	Alogyne huegeii	Blue Hibiscus	Shrub
19.	o	Ambrosia chammissonis	Beach Bur-Sage	Perennial

	Code	Botanical Name	Common Name	Plant Form
20.	o	Amorpha fruticosa	Western False Indigobush	Shrub
21.	W	Anigozanthus flavidus	Kangaroo Paw	Perennial/accent
22	o	Antirrhinum nuttalianum ssp.	no common name	Subshrub
23.	X	Aptenia cordifolia x 'Red Apple'	Red Apple Aptenia	Ground cover
24.	W	Arbutus unedo	Strawberry Tree	Tree
25.	W	Arctostaphylos 'Pacific Mist'	Pacific Mist Manzanita	Ground Cover
26.	W	Arctostaphylos edmundsii	Little Sur Manzanita	Ground Cover
27.	o	Arctostaphylos glandulosa ssp.	Eastwood Manzanita	Shrub
28.	W	Arctostaphylos hookeri 'Monterey Carpet'	Monterey Carpet Manzanita	Low Shrub
29.	N	Arctostaphylos pungens	no common name	Shrub
30.	N	Arctostaphylos refugioensis	Refugio Manzanita	Shrub
31.	W	Arctostaphylos uva-ursi	Bearberry	Ground Cover
32.	W	Arctostaphylos x 'Greensphere'	Greensphere Manzanita	Shrub
33.	N	Artemisia caucasica	Caucasian Artesmisia	Ground Cover
34.	X	Artemisia pycnocephala	Beach Sagewort	Perennial
35.	X	Atriplex canescens	Four-Wing Saltbush	Shrub
36.	X	Atriplex lentiformis ssp. breweri	Brewer Saltbush	Shrub
37.	o	Baccharis emoyi	Emory Baccharis	Shrub
38.	W o	Bacharis pilularis ssp. Consanguinea	Chaparral Bloom	Shrub
39.	X	Baccharis pilularis var. pilularis	Twin Peaks #2	Ground Cover
40.	o	Baccharis salicifolia	Mulefat	Shrub
41.	N	Baileya Multiradiata	Desert Marigold	Ground Cover
42.	N n	Bougainvillea spectabilis	Bougainvillea	Shrub
43.	o	Brickellia californica	no common name	Subshrub
44.	W o	Bromus carinatus	California Brome	Grass
45.	o	Camissonia cheiranthifiloa	Beach Evening Primrose	Perennial Shrub
46.	N	Carissa macrocarpa	Green Carpet Natal Plum	Ground Cover/Shrub
47.	X	Carpobrotus chilensis	Sea Fig Ice Plant	Ground Cover
48.	W	Ceanothus gloriosus 'Point Reyes'	Point Reyes Ceanothus	Shrub
49.	W	Ceanothus griseus 'Louis Edmunds'	Louis Edmunds Ceanothus	Shrub
50.	W	Ceanothus griseus horizontalis	Yankee Point	Ground Cover
51.	W	Ceanothus griseus var. horizontalis	Carmel Creeper Ceanothus	Shrub
52.	W	Ceanothus griseus var. horizontalis	Yankee Point Ceanothus	Shrub
53.	o	Ceanothus megarcarpus	Big Pod Ceanothus	Shrub
54.	W	Ceanothus prostratus	Squaw Carpet Ceanothus	Shrub
55.	o	Ceanothus spinosus	Green Bark Ceanothus	Shrub
56.	W	Ceanothus verrucosus	Wart-Stem Ceanothus	Shrub
57.	W	Cerastium tomentosum	Snow-in-Summer	Ground cover/Shrub
58.	W	Ceratonia siliqua	Carob	Tree
59.	W	Cercis occidentalis	Western Redbud	Shrub/Tree

	Code	Botanical Name	Common Name	Plant Form
60.	X	Chrysanthemum leucanthemum	Oxeye Daisy	Ground Cover
61.	W	Cistus Crispus	no common name	Ground Cover
62.	W	Cistus hybridus	White Rockrose	Shrub
63.	W	Cistus incanus	no common name	Shrub
64.	W	Cistus incanus ssp. Corsicus	no common name	Shrub
65.	W	Cistus salviifolius	Sageleaf Rockrose	Shrub
66.	W	Cistus x purpureus	Orchid Rockrose	Shrub
67.	W	Citrus species	Citrus	Tree
68.	o	Clarkia bottae	Showy Fairwell to Spring	Annual
69.	o	Cneoridium dumosum	Bushrue	Shrub
70.	o	Collinsia heterophyllia	Chinese Houses	Annual
71.	W o	Comarostaphylis diversifolia	Summer Holly	Shrub
72.	N	Convolvulus cneorum	Bush Morning Glory	Shrub
73.	W	Coprosma kirkii	Creeping Coprosma	Ground Cover/Shrub
74.	W	Coprosma pumila	Prostrate Coprosma	Low shrub
75.	o	Coreopsis californica	Califiornia Coreopsis	Annual
76.	W	Coreopsis lanceolata	Coreopsis	Ground Cover
77.	N	Corea pulchella	Australian Fuscia	Ground Cover
78.	W	Cotoneaster buxifolius	no common name	Shrub
79.	W	Cotoneaster congestus ‘Likiang’	Likiang Cotoneaster	Ground Cover/Vine
80.	W	Cotoneaster aprneyi	no common name	Shrub
81.	X	Crassula lactea	no common name	Ground Cover
82.	X	Crassula multicava	no common name	Ground Cover
83.	X	Crassula ovata	Jade Tree	Shrub
84.	X	Crassula tetragona	no common name	Ground Cover
85.	W o	Croton californicus	California Croton	Ground Cover
86.	X	Delosperma ‘alba’	White trailing Ice Plant	Ground Cover
87.	o	Dendromecon rigida	Bush Poppy	Shrub
88.	o	Dichelostemma capitatum	Blue Dicks	Herb
89.	N	Distinctis buccinatoria	Blood-Red Trumpet Vine	Vine/Climbing vine
90.	N	Dodonaea viscosa	Hopseed Bush	Shrub
91.	X	Drosanthemum floribundum	Rosea Ice Plant	Ground Cover
92.	X	Drosanthemum hispidum	no common name	Ground Cover
93.	X	Drosanthemum speciosus	Dewflower	Ground Cover
94.	o	Dudleya lanceolata	Lance-leaved Dudleya	Succulent
95.	o	Dudleya pulverulenta	Chalk Dudleya	Succulent
96.	W	Elaeagnus pungens	Silverberry	Shrub
97.	o	Encelia californica	California Encelia	Small Shrub
98.	o *	Epilobium canum [Zauschneria californica]	Hoary California Fuschia	Shrub
99.	o	Eriastrum Sapphirinum	Mojave Woolly Star	Annual
100.	N	Eriobotrya japonica	Loquat	Tree

	Code	Botanical Name	Common Name	Plant Form
101.	o	Eriodictycon trichocalyx	Yerba Santa	Shrub
102.	W o	Eriophyllum confertiflorum	no common name	Shrub
103.	W	Erythrina species	Coral Tree	Tree
104.	N	Escallonia species	Several varieties	Shrub
105.	W o	Eschscholzia californica	California Poppy	Flower
106.	X	Eschscholzia mexicana	Mexican Poppy	Herb
107.	N	Euonymus fortunei	Winter Creeper Euonymus	Ground Cover
108.	N	Feijoa sellowiana	Pineapple Guava	Shrub/Tree
109.	N	Fragaria chiloensis	Wild Strawberry/Sand Strawberry	Ground Cover
110.	o	Frankenia salina	Alkali Heath	Ground Cover
111.	W	Fremontondendron californicum	California Flannelbush	Shrub
112.	X	Gaillardia x grandiflora	Blanketflower	Ground Cover
113.	W	Galvezia speciosa	Bush Snapdragon	Shrub
114.	W	Garrya ellipta	Silktassel	Shrub
115.	X	Gazania hybrids	South African Daisy	Ground Cover
116.	X	Gazania rigens leucolaena	Training Gazania	Ground Cover
117.	o	Gilia capitata	Globe Gilia	Perennial
118.	W	Gilia leptantha	Showy Gilia	Perennial
119.	W	Gilia tricolor	Bird's Eyes	Perennial
120.	W	Ginkgo biloba	Maidenhair Tree	Tree
121.	o	Gnaphalium californicum	California Everlasting	Annual
122.	W	Grewia occidentalis	Starflower	Shrub
123.	o	Grindelia stricta	Gum Plant	Ground Cover
124.	N n	Hakea suaveolens	Sweet Hakea	Shrub
125.	W	Hardenbergia comptoniana	Lilac Vine	Shrub
126.	N	Heliathemum muutabile	Sunrose	Ground Cover/Shrub
127.	o	Helianthemum scoparium	Rush Rose	Shrub
128.	o	Heliotropium curassavicum	Salt Heliotrope	Ground Cover
129.	X	Helix Canariensis	English Ivy	Ground Cover
130.	W	Hesperaloe parviflora	Red Yucca	Perennial
131.	o n	Heteromeles arbutifolia	Toyon	Shrub
132.	X	Hypericum calycimum	Aaron's Beard	Shrub
133.	N	Iberis sempervirens	Edging Candytuft	Ground Cover
134.	N	Iberis umbellatum	Globe Candytuft	Ground Cover
135.	o	Isocoma menziesii	Coastal Goldenbush	Small Shrub
136.	o	Isomeris arborea	Bladderpod	Shrub
137.	W	Iva hayesiana	Poverty Weed	Ground Cover
138.	N	Juglans californica	California Black Walnut	Tree
139.	o	Juncus acutus	Spiny Rush	Perennial
140.	o	Keckiella antirrhinoides	Yellow Bush Penstemon	Subshrub
141.	o	Keckiella cordifolia	Heart Leaved Penstemon	Subshrub

	Code	Botanical Name	Common Name	Plant Form
142.	o	Keckiella ternata	Blue Stemmed Bush Penstemon	Subshrub
143.	W	Kniphofia uvaria	Red Hot Poker	Perennial
144.	W	Lagerstroemia indica	Crape Myrtle	Tree
145.	W	Lagunaria patersonii	Primrose Tree	Tree
146.	X	Lamprathus aurantiacus	Bush Ice Plant	Ground Cover
147.	X	Lampranthus filicaulis	Redondo Creeper	Ground Cover
148.	X	Lampranthus spectabilis	Trailing Ice Plant	Ground Cover
149.	W	Lantana camara cultivars	Yellow Sage	Shrub
150.	W	Lantana montevidensis	Trailing Lantana	Shrub
151.	o	Lasthenia californica	Dwarf Goldfields	Annual
152.	W	Lavandula dentata	French Lavender	Shrub
152.	W	Leptospermum laevigatum	Australian Tea Tree	Shrub
154.	W	Leucophyllum frutescens	Texas Ranger	Shrub
155.	o	Leymus condensatus	Giant Wild Rye	Large Grass
156.	N	Ligustrum japonicum	Texas privet	Shrub
157.	X	Limonium pectinatum	no common name	Ground Cover
158.	X	Limonium perezii	Sea Lavender	Shrub
159.	W n	Liquidambar styraciflua	American Sweet Gum	Tree
160.	W	Liriodendron tulipfera	Tulip Tree	Tree
161.	X	Lonicera japonica ‘Halliana’	Hall’s Japanese Honeysuckle	Vining Shrub
162.	o	Lonicera subspicata	Wild Honeysuckle	Vining Shrub
163.	X	Lotus corniculatus	Bird’s Foot Trefoil	Ground Cover
164.	o	Lotus hermannii	Northern Woolly Lotus	Perennial
165.	o	Lotus scoparius	Deerweed	Shrub
166.	W	Lupinus arizonicus	Desert Lupine	Annual
167.	W	Lupinus benthamii	Spider Lupine	Annual
168.	o	Lupinus bicolor	Sky Lupine	Flowering annual
169.	o	Lupinus sparsiflorus	Loosely Flowered Annual Lupine or Coulter’s Lupine	Annual
170.	W	Lyonothamnus floribundus ssp. Asplenifolius	Fernleaf Ironwood	Tree
171.	W	Macadamia integrifolia	Macadamia Nut	Tree
172.	W	Mahonia aquifolium ‘Golden Abundance’	Golden Abundance Oregon Grape	Shrub
173.	W	Mahonia nevenii	Nevin Mahonia	Shrub
174.	o	Malacothamnus fasciculatus	Chapparal Mallow	Shrub
175.	X	Malephora luteola	Training Ice Plant	Ground Cover
176.	W	Maytenus boaria	Mayten Tree	Tree
177.	W	Melaleuca nesophila	Pink Melaleuca	Shrub
178.	N	Metrosideros excelsus	New Zealand Christmas Tree	Tree
179.	o *	Mimulus species	Monkeyflower	Flower
180.	o	Mirabilis californica	Wishbone Bush	Perennial
181.	N	Myoporum debile	no common name	Shrub

	Code	Botanical Name	Common Name	Plant Form
182.	W	Myoporum insulare	Boobyalla	Shrub
183.	W	Myoporum parvilfolium	no common name	Ground Cover
184.	W	Myoporum 'Pacificum'	no common name	Ground Cover
185.	o	Nassella (stipa) lepidra	Foothill Needlegrass	Ground Cover
186.	o	Nassella (stipa) pulchra	Purple Needlegrass	Ground Cover
187.	o	Nemophilia menziesii	Baby Blue Eyes	Annual
188.	X	Nerium Oleander	Oleander	Shrub
189.	o	Nolina cismontana	Chapparal Nolina	Shrub
190.	N	Nolina species	Mexican Grasstree	Shrub
191.	W	Oenothera belandieri	Mexican Evening Primrose	Ground Cover
192.	N	Oenothera hookeri	California Evening Primrose	Flower
193.	W	Oenothera speciosa	Show Evening Primrose	Perennial
194.	X	Ophiopogon japonicus	Mondo Grass	Ground Cover
195.	o *	Opuntia littoralis	Prickly Pear	Cactus
196.	o *	Opuntia oricola	Oracle Cactus	Cactus
197.	o *	Opuntia prolifera	Coast Cholla	Cactus
198.	W	Osmanthus fragrans	Sweet Olive	Shrub
199.	X	Osteospermum fruticosum	Training African Daisy	Ground Cover
200.	X	Parkinsonia aculeata	Mexican Palo Verde	Tree
201.	W	Pelargonium peltatum	Ivy Geranium	Ground Cover
202.	X	Penstemon species	Beard Tongue	Shrub
203.	W	Photinia fraseria	no common name	Shrub
204.	W	Pistacia chinesis	Chinese Pistache	Tree
205.	X	Pittosporum undulatum	Victorian Box	Tree
206.	o	Plantago erecta	California Plantain	Annual
207.	**	Plantago insularis	Woolly Plantain	Annual
208.	X	Plantago sempervirens	Evergreen Plantain	Ground Cover
209.	W	Plantanus racemosa	California Sycamore	Tree
210.	W	Plumbago auritulata	Plumbago Cape	Shrub
211.	o	Popolus fremontii	Western Cottonwood	Tree
212.	X	Portulacaria afra	Elephant's Food	Shrub
213.	o	Potentilla glandulosa	Sticky Cinquefoil	Subshrub
214.	X	Potentilla tabernaemontanii	Spring Cinquefoil	Ground Cover
215.	X	Prunus caroliniana	Carolina Cherry Laurel	Shrub/Tree
216.	o	Prunus ilicifolia ssp. Ilicifolia	Holly Leafed Cherry	Shrub
217.	X	Prunus lyonii	Catalina Cherry	Shrub/Tree
218.	N	Punica granatum	Pomegranate	Shrub/Tree
219.	W	Puya species	Puya	Succulent/Shrub
220.	W	Pyracantha species	Firethorn	Shrub
221.	o	Quercus agrifolia	Coast Live Oak	Tree
222.	o n *	Quercus berberdifolia	California Scrub Oak	Shrub
223.	o n *	Quercus dumosa	Coastal Scrub Oak	Shrub

	Code	Botanical Name	Common Name	Plant Form
224.	X	Quercus engelmannii	Engelmann Oak	Tree
225.	X	Quercus suber	Cork Oak	Tree
226.	X	Rhamnus alaternus	Italian Buckthorn	Shrub
227.	o	Rhamnus californica	California Coffee Berry	Shrub
228.	o	Rhamnus crocea	Redberry	Shrub
229.	o	Rhamnus crocea ssp. Ilicifolia	Hollyleaf Redberry	Shrub
230.	N	Rhaphiolepis species	Indian Hawthorne	Shrub
231.	o	Rhus integrifolia	Lemonade Berry	Shrub
232.	N	*Searsia Lancea*	African Sumac	Tree
233.	o n	Rhus ovata	Sugar bush	Shrub
234.	o	Ribes aureum	Golden Currant	Shrub
235.	o	Ribes indecorum	White Flowering Currant	Shrub
236.	o	Ribes speciosum	Fuschia Flowering Gooseberry	Shrub
237.	W	Ribes viburnifolium	Evergreen currant	Shrub
238.	o *	Romneya coulteri	Matilija Poppy	Shrub
239.	X	Romneya coulteri 'White Cloud'	White Cloud Matilija Poppy	Shrub
240.	W n	Rosmarinus officinalis	Rosemary	Shrub
241.	W n	Salvia greggii	Autums Sage	Shrub
242.	W n	Salvia sonomensis	Creeping Sage	Ground Cover
243.	o	Sambucus mexicana	Mexican Elderberry	Tree
244.	W	Santolina chamaecyparissus	Lavender Cotton	Ground Cover
245.	W	Santolina virens	Green Lavender Cotton	Shrub
246.	o	Satureja chandleri	San Miguel Savory	Perennial
247.	o	Scirpis scutus	Hard Stem Bulrush	Perennial
248.	o	Scirpus californicus	California Bulrush	Perennial
249.	X	Sedum acre	Goldmoss Sedum	Ground Cover
250.	X	Sedum album	Green Stonecrop	Ground Cover
251.	X	Sedum confusum	no common name	Ground Cover
252.	X	Sedum lineare	no common name	Ground Cover
253.	X	Sedum x rubrotinctum	Pork and Beans	Ground Cover
254.	X	Senecio serpens	no common name	Ground Cover
255.	o	Sisyrinchium bellum	Blue Eyed Grass	Ground Cover
256.	o	Solanum douglasii	Douglas Nightshade	Shrub
257.	o	Solanum xantii	Purple Nightshade	Perennial
258.	W	Stenicarpus sinuatus	Firewheel Tree	Tree
259.	W	Strelitzia nicolai	Giant Bird of Paradise	Perennial
260.	W	Strelitzia reginae	Bird of Paradise	Perennial
261.	o	Symphoricarpos mollis	Creeping Snowberry	Shrub
262.	W	Tecoma stans (Stenolobium stans)	Yellow Bells	Shrub/Small Tree
263.	X	Tecomaria capensis	Cape Honeysuckle	Ground Cover
264.	N	Teucarium chamedrys	Germander	Ground Cover
265.	N	Thymus serpyllum	Lemon Thyme	Ground Cover

	Code	Botanical Name	Common Name	Plant Form
266.	N	Trachelospermum jasminoides	Star Jasmine	Shrub
267.	o	Trichosstems lanatum	Woolly Blue Curls	Shrub
268.	X	Trifolium hirtum 'Hyron'	Hyron Rose Clover	Ground Cover
269.	X	Trifolium fragerum 'O'Connor's'	O'Connor's Legume	Ground Cover
270.	o	Umbellularia californica	California Laurel	Tree
271.	o	Verbena lasiostachys	Western Vervain	Perennial
272.	N	Verbena peruviana	no common name	Ground Cover
273.	X	Verbena species	Verbena	Ground Cover
274.	X	Vinca minor	Dwarf Periwinkle	Ground Cover
275.	o	Vitis girdiana	Desert Wild Grape	Vine
276.	X	Vulpia myuros 'Zorro'	Zorro Annual Fescue	Grass
277.	W	Westringia fruticosa	no common name	Shrub
278.	W	Xannithorrhoea species	Grass Tree	Perennial, Accent shrub
279.	W	Xylosma congestum	Shiny Xylosma	Shrub
280.	X	Yucca Species	Yucca	Shrub
281.	o	Yucca whipplei	Yucca	Shrub

Approved Plant Palette Qualification Statements for Select Plant Species

2. Acacia redolens desert carpet: May be used in the furthest ½ of the "B" FMZ from the structure, and no closer than 25 feet from the edge of the zone nearest the structure. The plants may be planted with a minimum spacing at 10 feet on center, maximum spacing in meandering zones not to exceed a mature width of 24 feet and mature height of 24 inches. If acacia redolens desert carpet is used in the roadway protection zone, it shall be maintained at a minimum of 25 feet from the curb face. At the time of precise plan review, the mature spacing shall be accounted for.

42. Bougainvillea spectabilis (procumbent varieties): Procumbent to mounding varieties may be used in the mid "B" FMZ. The plants may be planted in groups at 6 feet on center spacing not to exceed eight plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

125. **Hakea suaveolens:** May be used in the mid "B" FMZ. The plants shall be used as single specimens with mature spacing between plants of 30 feet minimum.

132. Heteromeles arbutifolia: May be used in the mid to lower "B" FMZ. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

160. Liquidambar styraciflua: May be used in the mid "B" FMZ. The plant shall be used as single specimens with mature spacing between trees and a 30 foot minimum.

223. Quercus berberdifolia: Additional information may be required as directed by the OCFA unless approved on the plan as shown.

224. Quercus dumosa: May be used in the mid to lower "B" FMZ. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

234. Rhus ovata & Rhus integrifolia: May be used in the mid to lower "B" FMZ of inland areas only. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

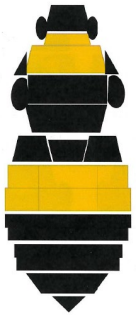
241. Rosmarinus officinalis: When used as a ground cover, it shall be maintained at 2 feet in height. Additional information may be required as directed by the OCFA.

242. Salvia greggii: Additional information may be required as directed by the OCFA unless approved on the plan as shown.

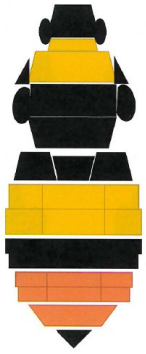
243. Salvia sonomensis: May be used in the mid to upper "B" FMZ. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 15 foot minimum.

Female *Bombus crotchii*









Male *Bombus crotchii*



Males have yellow hair on their face and large "bug-like" eyes, yellow stripe on top and bottom of thorax (middle body segment), and yellow top of abdomen (at least T2) with either black or red at tail end of abdomen.

NOTE: Although these are the most common forms, there are several other color variations for Crotch's bumble bee and 5 additional species of bumble bee known to occur in Southern California as well as numerous bumble bee mimics, therefore, it is best to protect the resource in place until the identification can be determined/confirmed by the Crotch bumble bee biologist.