1125 Tamalpais Avenue
San Rafael, CA 94901

1 (888) 632-3674
mceCleanEnergy.org

Marin Clean Energy
Board of Directors Meeting
Thursday, October 15, 2015
7:00 P.M.

The Charles F. McGlashan Board Room
1125 Tamalpais Avenue, San Rafael, CA 94901

1. Board Announcements (Discussion)

2. Public Open Time (Discussion)

3. Report from Chief Executive Officer (Discussion)

4. Consent Calendar (Discussion/Action)
   - C.1 9.17.15 Board Retreat Meeting Minutes
   - C.2 Approved Contracts Update
   - C.3 Monthly Budget Report
   - C.4 First Agreement with D.A. Jordan, DHA

5. Presentation from Mainstreet Moms (Discussion)

6. The Charles F. McGlashan Advocacy Award (Discussion/Action)

7. Updated Integrated Resource Plan (Discussion/Action)

Agenda material can be inspected 1125 Tamalpais Avenue, San Rafael, CA 94903 on the Mission Avenue side of the building. The meeting facilities are in accessible locations. If you are a person with a disability and require this document in an alternate format (example: Braille, Large Print, Audiotape, CD-ROM), you may request it by using the contact information below. If you require accommodation (example: ASL Interpreter, reader, note taker) to participate in any MCE program, service or activity, you may request an accommodation by calling (415) 464-6032 (voice) or 711 for the California Relay Service or by e-mail at djackson@mceCleanEnergy.org not less than four work days in advance of the event.

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8. Update on MCE Solar One Draft Environmental Impact Report (Discussion/Action)

9. MCE Compensation Analysis (Discussion/Action)

10. Board Member Assignment to Ad Hoc Committees (Discussion/Action)

11. Regulatory and Legislative Updates (Discussion)

12. Board Member & Staff Matters (Discussion)

13. Adjourn

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MCE Clean Energy
My community. My choice.

Sonoma Clean Power
Local. Renewable. Ours.

Lancaster Choice Energy
THE POWER TO CHOOSE

LEAN ENERGY U.S.
Local Energy Aggregation Network
Harnessing the Power of Communities

California CCA Quarterly Update | October 2015

California has three operational Community Choice Aggregators (CCAs): Marin Clean Energy (MCE), Sonoma Clean Power (SCP), and Lancaster Choice Energy (LCE). Each CCA chooses the sources of electricity while the utility continues to provide electric delivery services. Several other California communities are at various stages of pursuing their own CCA programs.

MARIN CLEAN ENERGY

MCE serves approximately 170,500 customers in Marin County, Unincorporated Napa County, and the cities of Benicia, El Cerrito, Richmond and San Pablo. MCE offers Light Green 50% renewable energy and Deep Green 100% renewable energy.

9 New Local Renewable Projects

9 renewable energy projects within MCE's service area, totaling 20.75 megawatts, are planned or developed to provide enough power for approximately 10,000 homes per year. In addition, MCE now has 102 MW of new renewable energy online in California.

MCE Pays Solar Customers +$150,000 for Excess Energy Production

MCE completed its fifth annual cash out process for rooftop solar customers, issuing over $150,000 in checks to buy excess electricity generation. MCE buys back all of its customer's excess solar energy at premium retail rates in order to support and encourage local rooftop solar installations.

Integrating Demand Response

MCE is testing opportunities for improving grid stability by encouraging customers to shift their energy usage away from peak periods during the day. On the residential side, MCE has installed remotely programmable thermostats and load control devices which can be automated to cycle on and off in response to the market price of electricity. On the commercial side, MCE is testing customers' willingness and ability to reduce their energy usage when prompted by text and/or email messages.

Property Assessed Clean Energy in Marin County

MCE has worked with the County of Marin to follow in the footsteps of Sonoma County and introduce California's second Open Market PACE program. This program allows any PACE provider willing to agree to a baseline of 'best practices' to operate in Marin County. This will increase access to secure, long-term financing options for energy efficiency, renewable energy, and water saving improvements for homes and businesses in Marin County.

2016 Energy Efficiency Plan

MCE released its 2016 Energy Efficiency Business Plan, a document that articulates MCE's long-term vision for transforming the local energy efficiency market by building on MCE's strategic advantages as a local government organization. The plan focuses on strong customer service and on the integration of demand side resources to achieve more comprehensive adoption of energy efficiency, renewable energy, and other resource conservation strategies. If approved by the California Public Utilities Commission, the plan would establish MCE as the primary energy efficiency provider for its service area.

SONOMA CLEAN POWER

SCP serves approximately 165,000 customers in Sonoma County. All Sonoma County cities, accept for Healdsburg which has its own municipal utility, have joined SCP. SCP offers GreenStart 33% renewable energy & EverGreen 100% renewable energy.

Stable and Low-cost Rates

For its second year of service, beginning May 2015, SCP has kept rates stable at 6-11% below PG&E rates.

Reducing Greenhouse Gas Emissions

At the end of SCP's first year of service, the total estimated savings of carbon dioxide is 53,579 metric tons - equivalent to removing more than 11,000 cars from Bay Area roads for an entire year. These reductions will be confirmed once PG&E publishes its final 2014 emissions data in early 2016.

New California Renewable Energy

Within its first year of service, SCP contracted for 83.5 MW of new California solar. The combination of contracts include two agreements with Recurrent Energy to construct 70 MWs of solar in the Central Valley, a 1 MW Feed-in-Tariff project in northern Sonoma County, and a contract with Pristine Sun to build up to 12.5 MWs of new floating solar power in Sonoma County. The Pristine Sun venture represents the largest floating solar project in the United States and the second largest in the world!

LANCASTER CHOICE ENERGY

LCE launched Phase 1 (all municipal accounts, plus 197 'early adopter' accounts) in May 2015. Phase 2 (all remaining customers) is on schedule to launch October 1, 2015. LCE offers Clear Choice 35% renewable energy and Smart Choice 100% renewable energy.

Successful Community Enrollments

LCE successfully launched Phase 1.5 (31 early adopter accounts) in August 2015 and Phase 2 (all remaining customers) will launch October 1, 2015. The response to LCE has been extremely positive throughout the community; to date, opt-out rates remain extremely low at just under 3% and 44% of early adopter accounts have chosen Smart Choice 100% renewable energy.

Energy Supply

LCE executed its first local solar power purchase agreement with Western Antelope Dry Ranch for a 10 MW project in Lancaster. The project is expected to begin delivering power in September 2016 and will create approximately 80 development and operation jobs. LCE also executed an agreement starting in early 2016 with 3 Phases Renewables for 65,000 MWh of wind energy from the Tehachapi Wind Pass project located in Kern County.

Community Education & Outreach

LCE has launched a comprehensive marketing plan which includes personalized contact with large commercial customers and a focus on community education about the benefits of locally managed CCA programs.

Awards

LCE was honored with the 2015 Green Leadership Award in the category of Renewable Energy by Green California.

STATEWIDE UPDATE

As of September 2015, more than 20 communities are investigating or actively pursuing CCA formation including the counties of Alameda, Butte, Contra Costa, Humboldt, Lake, Los Angeles, Mendocino, San Bernardino, San Diego, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz/ Monterey/San Benito (tri-County CCA), and Ventura as well as the cities of San Diego, Solana Beach, and Morrow Bay. The following is an update on communities that recently committed significant resources to CCA and are actively engaged in planning and program development.

Humboldt, Lake, and Mendocino Counties

These counties are developing a Request for Proposal (RFP) for CCA formation support and operational services. Once drafted, each county will proceed with its own RFP process to create unique CCA plans for each county.

Los Angeles (LA) County

In September, the Board of Supervisors approved $300,000 for a countywide technical study and is working on outreach to LA County cities not served by LA Department of Water and Power. In addition, 12 communities passed resolutions in support of a CCA program, tentatively called SouthBay Clean Power, and could serve up to 16 communities along the Los Angeles coast.

Monterey Bay

Santa Cruz, Monterey and San Benito counties are working on a technical study and CCA governance and management planning.

San Francisco City and County

The California Public Utilities Commission approved CleanPowerSF's updated CCA Implementation Plan. The San Francisco Public Utilities Commission received 52 renewable energy supply bids in response to its Request for Offers to serve CleanPowerSF's initial phases and expects to finalize contracts by December. Over 240 customers have pre-enrolled for CleanPowerSF service. The first phase of 30-50 MW will include auto-enrollment for accounts in Southeast San Francisco and voluntary enrollments in spring 2016.

San Luis Obispo County

On October 6th the County Board of Supervisors will consider joining the technical study sponsored by Santa Barbara County. This study will be the first to contemplate a CCA program in a split utility service territory (PG&E and SCE), potentially serving the counties and cities of Santa Barbara, San Luis Obispo, and Ventura.

San Mateo County

The county received favorable rate and environmental results from its technical feasibility study. The Board of Supervisors will vote in October on the CCA formation ordinance and JPA agreement. The county plans to launch Peninsula Clean Energy in fall 2016.

Santa Clara County

The County of Santa Clara and cities of Cupertino, Mountain View, and Sunnyvale are leading the CCA initiative and a technical study is underway. Additional cities in the county are also considering CCA program participation which is targeted to launch in late 2016.

Time to Lead on Climate

Firing up the POLITICAL WILL to SOLVE climate change

Monday Nov. 9th 7–9pm DOMINICAN UNIVERSITY Angelico Hall

JOIN US on the eve of the U.N. climate summit and U.S. elections to hear how we can overcome the greatest crisis of our time—and how YOU can help.

CAN CALIFORNIA INSPIRE GLOBAL SOLUTIONS?

KEN ALEX, U.N. CLIMATE DELEGATE
Office of Governor Jerry Brown

CAN WE MAKE CLIMATE A TOP ISSUE NEXT YEAR?

JOSH FRYDAY
COO, NextGen Climate Action

CAN WE GET CONGRESS TO PUT A PRICE ON CARBON?

CONGRESSMAN JARED HUFFMAN
Democratic Assistant Whip

CAN MORAL PASSION LEAD TO ACTION?

SUSAN STEPHENSON
Executive Director, Interfaith Power & Light

SPECIAL GUEST ~ VIA VIDEO

BILL McKIBBEN
Founder of 350.org

MODERATOR

MARY MARCY, President
Dominican University of California

CA → US → UN

from California to Congress to Climate Talks in Paris

ORGANIZING for ACTION

Tickets & information
www.leadonclimate.org
$10 Advance *(best seating)*, **$15 at Door, $5 Students**
No one turned away for lack of funds.

sustainable SAN RAFAEL
sustainablesanrafael.org

PARTNERS & SUPPORTERS

350Marin • Marin Conservation League • Golden Gate Electric Vehicle Association • Cool the Earth • Citizens Climate Lobby • Environmental Forum of Marin • Sustainable Marin • Resilient Neighborhoods • Marin School of Environmental Leadership • Shore Up Marin

MCE Clean Energy ° Marin Municipal Water District ° Marin Environmental Housing Collaborative ° Green Sangha ° Canal Alliance
Environmental Action Committee of West Marin ° Coalition for a Livable Marin ° NextGen Climate Action ° Redwoods Seniors for Peace ° Marin Link
The Solutions Project ° Marin Transit ° Strategic Energy Innovations ° League of Women Voters of Marin County
College of Marin ° Dominican University of California ° Environmental Action Committee of Branson

Fiscal sponsor: SUSTAINABLE MARIN 501(C)3 #94-3308034

design | kiki la porta | kiki@desconstudios.com

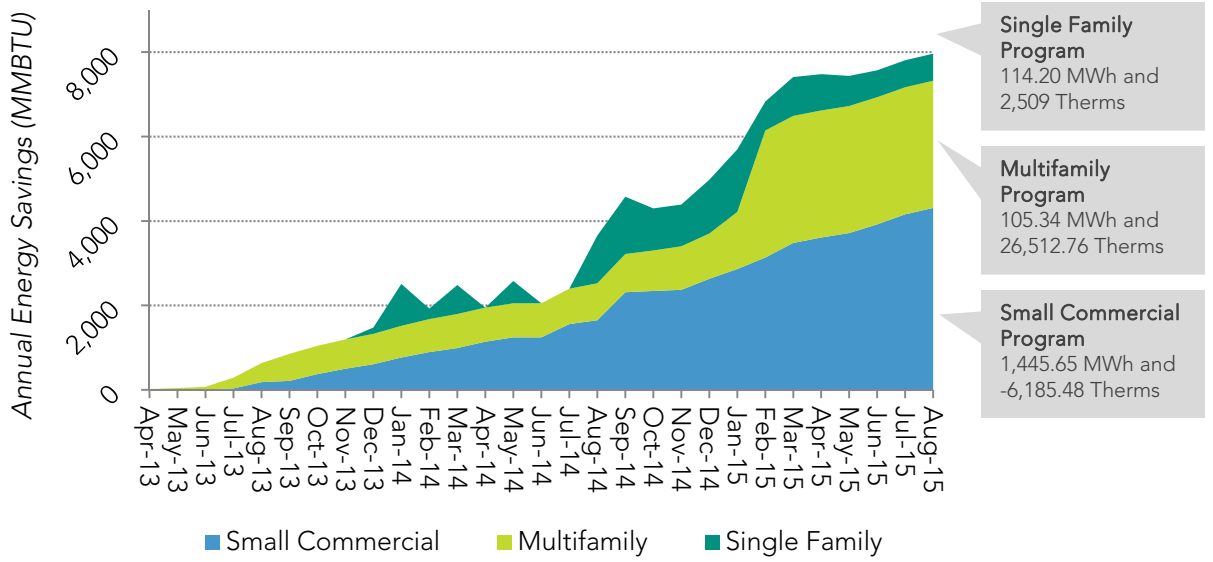
MCE Energy Efficiency Programs Monthly Update

MCE Clean Energy
My community. My choice.

Energy Efficiency Mission Statement

MCE's Energy Efficiency program increases the efficiency of energy and water systems within existing and new buildings to reduce environmental impacts and improve health, comfort and safety.

The program empowers communities through local workforce development, and access to educational tools and financial incentives.



Program Achievements – January 2013 to Present

Small Commercial

Small Businesses Audited
1,102*

Total Rebates Distributed
$233,756.45

Number of Completed Projects
165

* Split between MCE, Marin Energy Watch and East Bay Energy Watch

Single Family

Number of My Energy Tool Accounts Created
2,364

Number of Action Plans Created
1,847

Total Number of Home Utility Reports Delivered
232,906

Multifamily

Multifamily Buildings Audited
641

Total Rebates Distributed
$181,521.00

Number of Units Provided with Free Energy Saving Equipment
925

Carbon Reductions

Annual Greenhouse Gas Emissions from:
268 cars

CO_2 Emissions from:
174 Homes' Annual Electricity Use

MARIN CLEAN ENERGY

BOARD RETREAT/BOARD MEETING MINUTES
Thursday, September 17, 2015
9:30 A.M.
Marin Art and Garden Center, Livermore Pavilion
30 Sir Francis Drake, Boulevard, Ross, CA 94957

Roll Call: Chairperson Sears had not yet arrived and Board member Butt called the Retreat to order at 9:00 a.m. An established quorum was met.

Present:
Denise Athas, City of Novato
Sloan Bailey, Town of Corte Madera
Barbara Coler, Town of Fairfax
Tom Butt, City of Richmond
Genoveva Calloway, City of San Pablo
Andrew McCullough, City of San Rafael
Ford Greene, Town of San Anselmo
Kevin Haroff, City of Larkspur
Garry Lion, City of Mill Valley
Bob McCaskill, City of Belvedere
Emmett O'Donnell, Town of Tiburon
Kate Sears, County of Marin
Carla Small, Town of Ross
Brad Wagenknecht, County of Napa
Ray Withy, City of Sausalito
Christina Strawbridge, (Alternate to Alan Schwartzman) City of Benicia
Gabe Quinto (Alternate to Greg Layman) City of El Cerrito

Absent: None

Staff:
Dawn Weisz, CEO
Elizabeth Kelly, Legal Director
Shalini Swaroop, Regulatory Counsel
Jamie Tuckey, Communications Director
Meaghan Doran, Energy Efficiency Specialist
Greg Brehm, Director of Power Resources
Nick Shah, Power Supply Contracts Manager
Kirby Dusel, Resource Planning & Renewable Energy Programs
John Dalessi, Operations and Development
Brian Goldstein, Resource Planning & Implementation
Rafael Silberblatt, Program Specialist
Carol Dorsett, Administrative Assistant
LaWanda Hill, Administrative Assistant
Darlene Jackson, Board Clerk

1. Welcome and 2015 Highlights (Discussion)

Director of Public Affairs Jamie Tuckey provided an overview of MCE achievements to date via PowerPoint presentation and Board members individually discussed slides:

- Board member Butt, on behalf of Chairperson Sears, highlighted the scope of what Marin Clean Energy has provided in the few years it has operated by way of numbers of customers served, megawatts, union work hours, and number of local renewable projects on-line or in the pipeline.
- Board member McCullough introduced the San Rafael Chamber of Commerce Joe Garbarino Green Business City Award for achieving a near zero waste goal.
- Board member Bailey introduced MCE's second award, which was Acterra's 2015 Business Environmental Innovation Award, and thirdly, the Environmental Protection Agency's Marin Clean Energy recognition as Green Power Communities.
- Board member McCaskill referred to SB 350 which increases the renewable portfolio standard to 50% by 2030 which is a level of renewable energy MCE began in 2012. Rates this year are lower than PG&E rates which save customers $10.6 million.
- Board member Butt said most exciting is that MCE is becoming more and more self-sufficient with the ability to develop energy sources that are within their service area. He presented three examples of projects coming on-line: 1) Two 1 MW projects on the North Shoreline of Richmond called NWC Goodrick and Richmond Parkway, 2) Local Sol project in Marin County of 1.5 MW, and 3) Solar One, being built on a Brownfield site at the Chevron Richmond Refinery. Ground-breaking is expected to occur in November and the first phase will be 2 MW with ultimate buildout at 10.5 MWs.
- Board member Athas spoke about new member communities of Benicia, El Cerrito, Richmond, San Pablo and Napa County, with a 30% increase in MCE's customer base.
- Board member Coler spoke about Climate Action Plans which reduce communities' carbon footprints. MCE communities contributed to the reduction of nearly 60,000 metric tons of GHG reductions between 2010 and 2013, reduction of 12,500 cars per year, carbon sequestration of nearly 50,000 acres of U.S. forests, and eliminating the energy use of 5,500 homes for one year.

Chairperson Sears welcomed all Board members and recognized the many accomplishments of MCE not just in terms of achievements, but what is occurring within such a young organization in acquiring and accelerating local renewable energy. Their expansion over the last couple of years has made a phenomenal difference to the Board and to the organization. She recognized marketing efforts and expansion into various communities, and stated Ms. Weisz will expand on MCE's specific progress.

2. <u>Progress Towards 2015 Goals & Strategic Goals for 2016 (Discussion)</u>

CEO Dawn Weisz spoke about MCE's high bar for performance, goal-setting and achieving those goals. The difference this year is the way MCE has matured as an organization through the development of systems to continue to function in an efficient and effective way through the following:

- Established departmental goal-setting in 2015 with discussion later during the Retreat regarding specific progress towards those goals.
- They are planning for an even more comprehensive strategic planning effort for 2016.
- They built a comprehensive compliance tracking system that covers all 48 of MCE's various reporting obligations.

- They have begun distributing quarterly legislative updates to the legislature and emerging CCA's around the state and are serving as a leader among CCA's and at the CPUC and the Legislature.
- They host three separate, regular calls among the existing and emerging CCA directors, communication staff and regulatory staff which provide an opportunity to provide leadership, coordination and facilitation to ensure they are working collaboratively with other CCA efforts around the state.
- This year they convened a CPUC joint CCA/IOU meeting this summer that included Northern California CCAs, PG&E, Lancaster, and Southern California Edison. Everyone spoke together about how they all can comply with the code of conduct and facilitate CCAs across the state.
- They have established collateral funds on the finance front and reserve targets that will allow them to procure outside of their initial supplier finance relationship, and have reduced their reserve requirements there by half just in the last month because of their financial strength.
- They have been asked to present their model to the Global United Nations Framework Convention on Climate Change this December as an example of climate leadership in California.

Meaghan Doran, Energy Efficiency Specialist, provided an overview of progress towards their 2015 goals and a status of efforts for 2016:

- For multi-family they are 5% towards their KWh goals and 61% toward their therm goals. This seems low but they have a robust timeline of committed products they anticipate closing this year.
- For small commercial they are halfway toward their therm and savings goals. They will be tracking rates as close as possible toward those goals.
- For single-family they are 46% toward KWh goals and 15%[h] toward therm goals. They are currently working on developing a campaign with some local community partners to get additional action finance and hopefully increase savings in that program.
- She presented a monthly visual depiction of metrics tracked and savings. Since 2013, their program has given $400,000 away in rebates for commercial and multi-family projects.
- Towards their 2016 program goals, most Board members have heard a lot about their 2016 application and moving towards their rolling portfolio. They will continue with their same budget and savings goals.
- For multi-family they have a robust pipeline for 2016 of committed projects they anticipate closing.
- With small commercial, they are working with the San Rafael to do an outreach campaign in the hopes of transferring that model to all Chambers of Commerce in their service area, and she asked that Board members forward contacts of any Chamber staff.
- With single family, she stated staff had asked Board members to create action plans and she asked for feedback to help staff provide added motivation. Board members individually provided their efforts to create action plans and feedback on their experience. Katie Elliott who manages the small commercial program was introduced She will be working to expand the financing program, and she is the staff member who Chamber of Commerce representatives should work with.

Jamie Tuckey, Director of Public Affairs, provided an overview of the Communication's team 2015 goals and accomplishments:

- MCE's customer base expanded by 30% with the addition of Napa County, Benicia, El Cerrito and San Pablo. New community relationships were formed by implementing Community

Outreach Plans, which included the formation of community leader advisory groups and participating in 184 public community meetings and events. The average enrollment rate among the four new communities is 87%.

- MCE increased its Light Green customer base by enrolling residential and commercial customers who had previously chosen to opt out. MCE serves approximately 170,500 customers to date and enrollment rates are increasing.
    - Success has been seen at Marin school districts where many had decided to opt out but then enrolled in Light Green this year. The Sausalito/Marin City, Mill Valley and Tamalpais School Districts enrolled this year and cumulatively are saving $50,000 on their electric bills.
- Deep Green has increased by 35% since January 2015.
- To date 94 customers have signed up for the Local Sol 100% local solar waiting list. Staff expects to be able to serve about 200 customers on the Local Sol service option.
    - Staff is continuing to promote Local Sol through advertisements and is in the process of creating a time-lapse video showing the construction of the solar project at the Cooley Quarry at Novato.
- MCE expanded and strengthened MCE brand awareness. An advertising campaign is underway now throughout all service areas focusing on Deep Green, Light Green, Local Sol, energy efficiency, job creation, new local and in state renewable projects, and cost savings.
- MCE expanded their social media outreach this year and experienced a 35% increase in Facebook and Twitter followers.
- MCE successfully encouraged PG&E program equity and good working relationships. MCE ensures PG&E's call center representatives are providing correct and accurate information for customers, treating them fairly. MCE reviews and addresses any issues passed on by customers. An indicator of success is the fact that PG&E now applies customer deposits to both MCE and PG&E charges.
- MCE staff supported new CCA start-ups and customer choice options throughout California. Staff has assisted Alameda, Contra Costa, Mendocino, San Mateo and Los Angeles counties and is working closely with other existing CCAs and SFCleanPower.
- The communications team has supported the legal team in communicating, especially to legislative and regulatory representatives, including the statewide quarterly CCA updates. The team also helps to create materials to explain complex topics in simple, understandable terms.
- The communications team has promoted participation in MCE's energy efficiency program and general awareness around energy efficiency by facilitating introductions to businesses and creating ties between Deep Green and energy efficiencies to offset the extra cost of Deep Green. Three new videos to explain how the different energy efficiency programs work are currently underway and will be used in advertising and community outreach.

Ms. Tuckey then discussed the Communications Team's goals for 2016. The new 2016 goals are to:

- Continually elevate and improve the customer experience and maintain a high level of service despite growth and expansion.
    - The MCE call center received 19,000 calls last year. They implemented a call satisfaction survey earlier in the year. On average, about 10% of callers are willing to take the survey. 93% say it is easy to connect and 94% are saying questions are

answered and are satisfied. For those who call in to opt out, about 7% will change their mind on average.

- Create and implement a strategic, goal-oriented, data-driven sales outreach plan to help support more Light Green, Deep Green elements and Local Sol.
- Fully subscribe Local Sol.
- Foster existing and develop new community relationships.
    - On September 22nd, they will hold an advocate training workshop at MCE offices and she asked Board members to RSVP if they would like to attend.
    - MCE will host a workshop for solar installers later in the fall throughout the Bay Area to ensure they know about their Net Energy Metering program.
    - Early next year MCE will host a student workshop to talk about renewable energy and energy efficiency and invite students from schools to participate.
    - MCE has plans to further enhance relationships with member municipalities. They will start next month to provide quarterly updates to each member community via email and also will provide hard copies of the newsletters to distribute to public offices so they are available.
    - MCE will also have a community spotlight to highlight community programs and will continue to apply for EPA Green Power Communities on behalf of municipalities.
    - MCE will act as the administrator for any member community who participates this year in the Cool Challenge California Program, which is administered by Energy Upgrade California and encourages residents to take action to reduce their carbon footprint by using MCE's MyEnergyTool.

Board member Coler requested a focus be placed to enroll all Marin County school districts, citing the potential amount of energy savings.

Chairperson Sears invited public comments.

Leslie Alden referred to MCE's support for SFCleanPower. She said there are two ballot measures coming up for San Francisco in November. One is PG&E's which is Measure H, and Measure G is supported by the Sierra Club to counter-balance PG&E's anti-SF Clean Power Measure H. She said SF Clean Power is in need of funds to provide outreach on those two measures. She also stated that she learned that MCE is now in the theaters.

Ms. Tuckey explained that at the last Board meeting it was suggested they look into advertising in local movie theaters and they have a contract in place for upcoming ads in their service area.

Board member Butt suggested that staff contact individuals who have chosen to opt out and ask them if they would be willing to indicate why they opted out originally, why they came back and capture their story in a video, which he thinks would be very powerful.

Chairperson Sears referred to MCE maturing over the last few years, and commented that the community engagement and action piece is very important. She is glad advocacy workshops are underway which continue to serve as a strong piece in how they engage with the community.

Ms. Weisz encouraged the Board to specifically review the Community Relations Report in the packet which provides a great overview of what MCE is doing in every single city and county.

Elizabeth Kelly, Legal Director, gave a background on her experiences since first starting with MCE, stating it has been an incredible challenge and reward.

She introduced and gave a brief background on each of MCE's legal regulatory team and their roles, and provided an overview of what their team does, as follows:

- Manage all deal transactions that come through the agency, manage all regulatory relations not only at the CPUC and at other venues.
- Run all compliance and legislative work.
- They now have trademarks for Light Green, Deep Green and Local Solar.
- Work with PG&E on implementation issues, issues that often require regulatory engagement, regulatory solutions or legal implications.
- Provide advisory services internally on ethics, confidentiality, Brown Act, Public Records Act, and other services.

She identified the following broad accomplishments for 2015:

- Assisted MCE staff and have built significant relationships with CPUC and the legislature, identifying key people to meet with and this year they have met with the head of the California Air Resources Board, Mary Nichols.
- MCE is the oldest CCA in the state and has a lot of experience. MCE has provided legislative quarterly updates and held monthly meetings with current and to be established CCAs.
- MCE has improved its internal management and has gone to a system where every task is assigned an owner. They have a specific delegation process which they have implemented to ensure all tasks are completed in a timely and organized fashion.
- Continue to hold quarterly meetings at the CPUC to hash through tough issues and emerging issues.
- Have had success in reform relating to one of the several exit fees that are charged to customers.
- Have negotiated agreements with PG&E.
- Have had significant legislative successes and have struck language that would have been significantly detrimental to CCAs and have succeeded in incorporating key language in one of the largest bills passed in the 2015 session.
- Made a measureable impact on the Power Charge Implementation Adjustment (PCIA). The PCIA fee is the main exit fee charged to customers which goes directly back to PG&E. Successes to date includes changing the methodology to incorporate a new portfolio standard into those fees which was an MCE initiative which required work with several stakeholders to accomplish.
- This year MCE has been able to change the scope of the proceeding in order to address another issue called "vintaging" which is the date the exit fee counts from, which is a significant impact. They finally have a specific proceeding to litigate over this issue.
- Succeeded in having PG&E make load projections about CCAs in their long-term procurement processes which has not been done in the past. This is another technical win and it took significant work from many agencies.
- Regarding awareness, MCE has had some significant bills come through such as AB 2145, an anti-CCA bill. There is a lot more awareness about CCAs and MCE in particular in those forums.

Ms. Kelley provided an overview of the Legal Team's 2016 goals and challenges:

- PG&E has proposed a 72% increase to the PCIA which is an incredibly steep increase and will push the PCIA about 2 cents per KWh. This means that in order to be at or below all costs, MCE must be below PG&E's procurement or generation rate by about 30%. Therefore, this is significant and she briefly explained how the methodology works.
- MCE is undertaking significant initiatives this year in order to stop or mitigate the increases in PCIA before January 1, 2016. This charge is volatile, unpredictable and has been ratcheting up. MCE is taking steps to short and long term effects to achieve that reform. This year, customers will pay $19.3 million to PG&E for PCIA. Next year it is expected that customers will pay $30.6 million to PG&E for PCIA.
- MCE is working on launching their first application before the PCIA in order to obtain funds for their 2016 rolling portfolio for energy efficiency services. This is a transformational change in energy efficiency and they are looking forward to it.
- On an on-going basis, they will continue all collaboration with regulatory and legislative folks on CCA issues and leverage resources.

Board member Haroff asked what opportunities the legal team has for its communities and Board members to support MCE's efforts to fight the PCIA issue.

Ms. Kelley replied that staff is meeting with other CCAs to engage them on this issue, reaching out to community members on talking points and issues and are reaching out to legislators and she will be requesting support letters from communities.

Board member Coler suggested development of relationships with the Governor's Office as far as PCIA increases, the need for reform, and the fact that they may lose the existing customer base without being able to get new customers. Ms. Kelley said they have not yet had the opportunity to meet with the Governor himself but are working with top advisors.

Ms. Weisz said the focus of the Retreat will now move into their procurement item and she noted that effective procurement of power supply has been a foundation of MCE's work from the beginning, and introduced the procurement team.

3. <u>Integrated Resource Plan 2015 Progress & Goals for 2016 (Discussion/Action)</u>

Greg Brehm, Director of Power Resources, said MCE had four significant contracts come online over the last year and, as a result, MCE has expanded its resource pool to the point where MCE can displace most their Bucket 3 content with Bucket 1 and Bucket 2 products, which he briefly explained. He said last year, 2014 MCE supplied about 30% of their retail load with Bucket 3 products and for 2015, they expect to be down 15%. Next year with the Board's approval, MCE will limit Bucket 3 unbundled RECs to no more than 3% of retail load. As a result of these contracts, MCE has about 750,000 surplus Bucket 1 renewables that MCE will use to displace Bucket 3 products.

Mr. Brehm recapped goals of last year:

- Break ground on the Local Sol project. He reported that the project broke ground in May and he expects them to be on-line in March 2016.
- Mr. Brehm stated the MCE Solar One project is in the middle of the EIR process and they expect to break ground in November, and to be fully on-line in October/November 2016.

- Mr. Brehm stated a goal to increase their GHG free content by 5% per year. Their standing goal was 60% and in the past year they were at 66%. Later in the presentation he will also talk about potential changes to increase that further in coming years.
- MCE added a new goal to increase their line of credit. They began with no secured credit and now have about $3 million of unsecured credit and are looking to double that in 2016. They also have a letter of credit facility in place for $15 million which is about half of their collateral needs to support its energy contracting needs.
- They had a goal to get at least half of their Feed-in Tariff projects in the queue on-line. They expect to exceed that and get 4.8 MW a 5.8 MW queue breaking ground with the one remaining project breaking ground early next year.
- Lastly, they had a goal to integrate roughly 142 MW of new projects and those are on-line.

Board member Coler asked for examples of the Bucket types. Mr. Brehm explained that Bucket 1 projects are located within the State of California where generation and renewable attributes are delivered simultaneously under the same contract, with solar and wind projects as examples.

Bucket 2 projects are generally located outside the State of California and are usually wind or other projects that possibly do not have direct interconnection to the California grid. Those projects generate in one time period, and the renewable attributes are repackaged with energy deliveries that are connected to the CAISO grid in another time period.

Bucket 3 projects are where energy is sold entirely separately from the actual physical energy. They are un-bundled from the power and are sold separately. These are generally wind projects which made up the majority of MCE's Deep Green portfolio in the past. He clarified these "Buckets are also referred to as Product Content Category "PCC1, PCC2, and PCC3 products".

In response to Board member Haroff, Kirby Dusel spoke about renewable energy certificates which represent the environmental attributes associated with all renewable energy generation. Those certificates are administered through a clearinghouse in western United States called WREGIS (Western Renewable Energy Generation Information System). Similar to a bank account, they can transfer certificates from one entity to another, buy them and sell them, maintain accounts that have balances associated with each compliance period. Over time in order to demonstrate compliance with standards, MCE retires certificates by putting them into specific retirement accounts.

Mr. Dusel stated that what Mr. Brehm is talking about is really the association between that renewable energy certificate and the physical electrical energy. What the buckets represent are different relationships between that certificate and the physical electricity commodity.

Board member Greene commented that the more MCE uses Bucket 1 products to displace the Bucket 3 products the better it can respond to the criticism that MCE is not really in the renewable business. Mr. Brehm noted that the debate has grown over the last few years. He thinks one of the primary ways to fend off criticism of these unbundled renewable energy certificates to do exactly what MCE is doing and what MCE planned to do from the start, which is to bring the sources of power closer to first within the state and then as close to customers as possible and then defer the use of other unbundled products secondarily. Mr. Dusel added that to the extent they can achieve this without affecting rates, this has been MCE's goal and practice.

Mr. Brehm then presented their load to resource balance and where all contracted energy come from right now. In moving forward for 2016 he provided the following changes in policy goals for MCE's updated Integrated Resources Plan (IRP):

- They hope to get the MCE Local Sol Project subscription rates to 180 to 200 customers. They expect a commercial operation date of November 2016
- MCE aspires to expand its conventional power portfolio to cover the period after the SENA agreement ends at the end of 2017 and that MCE is fully hedged for all renewable requirements through the next 3-4 years.
- Their MCE renewable content is currently at 56% renewables. They will talk about a change to reduce their Bucket 3 products while increasing their renewable content from 50% to 80%.
- They want to develop at least one more new project after the MCE Solar One project. He presented a project in Napa County and they are looking to expand in other areas.
- He presented a slide of all products and noted that Bucket 3 products are decreasing, with Bucket 1 product increasing.
- Part of the strategy in changing their Integrated Resource Plan, they expect to increase their goal of 60% GHG free products to 95% GHG free by 2025. He presented the plan under business as usual, and discussed various product mixes in various buckets, and said they would like to eliminate Bucket 3 products and that Renewable mix would be approximately 75% Bucket 1 and 25% Bucket 2. If they extend this policy through 2025, they would expect about a 2% increase in rates in 2025 with marginal impact to rates over the next 4 years.
- The next strategy which has a cumulative effect would be to maintain the same portfolio content of 80% on the renewable side and increase hydroelectric to 45% with a goal of achieving a 95% carbon free portfolio by 2025. This would increase rates 3% to 6% in 2025.
- The last option is 100% renewable portfolio, but comments received from both the Technical and Executive committees were that this was not sustainable and they pulled back to 80% renewable content which would also reduce their large hydroelectric exposure. This proposition would have an 8% to 11% rate increase in 2025.

Board member Haroff commented that the 8% to 11% increase would be over a 10-year period or roughly a 1% increase over and above what other increases might come. Mr. Brehm noted that the increase would be cumulative and in addition to normal rate escalation.

Ms. Weisz pointed out that this is the increase projected above what they might otherwise see in rates, so there may be other factors causing rates to go up or down.

Board member Lyman referred to the large exposure on the chart with hydroelectric power and availability, with climate change. Knowing they will have more drought years, he asked for an explanation on the strategy. He wants to know whether there will be difficulty with hydro power given climate change. Mr. Brehm explained that for hydroelectric resources MCE uses the driest year or worst case year in their planning.

Mr. Dusel added that there is also an element of regional diversity and when looking at large hydroelectric production, they talk about not only drawing from California but also from out of state, particularly the Pacific Northwest where it a bit more abundant.

Board member Lyman suggested not putting all of their "eggs" in the hydroelectric basket. In the short term there is ample opportunity, but this is a new market where buyers are looking for carbon-free

power and the supply is not growing. They are somewhat concerned that with more demand, if supply is not able to expand, this drives up the premiums, whereas with renewable power, they know it is expanding. He suggested considering a more balanced approach which will in the long-run be a better option.

Board member Coler said she has similar concerns about hydroelectricity and suggested one option could be something in between strategies 2 and 3. She asked where the natural gas is located in the charts.

Mr. Brehm stated natural gas makes up the balance of their portfolio that is not renewable so right now 39% would be natural gas or GHG emitting, and that natural gas would be part of each of the three scenarios. He noted that in the State of California about 67% of the generation is natural gas. Board member Coler commented that it is good to know it is a small item.

Board member McCullough said most residential customers are price-sensitive when looking at the three strategies and impacts on rates. He asked how to project what PG&E's rates might be over the same time period in order to determine where they will land if they adopt a given strategy relative to PG&E's rates.

Mr. Brehm said it depends on what PG&E does with its procurement. In fact, renewables may become a larger portion of their portfolio as additional load departs to other CCAs which would allow PG&R to have better/ lower rates. It may be more challenging for MCE to compete. Typically large hydroelectric resources are the cheapest energy and the most flexible.

Chairperson Sears noted that the Technical and Executive Committees had extensive discussions on this subject and one challenge is to understand how to choose a strategy and setting rates. It is important to remember in selecting a specific strategy that MCE may be depriving themselves of flexibility in a given year and should be looking at how those strategies are working out and then discover what PG&E is doing with their rates and how that may impact how MCE chooses to do business. Therefore, she thinks it is important to have the strategies but also make sure it does not handcuff them from making adjustments, given what PG&E and the market does.

Ms. Weisz said what staff is talking about now are strategies that will be incorporated into their Integrated Resource Plan update. The Board goes through this process annually, discuss scenarios with committees later in the month and she will be bringing back adjustments to committees and then to the full Board next month for consideration of approval. Getting feedback on which strategies or combination of strategies make the most sense will be helpful to staff.

Chairperson Sears thanked Mr. Brehm for making changes in strategy 3, which were discussed and requested by the Technical Committee.

Board member O'Donnell said in the final analysis he would think the Board's preference would be strategy 3 other than the concern over what PG&E's rates will be. This is where most Board members get stumped because presumably staff is in a better position to guess what they might be, whereas no one else around the state will be able to forecast them at all.

Ms. Weisz said in echoing what Chairperson Sears stated, the Integrated Resource Plan is a long-range visionary goal of where MCE would like to be in 10 years. The rate setting process happens after they

know with certainty what PG&E's rates will be in the beginning part of the year. Therefore, it is possible to set a long-range goal and when they get to the rate-setting process, they will determine how far they want to move toward the long-term Integrated Resource Plan. If they see PG&E's rates are decreasing for some reason and MCE may not be able to move in the direction of the plan, it is an adjustment that could be made on an annual basis.

Board member O'Donnell said the strategy without regard to what PG&E's rates are would be strategy 3 which clearly provides MCE with the maximum flexibility. Mr. Dusel said it is fair to say PG&E's rates are competitive and if the Board is talking about adding 8% to 11% on top of MCE's costs, it is reasonable to assume that rates might be above PG&E.

Board member O'Donnell stated it might be a higher cost strategy but in the push for more renewable power over the last couple of years has brought down the price. So if they set it at Strategy 3, they are partially contributing to global renewable power being brought on the grid and therefore driving the price down. He thinks they could see a benefit and thinks they will be within the same ballpark of other investor-owned utilities and CCAs that are charging their customers, and he supported strategy 3.

Board member Small said in participating on the Technical Committee, they were leaning towards the revised strategy 3, but the other comment is that it is not just PG&E's rates but the conversation on the PCIA. It is the combination of that they will be dealing with. They have to make sure they do not get to the point of losing customers because they do not know where they will be with that PCIA charge and how volatile it is. It is a constant struggle for MCE to figure out where it should be each year.

Board member Greene said as the rate structure is considered and the procurement happens, the Board can make those adjustments and during certain years they can choose other strategies, so as the rate structure and procurement happens, they can make those adjustments. While it will not be as smooth as they like, he thinks this is the purpose.

Chairperson Sears invited public comment and there were no comments.

BREAK
Chairperson Sears called for a break at 10:40 a.m. and, thereafter, reconvened the Retreat at 10:50 a.m.

4. <u>New Community Inclusion (Discussion/Action)</u>

Ms. Weisz provided background on the item, stating that the MCE annual Board Retreat was held September of 2013 and the MCE Board spent time discussing new community membership. The Board approved Policy 007 and it defined a process for including new communities in the MCE territory. Following approval, they implemented the policy and added new members.

After completing the enrollment this year between February and May MCE staff and Board members began to evaluate the benefits of implementation of the Policy and began to identify improvements they need to consider to the process moving forward.

On June 19, 2015 the Board established an Ad-Hoc Expansion Committee made up of Board members. They have held a couple of meetings and also meetings of staff have been held where they collected information and provided it to the Ad-Hoc Committee's discussions. The focus was to review

information collected to date and develop recommendations to bring to the Technical Committee and to the Board to approve new community members.

The Ad-Hoc Committee met in July and August developing recommendations that were subsequently presented at meetings of the Technical Committee and the Executive Committee to get them to a clear recommended course of action.

Some benefits identified include:

- Reduced GHG emissions
- Increase in renewable energy use
- Rate benefits in the MCE territory
- Successful new community outreach while maintaining outreach within existing communities
- Increased regulatory and legislative abilities
- Ability to incentivize the creation of new CCAs by having choices available and examples
- New energy efficiency opportunities when moving into communities having different load shapes and different building stock
- Ability to add new and unique staff skill sets

The Ad-Hoc Committee also discussed some of the challenges they have seen with community inclusion and areas that could benefit from improvements, and some suggestions from the Committee include:

- Making some adjustments to the process of new community inclusion and to streamline a bit more and reduce repetitive tasks and Council actions
- Ensuring new community interest and commitment is determined upfront to avoid potential delays that could happen when one community is not at the same point in the process as other communities
- Information requests and making changes to the membership application to identify more upfront requirements
- As the MCE Board has grown, the efficient flow of information and level of engagement challenges can grow.
- Additional strategies build in upfront to collaborate with new communities in a more proactive way so communities are engaged in distributing information via their websites, at their counters and informational kiosks

Ms. Weisz said before getting into recommendations, she outlined the general guidelines not explicit in the Policy and after discussing them, the Ad-Hoc Committee did not believe they needed to be added to the Policy:

- MCE wants to continue to remain responsive to local government, staff, and elected officials in communities that have expressed interest in MCE service.
- MCE wants to avoid inclusion of new communities in counties where CCAs are currently serving customers. An example was Sonoma County cities.

The Committee recommended the following minor adjustments to Policy 007:

1. Allow jurisdictions with a customer base larger than 40,000 to join through the Affiliate membership process if they are already in a county served by MCE. This would assist the City of Napa.

2. An adjustment to the member designation for all perspective communities to maintain fair representation of what would be a manageable task for the Board
3. An adjustment to the Affiliate membership process to conform to strategies mentioned above
4. Making some adjustments to the membership application that requires more things to happen upfront.

Ms. Weisz explained that changes to the membership application require a few things such as looking for communities to not only give MCE the authorization to get load information from PG&E but also agree to help spread the word about the program and make sure information is posted on their websites, and making sure the new community holds their public discussion before MCE conducts their analysis. This would include approval of a resolution and ordinance to join MCE subject to the Board accepting their membership request.

MCE would also recommend asking for Assessor's data on housing stock which will help MCE in the beginning of the process to start planning for any energy efficiency services for the community.

Ms. Weisz explained that when MCE first launched service in 2010, only 8 of the communities then were members. There were 4 communities that wanted to wait and see to determine how things went. By the end of that year things were going very well and there was interest in reconsidering among those communities. Staff determined that the most efficient way to incorporate those communities would be to do it at one time so they could procure for them all at one time. Staff launched an amnesty period and invited those 4 communities to join giving them a 3-4 month window and let them know if they joined they could do it at no cost. If they wanted to join later there might be some cost because they would have to procure separately.

The amnesty program worked well and all 4 communities joined at the same time. Therefore, staff thought they might apply that same approach moving forward for communities that had expressed interest to date. It would propose a 6 month window to take care all of the things in the membership application and would include adoption of an ordinance to join MCE subject to the Board accepting their request. They would offer the inclusion period between October 1 and March 31, 2016. There would be a lot more streamlining for MCE staff in regards to procurement, outreach and analysis.

The last recommendation is the governance recommendation. Three ideas were discussed by the Ad Hoc Committee and one is being recommended by staff based on input from both Board members and from municipal legal counsel. The top recommendation from staff was that for any new members joining after January 1, 2016 MCE would allow for one representative per county and one city representative per county. This would allow cities to determine who they want their representative and alternate to be, which could be from another city or town. This structure would follow what was seen with many other bodies around the Bay Area and other parts of the state with JPAs. It would ensure fair representation and that city representative's voting share would be weighted based on the load of all cities and towns they are representing.

Ms. Weisz said during the last 6 months MCE has received letters of interest from all 5 cities and towns in the County of Napa, from Walnut Creek and Lafayette located in Contra Costa County, and from the City of Davis and Yolo County. The letters express an interest in dialoguing with MCE about processes to follow to join MCE. Board action today would facilitate next steps with some clarity and be able to move forward with a clear set of assumptions.

She asked for Board feedback, noting that given the amount of preliminary discussions and vetting, the recommendation is for the Board to vote on the matter.

Board member Bailey voiced concern with the governance recommendation and thinks that everybody should have a seat at the table. He thinks part of what MCE does is unique and is recognized by the many innovative awards. When truncating this purely for administrative purposes, it raises attention. He suggested options to possibly hold fewer Board meetings and being more efficient by vetting by holding more or new committee meetings.

Board member Withy said he served on the Ad-Hoc Committee and would not necessarily agree that the committee was unified in proposing Option 1. The committee was presented with 3 options and discussed which would be preferable. There was a presumption from staff that there is a governance problem to solve; however, he questioned what problem needed to be solved. He believed that if there is a problem with a large group of people he suggested having a new governance structure for the whole organization which includes Marin County and re-brand themselves.

Board member Coler said she was also part of the Ad-Hoc Committee as was Board member Wagenknecht. Part of her problem is that the Board Room is not large enough and she thinks Option 1 was preferable. She feels strongly that MCE is still growing and evolving and to spin something off to an Executive Committee or hold meetings once or twice a year is not workable at this time. She thinks possibly it could happen in the future when there is not as much debate or issues with PG&E and the PCIA. She strongly believes MCE should retain the representation but given logistics, some Ad-Hoc Committee members felt Option 1 was preferable. Because Marin was the original founders, she suggested revisiting the governance problem at a later date.

Board member Wagenknecht said given MCE's maturation a lot of what has been original decision-making will and has taken less and less time. He can see the future as being some hybrid but once a member has sat and participated in meetings, it is difficult to not then participate. He said carpooling with Napa members could be an option, but he agreed the matter might be something they could change in the future.

Ms. Weisz thanked Board members for their comments and presented the 3 Options originally discussed by the Ad Hoc Committee:

One option was that there is one representative per County going forward and to not add any more City representatives. The concern with this option is that elected officials felt there is a different mentality between County and City representatives. Therefore, this option was not preferred by any member of the Ad Hoc Committee.

Option 2 was MCE continues to add a new representative for every city and every county and allow the Board to continue growing, but once they reached the point of having 20 members they would then shift to a structure where the Executive Committee is making the month to month decisions. She said they do need to meet monthly because procurement decisions and other finance decisions need to be approved. The idea with this option is that the Board would meet no less than once a year, and that the Executive Committee would take on the more routine decision-making.

She said the reason why Option 2 is not being recommended by staff is there are concerns by their municipal legal counsel on this option as far as the oversight being delegated to a committee. Another constraint is that the full Board would be required to do any budget setting and issue any debt.

She thinks it might be helpful to respond to the comment about it being an administrative problem. Personally she does not see Board growth as an administrative problem at all and they can accommodate large groups. One of the reasons MCE has been so successful to date relates to the informed engagement of board members. The topic is technical and it takes time to familiarize oneself with the subject area. Having an efficient Board size that allows for information flow has contributed to their success in the past, and looking forward this is an important element to retain.

She said she thinks Option 2 could work but asked members to keep in mind that the large Board would have to meet annually and sometimes in between to make some fundamental decisions relating to budget and finance.

Ms. Kelley commented that finance undertakings must be taken by a vote of the Board at a regularly scheduled meeting.

Board member Butt said at least two options will have an expanded number of Board members. They talked about agendizing more items on the Consent Calendar which could mitigate any downside to expansion. This way, there is still the Board vote on items without necessarily spending a lot of time talking about them. While he was willing to consider a hybrid model of consolidation of representation of cities and counties, it bothered him that it creates two classes of representation.

Chairperson Sears said she serves on many boards and commissions which are very large. In some ways, there are different ways to do Option 2 and accomplish concerns. On the Golden Gate Bridge Board, they have robust committees where most of the work is done. Their Board meetings have been reduced to once monthly but regardless, the Board ratifies decisions made in subcommittees, with the ability to hold discussion. She thinks it is important to treat all members equally regardless of existing or new members. For some interim period, she has mixed feelings putting things on the Consent Calendar, but as the Board gets larger they could also expand or create new committees and really streamline how they manage the Board.

She said in response to Board member Butt regarding the ratification process and the Consent Calendar process with the Bridge District, reports from committees are listed on the Consent Calendar and the chair of each committee reviews the list of items considered by that committee and their decisions. The Board can hold discussion or vote to approve that decision. Therefore, it is a hybrid.

Board members Greene said he goes back between Option 1 and Option 2, but agrees there is not a problem today. He is sympathetic to Ms. Weisz's concerns of when the Board gets too big and effectiveness and how to run an organization that has 25-30 members. He sees that once a Board gets that large, people disengage. He questioned whether going with Option 1 makes some cities more reluctant to join because they do not have a vote. He also thinks there is an argument this could be good because one issue of expansion is whether or not they are better off encouraging other cities to join us or encourage them to form their own CCAs, and he believes it is the latter. Given this, he would rather see other CCAs form as opposed to making it more attractive to join MCE.

Chairperson Sears said to her Option 1 is not a good option in suggesting one Board meeting a year, given the disengagement issue. She thinks it is important to have more frequent Board meetings or Option 2. She would want to see a revision of option 2 for more frequent Board meeting.

Board member Greene asked if part of the analysis is an assumption of unwieldiness to the size, given they have not gotten there yet. He can appreciate that anticipation but agrees with Board member Bailey and others of concern regarding having two classifications of voting authority. This goes directly to the Chair's comments about how MCE began. It began based on activism and it is continuing to grow based on the same activism. It would seem to be more fair and reasonable to be inclusive and if at some point that inclusivity translates into not being able to move, then they might want to re-organize what their decision-making process is going to be.

Board member Coler stated Board member Haroff had to leave and asked her to comment that he feels strongly that there is no change to the governance structure and to keep adding members until such time that the membership needs to be re-considered.

Board member Quinto said this committee was developing options but they did not get to the core question of whether there is a problem and personally he did not think there was a problem to solve. He said this Board operates differently and has a different mission than most JPAs which exist and he thinks most cities are completely disengaged in the process.

Board member McCaskill said his argument for addressing the issue now is that if they wait until it is a problem Option 1 will have to be removed as an alternative because once the organization gets too big, it will be difficult to disenfranchise a representative.

Board member O'Donnell said he is sympathetic to comments by Board members Bailey and Greene. He thinks one of the things people will criticize about large public agencies is the fact that local elected representatives do not have much of a say, as agencies become very staff-driven and there is a lot of criticism in that direction and this board does not suffer from that. If they went down the path of Option 1, they would have a tremendous disengagement and he suggested coming up with a better construct such as strengthening committee structures. He thinks Board meetings could be quarterly, with committee meetings occurring between those times.

Board member O'Donnell also thinks that in relation to Option 1 and 2, if they get bigger, this becomes a large financial organization and he wondered if they should also bring on some outside energy expert as a director or a CFO type of director with specific expertise in some of the fields that an organization of this size may require. He recognized the existing talent, but said no members completely understand all dynamics in the energy and financial fields. He agrees with Board member Bailey and did not want to go down the route of Option 1.

Board member Small noted that there was not a consensus at the Technical Committee on how to move forward. She was uncomfortable with a different set of rules for the group. She asked to consider tabling this portion and looking at other changes to make and possibly a motion to adopt those changes and return on this issue with a hybrid of what was mentioned.

Board member Gabe Quinto, speaking on behalf of Board member Lyman, stated he supports Option 2 because it is the ABAG and Air Board model where there are strong committees which help streamline the Board.

Board member Calloway said this raises a communication issue for Board members to be effective or not effective. No matter which model they choose, they will need to determine how they stay in communique amongst the layers of materials. Today is a good example of suggestions given and it seems like many Board members pay attention and make many comments. She also believes in the core value of inclusion and supported those comments. She supported coming up with a revised model based on the discussion today and postpone the decision until the next meeting.

Board member McCullough said if the result of this discussion results in deferring the ultimate decision on governance, he thinks it might be productive if Ms. Weisz could ask those communities interested in joining what their view is and whether their interest would remain even if they joined with a less representation level along the lines of Option 1. This way, it gets to Board member McCaskill's point of the effect on enthusiasm of potential members and whether it affects how they might view their role on a reduced authority level.

Board member Strawbridge said she is a new city council member and Benicia held a lot of discussion and having that representation authority was a big factor in Benicia agreeing to be part of the agency.

Board member Athas asked what PG&E's structure is for their Board because basically they are a utility. She does not think they began as MCE began with wanting to have representation and governance from each city. She completely agrees with Board member Bailey and others and does not want to de-include members and frankly does not think the cities have the voice with only one representative.

Board member Withy said in observing the discussion, the Board is lightening its subject matter. The PG&E board is very different. They are full of experts, senior industry and regulatory leaders, senior politicians, and they do not provide the same transparency. In terms of the governance structure, he is hearing the Board does not want to change anything right now other than suggestions on procedures. He said he is in 100% support of Board member O'Donnell's comments in that there needs to be a senior advisory committee of industry business experts, regulatory and possibly CPUC experts who are present and advise and monitor the overall progress of this organization that reports to this Board.

Chairperson Sears said she has learned that the PG&E Board has 12 members and asked for public comments.

Rob Davis, Mayor Pro Tem, City of Davis, introduced Mitch Sears who is their Sustainability Director. He said they have a Community Choice Energy Advisory Committee right now in Davis which examines options for their City to move forward and Jerry Braun is a member of that community. John Mont Smith is a staff member from the County of Yolo and they are thankful for the opportunity to attend this Board meeting. He related how stellar MCE staff has been to their City and County through their attendance at a well-attended community forum and just being able to describe MCE put many people at ease about what it might mean if they choose to form their own CCA or the option of joining MCE.

Mayor Davis said he appreciates the conversation the Board is holding and said it is concerning watching the evolution of MCE, and how MCE will work when they expand and add new cities. However, some of that concern is alleviated when seeing the passion here and realizing what they are participating in is actual movement. He hears comments that the reason they want everybody to stay and be engaged is because it is a movement and providing not only electricity but sustainability, which is what Davis is and aspires to be. No matter what decision they make, MCE will find them to be an extremely important ally

at the State level first given they are geographically located closer to Sacramento. Also, a difference between this Board and PG&E is that this board is not reimbursed. He appreciates the Board's conversation, the spirit in which it is taken and said he could easily see himself on the Board.

Chairperson Sears said it has been said that the City of Davis would be kindred spirit and thanked Mayor Davis for his comments.

Leslie Alden said coming from the policy side in the beginnings of MCE and not the technical or advocate side, she is the only one in the room going back to 2006 that has that perspective. She said the incredible process that the task force that formed what ultimately became MCE was about participation and everyone having a voice. She thinks the question is how big MCE wants to be, can be and should be. She thinks the governance question, instead of it being function following forum should not drive this. She said MCE is very much a grassroots, innovative, leading and bleeding edge organization, and to lose that would be a detriment to the movement. With the Governor's proposals, this model is a huge piece of what will make this work in California and get them to critical goals. She encouraged the Board to keep the individual jurisdiction vote concept and keep everybody engaged because this is not a rubber-stamp organization and she applauded all Board members.

Carol Weed, Walnut Creek, said she is involved in a community action group in Contra Costa County, and a speaker said at the Committee Board meeting at Contra Costa County this past week that one of the many things floated was the possibility of them requesting application to MCE of their unincorporated portions of Contra Costa. These areas have 170,000 potential users which are about the number of users MCE has now and she jokingly asked how many votes they would have.

Chairperson Sears said there have been a couple of suggestions that the Board move forward with some other revisions and table the governance issue for now.

Ms. Weisz clarified that per the recommendations in the staff report she did not hear feedback on the affiliate membership process and the inclusion period. It sounds like recommendation 2 and 3 would move forward and the other option would be tabled and that possibly they can take this up at the committee level before returning to the Board.

ACTION: It was M/S/C (Small/Withy) to approve staff recommendations except for governance changes which will be tabled for discussion at the Committee level prior to returning to the full Board of Directors. Motion carried by unanimous roll call vote: (17-0); (Absent: Haroff).

LUNCH
The Board adjourned at 12:25 p.m. to lunch and thereafter reconvened the Retreat at 1:10 p.m.

5. <u>Board Business</u>

A. Public Open Time (Discussion)

Chairperson Sears invited public comment and there was none.

B. Report from CEO (Discussion)

Dawn Weisz, Executive Officer invited Shalini Swaroop, Regulatory and Legislative Counsel to provide a legislative update:

Ms. Swaroop gave the following update:

- The end of the 2014/15 session will occur on October 11th when the Governor must sign or veto bills. The voting on bills ended on September 11th and she referred to the memo included in Retreat materials which expand on the following:

    - AB 1110 is a 2-year Bill from Assembly member Ting from San Francisco which would have adjusted reporting requirements for GHG emissions from Load Serving Entities, including CCAs.
    - SB 350, which was initiated by the Governor, would address halving petroleum use, increasing the renewable energy portfolio standard to 50%, and doubling energy efficiency in buildings by 2030. The petroleum use provisions were removed last Wednesday due to opposition from oil and gas companies. She briefly described specifics of the bill affecting CCAs.

Board member McCullough referred to the requirement that CCAs have at least 65% of their RPS procurement in long-term contracts of 10 years or more. He asked if there is a similar requirement imposed on investor-owned utilities. Ms. Swaroop said it is also imposed on investor-owned utilities.

Board member O'Donnell asked if this relates to all procurement strategies. Ms. Weisz replied that she thinks they are close to if not already in compliance with that goal. This goal will kick in sometime in 2021 and they do not see it as a problem for MCE.

C. Consent Calendar (Discussion/Action)

C-1. 8.20.15 Board Minutes
C-2. Resolution 2015-05 Approving Activation of Agreement with River City Bank
C-3. Second Addendum to Fourth Agreement with Jay Marshall
C-4. First Addendum to Second Agreement with Rincon Consultants
C-5. First Addendum to Third Agreement with Braun, Blaising, McLaughlin & Smith PC

ACTION: It was M/S/C (McCaskill/Bailey) to approve Consent Calendar Items C.1 through C-5. Motion carried by unanimous roll call vote: 15-0 (Absent: Coler, Haroff and Wagenknecht).

D. MCE Power Content Label and Attestation (Discussion/Action)

Kirby Dusel, Technical Consultant, said this item is a formality that falls under the jurisdiction of the California Energy Commission and Power Source Disclosure Program. On the other hand, it is a more important piece of information people need to communicate with their customers regarding the power supply MCE provides to them.

He referred to the staff report and the fact that the Public Utilities Code requires all detailed sellers of electric energy to disclose accurate and reliable and simple to understand information on the sources of energy that are delivered to their respective customers. The label is intended to distill down transactional detail into a simple table that articulates the proportion of supply attributable to certain fuel sources.

He stated that in the middle of the staff report is a representation of the power content label which is very prescriptive and must be distributed to customers by October 1st of each year. As a public entity,

the Board must self-certify the accuracy of the information being presented to customers, which is distinct from the investor-owned utilities which must engage third party auditors in order to review all transactional information.

Mr. Dusel briefly discussed the 2014 label contents and said the Light Green customer mix included 65% GHG free supply which is very high and Deep Green is 100% renewable and GHG free. In how this compares to PG&E's mix, PG&E will soon be distributing its label to customers within the next week, but PG&E's overall renewable content did increase year over year and they will be representing an overall renewable supply of 27%. In addition they relied on 21% nuclear deliveries, 8% hydroelectric, 24% natural gas and an additional 21% from an unspecified category, a portion of which is natural gas purchases.

All in all, the Light Green emission factor rounds out to be 334 pounds of CO2 equivalent per MW hour. The Deep Green emission factor is at zero and they expect based on information included in PG&E's disclosure that their emission factor will be around 400 pounds of CO2 per MW hour.

Mr. Dusel asked that the Board attest as to the accuracy in MCE's label. He said at the staff level there has been rigorous review of all transaction information and the program received a third party audit and he is confident information is accurate, and asked the Board to approve the accuracy of the information.

Board member Bailey asked what the level of review is that other CCA Boards give prior to certifying the content label. Mr. Dusel said the process is similar, but no third party audit is required for public entities.

Board member O'Donnell asked if information flows back on what is actually being used or is it obtained from the procurement side. Mr. Dusel said MCE's portfolio is so heavily weighted towards renewable products and MCE has renewable energy certificates or records of transactions to substantiate volumes being represented in the power content label. In addition, MCE has tagging or transaction and verification information provided to them by suppliers to substantiate the importing of hydroelectric power. So between both, they are able to do a great detailed accounting.

Board member Coler referred to the Light Green and said there is solar at <1%. She asked if this is a negative 1%, and Mr. Dusel said it is above zero but less than 1% but must be represented however small. He confirmed that under the Deep Green program and in talking with Sacramento MUD which administers the Greenergy Program where they offer a 50% and 100% renewable option. They have been working to better align their resource mix to reflect delivery patterns which are more similar to how customers use energy and they bring geothermal and biomass into the mix which tend to deliver a relatively flat profile, and solar which peaks throughout the day, and blending in resources for more diversity, and this is what MCE is considering as well.

Chairperson Sears invited public comment and there was none.

Ms. Weisz explained that the Board is looking at the 2014 power content label. For 2015, the solar number will look very different, as they have had 2-3 large projects come on line.

ACTION: It was M/S/C (Bailey/O'Donnell) to endorse the accuracy of information presented in MCE's 2014 power content label. Motion carried by unanimous roll call vote: (15-0) (Absent: Coler, Haroff and Wagenknecht).

Ms. Weisz said the presenters for the next agenda item are still in route and noted that for planning purposes, they were able to complete all business during the morning session so no items need to be carried over and so the meeting is likely to end somewhat early in the day. She suggested a break until presenters arrive.

BREAK
Chairperson Sears called for a break at 1:50 p.m. and thereafter reconvened the Retreat at 2:00 p.m. Item 6B was moved up on the agenda.

6. Emerging Technology and Innovative Programs (Discussion)
B. City of Benicia: Gray Water

Ms. Weisz introduced Alex Porteshawver, Consulting Climate Action Plan Coordinator from the City of Benicia for new community enrollments. When staff was planning the Retreat a lot of input was received from Board members on discussion topics. There was an interest in cross pollination between member agencies and learning about what is happening with green initiatives in member agencies. If this is something Board members are interested in seeing more of, staff could coordinate future topics on a quarterly basis.

Ms. Porteshawver thanked the Board for inviting her to the Retreat and provided a background on her role with helping the City of Benicia implement their Climate Action Plan. She said they implemented a variety of GHG reductions, water conservation and resilient strategies in the City. She focused on the Laundry to Landscape or "L to L Graywater Kit Program."

She gave the following overview of the program:

- Laundry to Landscape or "L to L Graywater Kit Program" was completed in 2015 and is one program it offers its water customers in assisting them in reducing water and energy consumption.
- Benicia is home to about 28,000 people. This translates to 8,500 residential water meter connections and 1,000 commercial and industrial connections.
- Over half of the City's water use comes from the residential sector and half of that is from outdoor landscaping which provides opportunities for savings.
- The Council adopted a Climate Action Plan which contains over 100 strategies to reduce GHG emissions, conserving water, preparing the City for future climate change-related impacts.
- Each year her team reviews the plan and selects 6-10 strategies they feel they can focus on implementing.
- The 2014/15 work plan selected the Residential Water Conservation Program as a priority and the grey water program was part of that program.
- They have worked with a company that completed hundreds of home water assessments. They used the data to determine where they should be focusing their energy.
- Now they are in a serious drought, this generated support from elected officials and they also had staff familiar with the program and wanted to leverage and replicate a similar program from the City of San Rosa and they worked with the same vendor called, Grey and Green.
- The City is party to a settlement agreement drafted as a result of the Good Neighbor Steering Committee who responded to a proposed improvement project and permit

approval at a local refinery. The agreement set aside funds for a specific program that would result in water and GHG savings. The program cost $10,000 and of that, they only used approximately $4,400.

- They purchased 30 kits which are valued at about $90 each. They also used funds to host a how-to workshop to learn how to install the kits. They also conducted marketing because the City is its own water supplier.
- The kit contains parts needed to install a simple laundry to landscape system which she displayed in a slide. One issue was that people were opposed to installing it after looking at their laundry system hookup.
- The U-Tube video is available on-line to those not able to attend the workshop. Customers also had to sign up for a no cost energy and water assessment because while landscaping might be the highest water use, it may not be the case for individual homes. They had to follow the Building Code checklist and the California Plumbing Code.
- Lastly, was inspection and they asked a couple of businesses to assist in this process given current City resources and Raising Sun is a third party PG&E Energy Efficient 3-month program who agreed to do it but they only had 4 or 5 installations in that timeframe. The option they settled on was to allow participants to send photos of their completed installation, which is an interesting concept but hard to enforce. Not all completed the installation photos which was also a problem.
- Regarding outreach, she said the Community Sustainability Commission is active in the community. They promoted the program through websites, flyers at City Hall and farmer's markets, and the City Manager's newsletters. The local newspaper also wrote an article to promote the grey water program.
- The Benicia Community Gardens Group did a fabulous job of marketing the program and received a grant to help develop backyard food forests and also to train local individuals how to install water systems. They hosted a number of workshops and had over 100 people registered and attend workshops. They gave all of the kits away and she learned to leverage existing programs and efforts through community outreach programs.
- The pilot program only had about 30 kits available and they had kits returned to them which were distributed to others.
- She said they estimate 75,000 gallons of water had been diverted to landscape as a result of installing 5 systems, which is significant.
- Lessons learned:
    - The installment was too complicated
    - People's laundry machine was downhill from the yard
    - Some installations involved landlord approval which could not be obtained
    - Verifying that the system was installed was difficult
    - Photos were hard to enforce
    - Even with the workshop and videos applicants felt overwhelmed by the installation and they could not find a contractor to install them.
    - People were frustrated and did not want to complete another energy and water assessment within the previous year and some waited until 3 years. The City wanted to make sure the assessment was current as behaviors change, leaks occur, appliances change, etc.
    - They offered programs on all water users, and in the future they might consider utilizing the data they have to identify users in Benicia that would benefit most from a gray water system.

- On a positive note, they knew most water use was outdoors, they had everybody complete a home energy and water assessment which helped to identify members to conserve, and the Benicia Community Gardens helped them generate continuing interest in the program, and they feel they can advocate to the water agency to expand the rebate and incentives.

Ms. Porteshawver provided her contact information and the Board applauded her for her presentation.

Board member O'Donnell said he is glad the program was taken on. He asked how the system could work and asked if the program addressed certain plumbing aspects and requirements.

Ms. Porteshawver said there must be 2 inches of depth wherever the water is going. Some people create basins around a tree and the water must be absorbed for no runoff and in practice, she thinks the only time they would know it was not properly installed was if the neighbor complained about runoff or recorded it.

Board member O'Donnell asked if landscape companies were approached, and Ms. Porteshawver said the problem was that it was cost-prohibitive for homeowners.

Chairperson Sears said the County of Marin is engaged in a partnership with the City of Mill Valley non-profit organization called, Water Now. The focus thus far in grey water was to have training sessions for local contractors so they build a database of installers. She thinks it would be daunting for most homeowners and one challenge is getting the resources for training.

Board member Butt asked what the kit consists of and what would it cost. Ms. Porteshawver said they have no kits left but the company charged $90 each for them. People could also go to a local hardware store and she discussed the various pieces and said a Benicia local shop that has all components for sale.

Board member Butt asked if the program is limited to washing machines, and Ms. Porteshawver said yes, given their limited budget and non-requirement of a building permit.

Board member Small noted that if people tried to run gray water from sinks they would run into E.coli issues.

Board member Athas asked if detergent is filtered out and Chairperson Sears said she thinks detergent would have to be changed. Ms. Porteshawver said most solvents are not as potent and also because they are using water for non-medical plants and trees and it is okay. It also depends on the groundwater situation in the community. She did not require a certain detergent be used in the program, but she did encourage people to use eco-friendly laundry detergent.

Board member Athas said it sounds as if it is directly related to how much laundry one does, and suggested that if people really want to water their yard, they may need to do more laundry. Board member O'Donnell commented that he purchased a new washing machine which uses very little water. Ms. Porteshawver commented that she has talked to people who prefer to take a bucket in the shower and use this for their watering.

Chairperson Sears thanked Ms. Porteshawver for her presentation.

A. Schneider Electric Load Control

Ms. Weisz introduced the item, stating MCE has a number of pilot programs and one program launched early this year was to shift load and how they can adjust the usage in the residential customer sector and being able to use the load when it benefits the grid and when it benefits other customers. They have entered into a relationship with Schneider Electric and they will speak today about what they do, how the system works and how the pilot has been working to date.

Mike Matthews, Schneider Electric, said they are in partnership with MCE to deliver a pilot program and to investigate the practical way in which they can go out and do some in-home demand management. He said they try to help consumers manage demand at the right times and in the right way.

Mr. Matthews said he brought some of the in-home products and said he will give a PowerPoint presentation and review the how they partnered with MCE, what they are doing in homes and how they are interacting with consumers, how they are connecting with the consumer through multiple media mechanisms, provide a clear understanding why MCE and any energy provider cares about these types of programs, talk about building a smarter grid, and talk about results.

He said Schneider Electric is a global manufacturer of hardware, manage big utility infrastructure products and projects, they manage infrastructure software platforms that help how generation and load is used by the utility and by the consumer. They have approximately 150,000 employees with the focus being on utility infrastructure and he provided different percentages of their market place. He said the ultimate goal is to deliver the cheapest KW hour they can to end customers.

Mr. Matthews brought a demonstration of how products operate in the home and customers have control over products as well as MCE. Consumers can control equipment in their homes such as electric vehicles, HVAC systems, large appliances, and other devices. He explained how their gateway devices communicate data and sending it out to their servers and they process the data with their demand response platform where they can help the consumer change their consumption pattern for the devices they have control over. Consumers have their own interface such as apps on phones or via a web stream on their computer or adding more devices in their homes.

The reason this is important to MCE, it gives consumer the ability to automate controls that are available. It is a service available to customers of MCE. The goal is to reduce operational expense as there is a lot to manage peak power consumption, wholesale prices and this platform augments many options necessary around buying excess power that is needed at peak and also on the flipside, to take advantage of bringing load onto the grid and consuming more power at times.

As MCE becomes an aggregator of energy, and MCE is able to mimic what a power plant can do by turning power off and on when demand is needed which is valuable to the environment and to customers. They want to reduce peak usage, have a measurable amount of KW hours that is valuable to the grid, and at 100 KW this is a valuable generation as a goal to increase grid efficiency. There is also the opposite where the utility has too much generation and the utility can ask consumers to use more for those moments.

This is an innovative program and the goal is to be able to turn off the load very fast. There are many initiatives about how to manage load in real time and take advantage of customer load to make that grid more efficient.

MCE partnered with them and helped them deploy a pilot program which is just starting and which allows them to monitor use in real time. Their independent system operator manages flows for all of California utilities. They monitor the availability of electrons to the market through pricing markets, which typically means there are less electrons available and the demand is higher and people will pay more. When they see pricing go out of parameters of delivering inexpensive KW hours to consumers, they automate load controls. For the pilot purpose, they will be documenting the success of how the automation and trading of electrons is working for them.

Mr. Matthews said lastly, the pilot program will become the reality for broad utility use five years from now and they are cutting edge in developing this product. On the in-home side, how they engage consumers is changing radically day to day. They have to make sure they offer products such as Nest thermostats that consumers want and are asking for and making sure they connect to the utility side of business which is evolving, and he ran a video regarding taking control of energy for consumers. He then ran through a demonstration of an in-home display and then took questions of the Board.

Rafael Silberblatt, Program Specialist, said he is working with Schneider Electric on the pilot program. He said staff will do a de-briefing on lessons learned once they get deeper into the pilot program. MCE has sent out mailers, made phone calls in an attempt to better understand what it takes to get people enrolled and keep them from opting out through incentives and effective messaging. They triggered their first event on Tuesday as a test and the pilot will give them a sense of what to expect in terms of people opting out so when they place a bid for resources, they will be able to meet that bid and not incur penalties.

Board member McCullough asked if there is a profile of homes for the target market, as many homes in Marin do not have air conditioning and he asked if they would be optimal for this type of pilot program. Mr. Matthews said generally yes, people who do not have A/C could participate, but they were also trying to obtain an understanding around pool pumps, electric hot water heaters and furnaces for the winter, targeting medium to high energy users. They focused mailers initially on Novato and Napa and Davis.

Board member Coler asked and confirmed that they have approximately 20 installations, but he noted there was a high attrition rate from those who registered to actually getting the installation scheduled and done. The goal initially was to get 70 devices installed and saw a much lower response rate than they had experienced in other areas, given the lack of A/C loads. Therefore, they are addressing this through more education and communications with customers.

Board member O'Donnell commented that people with heating and A/C systems can turn on and off their systems when they get home. Mr. Matthews admitted that the devices are not for all consumers but the offer is that those consumers are helping MCE understand how to make the grid more efficient because program pricing could change. Their benefit is that they get automated products in their home which add convenience. If they were interested in controlling any loads remotely or from their couch, they have the ability to access those applications, as well. He also said the devices and installation were free and it was more about who was willing to adopt the technology issue.

Board member Athas asked if consumers were not paying for the technology, and Mr. Matthews said for this pilot, it was free device, free installation plus a $50 incentive which they started putting into place after the first wave of scheduled appointments. There will not be a fee for the pilot program, but in the future if they were bidding this as a resource, they would probably split the cost of the device with the

customer. He said the historical way these are paid for is that the amount of energy controlled has significant value to the systems operator and whether they can take load off of the grid on a hot summer day.

Board member Athas said because it is web-based, she asked if there is a benefit where they are able to monitor the usage of the people who have the systems so they can get a handle on whether or not it is currently working. Mr. Matthews said they typically only do it in aggregate. They look at load usage in aggregate and typically do not care about any particular user unless they are asked to care. Usually that would be over a customer service issue. Or, if they do not have as much controllable load, they would be interested in who is not participating and why.

Board member Strawbridge asked if they had contacted Benicia, noting they have a very engaged community. Mr. Silberblatt said when they first began the program, Benicia was not yet an MCE member. They were trying to get people also in geographically close proximity so the installer could go to one place to the next.

Board member Strawbridge also asked if the pilot program was only for residential customers or small businesses as well. Mr. Silberblatt said this pilot program is only for residential; however, they have a small commercial pilot underway.

Board member O'Donnell asked if the system allows customers to charge their EV at an optimal time during the evening when rates are lowest. Mr. Matthews said yes, and he said EV charging is probably the most complicated aspect of all of this because of the risk of leaving someone with not enough charge in the morning or if they have an emergency. In the future what will likely happen is they will pull electricity back and forth from the grid from the EV's so customers could charge the electricity from their car at one point during the day and have the flow go the other direction based on pricing signals.

Chairperson Sears thanked Mr. Matthews for his presentation and Mr. Silberblatt for his comments.

Ms. Weisz announced that some Board members may have received information that the Retreat is also occurring tomorrow, but it is not.

7. <u>Unfinished Items</u> - None

8. <u>Adjournment</u>

The Board of Directors adjourned the meeting at 3:02 p.m. to the Board Retreat on October 15, 2015.

_____

Kate Sears, Chair

Attest:

_____

Dawn Weisz, Secretary

October 15, 2015

TO: Marin Clean Energy Board

FROM: Sarah Estes-Smith, Internal Operations Coordinator

RE: Report on Approved Contracts (Agenda Item #04 – C.2)

Dear Board Members:

SUMMARY:

In March 2013 your Board adopted Resolution 2013-04 which authorized the Chief Executive Officer to enter into and execute agreements for an amount not to exceed $25,000 within a fiscal year consistent with the Board approved budget, the Joint Powers Agreement, and the Operating Rules and Regulations.

In November 2012 your Board approved the MCE Integrated Resource Plan authorizing the Chief Executive Officer to enter into and execute short term power purchase agreements for energy, capacity and renewable energy for less than or equal to 12 months, as well as medium-term contracts for energy, capacity and renewable energy for terms of greater than 12 months and less than or equal to 5 years in conjunction with the MCE Board Chair. Short and medium term power purchase agreements must be pursuant to a MCE Board approved Integrated Resource Plan. A committee of the MCE Board is consulted prior to execution of any medium-term contract by the Chief Executive Officer and MCE Board Chair.

The following chart summarizes agreements of this nature which have been entered into during the previous month:

Month	Purpose	Contractor	Maximum Annual Contract Amount	Term of Contract
August	White board animation videos to market Energy Efficiency Programs	Mark Wooding	$6,000	8 months
September	Light Green logo design	Moore Iacofano Goltsman, Inc.	$5,000	7 months
September	Employee Assistance Program for MCE employees and their dependents	Managed Health Network	$5,580	3 years
September	Adjustments to energy efficiency E3 calculators	Bevilacqua-Knight, Inc.	$9,000	7 months
September	Special Liability Insurance Program (SLIP) Coverage	Alliant Insurance Services, Inc.	$3,203.26	12 months
October	50 MW Conventional Energy January-December 2018	Exelon Generation Company, LLC	$15,811,800	12 months

October	50 MW Conventional Energy January-December 2019	Exelon Generation Company, LLC	$16,381,200	12 months
October	21 MW System Resource Adequacy January-December 2016	Calpine Energy Services, LP	$567,000	12 months
October	15 MW System Resource Adequacy January-December 2016	Calpine Energy Services, LP	$468,000	12 months

Recommendation: Information only. No action required.

October 15, 2015

TO: Marin Clean Energy Board

FROM: John Dalessi, Finance, Operations and Development

RE: Monthly FY 15/16 Budget Report (Agenda Item #04-C.3)

ATTACHMENT: MCE Budget Reports 2015-08 (Unaudited)

Dear Board Members:

SUMMARY:

The attached budget update compares the FY 2015/16 budget to the unaudited revenue and expenses of MCE for the month ending August 2015.

OPERATING BUDGET:

Year-to-date revenues continue slightly over budget, with cost of energy at levels slightly under budget. Operating expenditures are generally below anticipated year-to-date levels, but much of this will be smoothed as the year continues.

Overall, MCE continues to spend near projections, as reflected in year-to-date figures.

ENERGY EFFICIENCY PROGRAM BUDGET:

The Energy Efficiency Program is entirely funded by the California Public Utilities Commission. For financial reporting purposes. MCE treats funds received from this program as a reimbursable grant. The result is that program expenses are mostly offset by revenue. Certain planning and grant writing activities are not reimbursable under this grant. A deferred asset is recorded for funds received by the CPUC that have yet to be expended by MCE.

LOCAL DEVELOPMENT RENEWABLE ENERGY BUDGET:

This program is funded through a portion of the Deep Green service provided to customers. To date, expenses primarily relate to legal costs associated with establishing a local renewable energy project.

RENEWABLE ENERGY RESERVE BUDGET:

This fund is intended for the procurement or development of renewable energy not planned for in the operating funds. Resources may accumulate from year to year and be expended as management determines.

Recommendation: No action needed. Informational only.

MAHER ACCOUNTANCY 1101 FIFTH AVENUE • SUITE 200 • SAN RAFAEL, CA 94901

Financial Plumbline

ACCOUNTANTS' COMPILATION REPORT

Board of Directors
Marin Clean Energy

We have compiled the accompanying budgetary comparison schedules of Marin Clean Energy (a California Joint Powers Authority) for the period ended August 31, 2015. We have not audited or reviewed the accompanying financial statement and, accordingly, do not express an opinion or provide any assurance about whether the financial statement is in accordance with accounting principles generally accepted in the United States of America.

Management is responsible for the preparation and fair presentation of the financial statement in accordance with accounting principles generally accepted in the United States of America and for designing, implementing, and maintaining internal control relevant to the preparation and fair presentation of the financial statements.

Our responsibility is to conduct the compilation in accordance with Statements on Standards for Accounting and Review Services issued by the American Institute of Certified Public Accountants. The objective of a compilation is to assist management in presenting financial information in the form of financial statements with undertaking to obtain or provide any assurance that there are no material modifications that should be made to the financial statement.

The supplementary information contained on page 4 is presented for purposes of additional analysis. The supplementary information has been compiled from information that is the representation of management. We have not audited or reviewed the supplementary information and, accordingly, do not express an opinion or provide any assurance on such supplementary information.

Certain accounting functions provided by Maher Accountancy are considered management functions by the American Institute of Certified Public Accountants. Accordingly, we are not independent with respect to Marin Clean Energy.

Maher Accountancy
September 17, 2015

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MARIN CLEAN ENERGY

OPERATING FUND
BUDGETARY COMPARISON SCHEDULE
April 1, 2015 through August 31, 2015

	Actual from April 1, 2014 through August 31, 2014	2015/16 YTD Budget (Amended)	2015/16 YTD Actual	2015/16 YTD Budget Variance (Under) Over	2015/16 YTD Actual/Budget %	2015/16 Annual Budget (Amended)	2015/16 Budget Remaining
REVENUE AND OTHER SOURCES:							
Revenue - Electricity (net of allowance)	$ 42,098,480	61,879,360	$ 62,895,464	$ 1,016,104	101.64%	$ 145,933,098	$ 83,037,634
Other revenues	21,061	-	382,373	382,373	-	-	-
Total sources	42,119,541	61,879,360	63,277,837	1,398,477	102.26%	145,933,098	83,037,634
EXPENDITURES AND OTHER USES:							
CURRENT EXPENDITURES							
Cost of energy	33,647,850	51,876,799	51,049,637	(827,162)	98.41%	129,522,715	78,473,078
Staffing	789,925	1,197,950	1,142,955	(54,995)	95.41%	2,964,000	1,821,045
Technical consultants	213,175	266,712	255,519	(11,193)	95.80%	629,000	373,481
Legal counsel	125,895	150,000	91,259	(58,741)	60.84%	360,000	268,741
Communications consultants and related expenses	186,524	312,917	264,926	(47,991)	84.66%	751,000	486,074
Data manager	1,102,799	1,192,500	1,174,643	(17,857)	98.50%	2,862,000	1,687,357
Service fees- PG&E	286,213	383,750	348,483	(35,267)	90.81%	921,000	572,517
Other services	145,731	174,167	188,520	14,353	108.24%	418,000	229,480
General and administration	172,699	137,083	106,247	(30,836)	77.51%	329,000	222,753
Occupancy	-	108,333	54,145	(54,188)	49.98%	260,000	205,855
Integrated Demand side pilot programs	-	20,833	10,090	(10,743)	48.43%	50,000	39,910
Marin County green business program	-	10,000	-	(10,000)	0.00%	10,000	10,000
Solar rebates	-	-	-	-	0.00%	35,000	35,000
Total current expenditures	36,670,811	55,831,044	54,686,424	(1,144,620)	97.95%	139,111,715	84,425,291
CAPITAL OUTLAY	9,966	118,500	134,349	15,849	113.37%	150,000	15,651
DEBT SERVICE	449,521	2,080,000	2,054,975	(25,025)	98.80%	2,080,000	25,025
INTERFUND TRANSFER TO:							
Renewable Energy Reserve Fund	-	1,000,000	1,000,000	-	100.00%	1,000,000	-
Local Renewable Energy Development Fund	109,994	151,383	151,383	-	100.00%	151,383	-
Total expenditures	37,240,292	59,180,927	58,027,131	$ (1,153,796)	98.05%	142,493,098	$ 84,465,967
Net increase (decrease) in available fund balance	$ 4,879,249	$ 2,698,433	$ 5,250,706	$ 2,552,273		$ 3,440,000	$ (1,428,333)

MARIN CLEAN ENERGY
ENERGY EFFICIENCY PROGRAM FUND
BUDGETARY COMPARISON SCHEDULE
April 1, 2015 through August 31, 2015

	Budget	Actual	Budget Remaining	Actual/ Budget
REVENUE AND OTHER SOURCES:				
Public purpose energy efficiency program	$ 1,505,702	$ 323,057	$ 1,182,645	21.46%
EXPENDITURES AND OTHER USES:				
CURRENT EXPENDITURES				
Public purpose energy efficiency program	1,505,702	421,581	1,084,121	28.00%
Expenditures paid for by Operating fund		(98,524)		
Total expenditures paid for by EE program	1,505,702	323,057	1,084,121	
Net increase (decrease) in fund balance	$ -	$ -		

LOCAL RENEWABLE ENERGY DEVELOPMENT FUND
BUDGETARY COMPARISON SCHEDULE
April 1, 2015 through August 31, 2015

	Budget	Actual	Budget Remaining	Actual/ Budget
REVENUE AND OTHER SOURCES:				
Transfer from Operating Fund	$ 151,383	$ 151,383	$ -	100.00%
EXPENDITURES AND OTHER USES:				
Capital Outlay	151,383	114,075	37,308	75.36%
Net increase (decrease) in fund balance	$ -	$ 37,308		

RENEWABLE ENERGY RESERVE FUND
BUDGETARY COMPARISON SCHEDULE
April 1, 2015 through August 31, 2015

	Budget	Actual	Budget Remaining	Actual/ Budget
REVENUE AND OTHER SOURCES:				
Transfer from Operating Fund	$ 1,000,000	$ 1,000,000	$ -	100.00%
EXPENDITURES AND OTHER USES:	-	-	-	-
Net increase (decrease) in fund balance	$ 1,000,000	$ 1,000,000		

See accountants' compilation report.

MARIN CLEAN ENERGY
BUDGETARY SUPPLEMENTAL SCHEDULE
April 1, 2015 through August 31, 2015

		Actual
Other services		
Audit	$	35,500
Accounting		60,000
IT Consulting		31,323
Human resources & payroll fees		3,556
Legislative consulting		37,500
Miscellaneous professional fees		20,641
Other services	$	188,520
General and administration		
Cell phones	$	340
Data and telephone service		13,388
Insurance		3,966
Office and meeting rentals		740
Office equipment lease		2,275
Dues and subscriptions		22,171
Conferences and professional education		8,618
Travel		11,082
Business meals		1,731
Office supplies and postage		41,936
General and administration	$	106,247

See accountants' compilation report.

October 15, 2015

TO: Marin Clean Energy Board of Directors

FROM: Sarah Estes-Smith, Internal Operations Coordinator

RE: First Agreement with D.A. Jordan, DHA (Agenda Item #04 – C.4)

ATTACHMENT: First Agreement with D.A. Jordan, DHA

Dear Board Members:

SUMMARY:

Over the past year, MCE has grown significantly, hiring 15 new staff members and expanding to include four new member communities. Currently, MCE is poised to consider the inclusion of several additional communities. Given the amount of growth, past and future, MCE identified a need for strategic planning activities to help define and set goals according to its internal and external strengths, opportunities, weaknesses, and challenges.

MCE management conducted a field assessment to determine which providers would be able to provide this service to MCE. MCE inquired with seven entities and requested proposals from five. MCE management then reviewed proposals from four consultants and determined that Dr. David A. Jordan would provide the most thorough organizational analysis process, and be able to deliver an actionable strategic plan within a reasonable budget.

MCE has drafted the attached contract with Dr. Jordan to interview key stakeholders, conduct an environmental/organizational analysis, formulate strategies that address MCE's goals and objectives, and design a system that would allow MCE to implement the strategic plan and evaluate progress. Dr. Jordan would visit MCE offices three to four times, and has proposed to begin in mid-October, with an anticipated completion date of January 31, 2016. The contract would not exceed $34,000.

Recommendation: Approve the First Agreement with D.A. Jordan, DHA.

MARIN CLEAN ENERGY
STANDARD SHORT FORM CONTRACT

FIRST AGREEMENT
BY AND BETWEEN
MARIN CLEAN ENERGY AND D.A. JORDAN, DHA

THIS FIRST AGREEMENT ("Agreement") is made and entered into this day **October 15, 2015** by and between MARIN CLEAN ENERGY, hereinafter referred to as "MCE" and D.A. JORDAN & ASSOCIATES, hereinafter referred to as "Contractor."

RECITALS:

WHEREAS, MCE desires to retain a person or firm to provide the following services: organizational analysis and strategic planning consulting services as requested and directed by MCE;

WHEREAS, Contractor warrants that it is qualified and competent to render the aforesaid services;

NOW, THEREFORE, for and in consideration of the agreement made, and the payments to be made by MCE, the parties agree to the following:

1. SCOPE OF SERVICES:
Contractor agrees to provide all of the services described in **Exhibit A** attached hereto and by this reference made a part hereof.

2. FURNISHED SERVICES:
MCE agrees to make available all pertinent data and records for review, subject to MCE Policy 001 - Confidentiality.

3. FEES AND PAYMENT SCHEDULE; INVOICING:
The fees and payment schedule for furnishing services under this Agreement shall be based on the rate schedule which is attached hereto as **Exhibit B** and by this reference incorporated herein. Said fees shall remain in effect for the entire term of the Agreement. Contractor shall provide MCE with his/her/its Federal Tax I.D. or Social Security number prior to submitting the first invoice. Contractor is responsible for billing MCE in a timely and accurate manner. Contractor shall invoice MCE on a monthly basis for any services rendered or expenses incurred hereunder. Fees and expenses invoiced beyond 90 days will not be reimbursable. The final invoice must be submitted within 30 days of completion of the stated scope of services or termination of this Agreement.

4. MAXIMUM COST TO MCE:
In no event will the cost to MCE for the services to be provided herein exceed the maximum sum of **$34,000**.

5. TIME OF AGREEMENT:
This Agreement shall commence on **October 15, 2015**, and shall terminate on **March 31, 2016**. Certificate(s) of Insurance must be current on the day the Agreement commences and if scheduled to lapse prior to termination date, must be automatically updated before final payment may be made to Contractor.

6. INSURANCE AND SAFETY:
All required insurance coverages shall be substantiated with a certificate of insurance and must be signed by the insurer or its representative evidencing such insurance to MCE. The general liability policy shall be endorsed naming Marin Clean Energy and its employees, officers and agents as additional insureds. The certificate(s) of insurance and required endorsement shall be furnished to MCE prior to commencement of work. Each certificate shall provide for thirty (30) days advance written notice to MCE of any cancellation or reduction in coverage. Said policies shall remain in force through the life of this Agreement and shall be payable on a per occurrence basis only, except those required by paragraph 6.4 which may be provided on a claims-made basis consistent with the criteria noted therein.

Nothing herein shall be construed as a limitation on Contractor's obligations under paragraph 16 of this Agreement to indemnify, defend and hold MCE harmless from any and all liabilities arising from the Contractor's negligence, recklessness or willful misconduct in the performance of this Agreement. MCE agrees to timely notify the Contractor of any negligence claim.

Failure to provide and maintain the insurance required by this Agreement will constitute a material breach of the agreement. In addition to any other available remedies, MCE may suspend payment to the Contractor for any services provided during any time that insurance was not in effect and until such time as the Contractor provides adequate evidence that Contractor has obtained the required coverage.

6.1 GENERAL LIABILITY

The Contractor shall maintain a commercial general liability insurance policy in an amount of no less than one million dollars ($1,000,000) with a two million dollar ($2,000,000) aggregate limit. MCE shall be named as an additional insured on the commercial general liability policy and the Certificate of Insurance shall include an additional endorsement page. (see sample form: ISO - CG 20 10 11 85).

6.2 AUTO LIABILITY

Where the services to be provided under this Agreement involve or require the use of any type of vehicle by Contractor in order to perform said services, Contractor shall also provide comprehensive business or commercial automobile liability coverage including non-owned and hired automobile liability in the amount of one million dollars combined single limit ($1,000,000.00).

6.3 WORKERS' COMPENSATION

The Contractor acknowledges the State of California requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of the Labor Code. If Contractor has employees, a copy of the certificate evidencing such insurance or a copy of the Certificate of Consent to Self-Insure shall be provided to MCE prior to commencement of work.

6.4 PROFESSIONAL LIABILITY INSURANCE

Coverages required by this paragraph may be provided on a claims-made basis with a "Retroactive Date" either prior to the date of the Agreement or the beginning of the contract work. If the policy is on a claims-made basis, coverage must extend to a minimum of twelve (12) months beyond completion of contract work. If coverage is cancelled or non-renewed, and not replaced with another claims made policy form with a "retroactive date" prior to the Agreement effective date, the contractor must purchase "extended reporting" coverage for a minimum of twelve (12) months after completion of contract work. Contractor shall maintain a policy limit of not less than $1,000,000 per incident. If the deductible or self-insured retention amount exceeds $100,000, MCE may ask for evidence that contractor has segregated amounts in a special insurance reserve fund or contractor's general insurance reserves are adequate to provide the necessary coverage and MCE may conclusively rely thereon.

Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Agreement. Contractor shall monitor the safety of the job site(s) during the project to comply with all applicable federal, state, and local laws, and to follow safe work practices.

7. NONDISCRIMINATORY EMPLOYMENT:

Contractor and/or any permitted subcontractor, shall not unlawfully discriminate against any individual based on race, color, religion, nationality, sex, sexual orientation, age or condition of disability. Contractor and/or any permitted subcontractor understands and agrees that Contractor and/or any permitted subcontractor is bound by and will comply with the nondiscrimination mandates of all Federal, State and local statutes, regulations and ordinances.

8. SUBCONTRACTING:

The Contractor shall not subcontract nor assign any portion of the work required by this Agreement without prior written approval of MCE except for any subcontract work identified herein. If Contractor hires a subcontractor under this Agreement, Contractor shall require subcontractor to provide and maintain insurance coverage(s) identical to what is required of Contractor under this Agreement and shall require subcontractor to name Contractor as additional insured under this Agreement. It shall be Contractor's responsibility to collect and maintain current evidence of insurance provided by its subcontractors and shall forward to MCE evidence of same.

9. ASSIGNMENT:

The rights, responsibilities and duties under this Agreement are personal to the Contractor and may not be transferred or assigned without the express prior written consent of MCE.

10. RETENTION OF RECORDS AND AUDIT PROVISION:

Contractor and any subcontractors authorized by the terms of this Agreement shall keep and maintain on a current basis full and complete documentation and accounting records, employees' time sheets, and correspondence pertaining to this Agreement. Such records shall include, but not be limited to, documents supporting all income and all expenditures. MCE shall have the right, during regular business hours, to review and audit all records relating to this Agreement during the Contract period and for at least five (5) years from the date of the completion or termination of this Agreement. Any review or audit may be conducted on Contractor's premises or, at MCE's option, Contractor shall provide all records within a maximum of fifteen (15) days upon receipt of written notice from MCE. Contractor shall refund any monies erroneously charged.

11. WORK PRODUCT:

All finished and unfinished reports, plans, studies, documents and other writings prepared by and for Contractor, its officers, employees and agents in the course of implementing this Agreement shall become the sole property of MCE upon payment to Contractor for such work. MCE shall have the exclusive right to use such materials in its sole discretion without further compensation to Contractor or to any other party. Contractor shall, at MCE's expense, provide such reports, plans, studies, documents and writings to MCE or any party MCE may designate, upon written request. Contractor may keep file reference copies of all documents prepared for MCE.

12. TERMINATION:

A. If the Contractor fails to provide in any manner the services required under this Agreement or otherwise fails to comply with the terms of this Agreement or violates any ordinance, regulation or other law which applies to its performance herein, MCE may terminate this Agreement by giving five (5) calendar days written notice to the party involved.
B. The Contractor shall be excused for failure to perform services herein if such services are prevented by acts of God, strikes, labor disputes or other forces over which the Contractor has no control.
C. Either party hereto may terminate this Agreement for any reason by giving thirty (30) calendar days written notice to the other parties. Notice of termination shall be by written notice to the other parties and be sent by registered mail.
D. In the event of termination not the fault of the Contractor, the Contractor shall be paid for services performed to the date of termination in accordance with the terms of this Agreement so long as proof of required insurance is provided for the periods covered in the Agreement or Amendment(s).

13. AMENDMENT:

This Agreement may be amended or modified only by written agreement of all parties.

14. ASSIGNMENT OF PERSONNEL:

The Contractor shall not substitute any personnel for those specifically named in its proposal unless personnel with substantially equal or better qualifications and experience are provided, acceptable to MCE, as is evidenced in writing.

15. JURISDICTION AND VENUE:

This Agreement shall be construed in accordance with the laws of the State of California and the parties hereto agree that venue shall be in Marin County, California.

16. INDEMNIFICATION:

Contractor agrees to indemnify, defend, and hold MCE, its employees, officers, and agents, harmless from any and all liabilities including, but not limited to, litigation costs and attorney's fees arising from any and all claims and losses to anyone who may be injured or damaged by reason of Contractor's negligence, recklessness or willful misconduct in the performance of this Agreement.

17. NO RECOURSE AGAINST CONSTITUENT MEMBERS OF MCE:

MCE is organized as a Joint Powers Authority in accordance with the Joint Exercise of Powers Act of the State of California (Government Code Section 6500, et seq.) pursuant to the Joint Powers Agreement and is a public entity separate from its constituent members. MCE shall solely be responsible for all debts, obligations and liabilities accruing and arising out of this Agreement. Contractor shall have no rights and shall not make any claims, take any actions or assert any remedies against any of MCE's constituent members in connection with this Agreement.

18. COMPLIANCE WITH APPLICABLE LAWS:

The Contractor shall comply with any and all Federal, State and local laws and resolutions (including, but not limited to the County of Marin Nuclear Free Zone, Living Wage Ordinance, and Resolution #2005-97 of the Board of Supervisors prohibiting the off-shoring of professional services involving employee/retiree medical and financial data) affecting services covered by this Agreement.

19. NOTICES

This Agreement shall be managed and administered on MCE's behalf by the Contract Manager named below. All invoices shall be submitted and approved by this Agreement Manager and all notices shall be given to MCE at the following location:

Contract Manager:	Sarah Estes-Smith
MCE Address:	1125 Tamalpais Avenue
	San Rafael, CA 94901
Email Address:	invoices@mcecleanenergy.org
Telephone No.:	(415) 464-6028

Notices shall be given to Contractor at the following address:

Contractor:	Dr. David A. Jordan
Address:	7 Westland Street
	Worcester, MA 01602
Email Address:	djordan@sevenhills.org
Telephone No.:	(508) 755-2340 ext. 1301

20. ACKNOWLEGEMENT OF EXHIBITS

	☒	***Check applicable Exhibits***	**CONTRACTOR'S INITIALS**
EXHIBIT A.	☒	**Scope of Services**	
EXHIBIT B.	☒	**Fees and Payment**	
EXHIBIT C.	☒	**Insurance Waiver/Reduction**	
EXHIBIT D.	☒	**Proposal**	

IN WITNESS WHEREOF, the parties have executed this Agreement on the date first above written.

APPROVED BY
Marin Clean Energy:

By:_____
CEO
Date:_____

By:_____
Chairperson
Date:_____

CONTRACTOR:

By:_____

Name:_____

Date:_____

MCE COUNSEL REVIEW AND APPROVAL ***(Only required if any of the noted reason(s) applies)***
REASON(S) REVIEW:

☒ **Standard Short Form Content Has Been Modified**
☐ **Optional Review by MCE Counsel at Marin Clean Energy's Request**

MCE Counsel: _____ **Date:**_____

EXHIBIT A
SCOPE OF SERVICES (required)

Contractor will provide the following organizational analysis and strategic planning consulting services, as requested and directed by MCE staff, up to the maximum time/fees allowed under this Agreement:

Phase 1: Environmental/Organizational Analysis

The environmental/organizational analysis phase involves a thorough review of MCE's ***'external'*** and ***'internal'*** environments. Using a healthcare metaphor – this is the "diagnostic workup" of an organization intended to reveal its resources, capabilities, and competencies, and the projected societal/ sector trends in which it must compete. Just as a healthcare practitioner cannot prescribe a plan of treatment without first conducting a comprehensive examination – an organization similarly cannot create a meaningful strategic – nor tactical – plan without first having a full and complete understanding of its strengths, weaknesses, opportunities, threats, and environmental trends. This process will involve interviewing key organizational stakeholders including the Board of Directors, leadership, and selected key *'publics'* – including MCE staff and members of the regulatory or other bodies MCE leadership would like to access.

Phase 2: Strategy Formulation

Strategy formulation considers the varied alternatives open to the MCE. These include adaptive strategies (i.e. expansion, contraction, or stabilization), market strategies (i.e. purchasing, cooperation, or development), positioning strategies (i.e. market-wide or market segment), and implementation strategies (i.e. functional and organization-wide strategies). It is in this second phase – strategy formulation – where thoughtful tactical and strategic planning is created and articulated.

Phase 3: Strategy Implementation

Strategy implementation involves the activities and choices required for the execution of MCE's tactical and strategic plans. In this phase, strategies and policies are put into action through the development of programs, budgets, and procedures. To begin the implementation process, strategy makers consider 3 questions:

- Who are the people who will carry out the tactical / strategic plan?
- What must be done?
- How are they going to do what is needed?

We will work with the Board and leadership of MCE to ensure that the formal organizational analysis and resultant strategic planning document clearly responds to each of these questions prior to strategy implementation.

Phase 4: Strategy Evaluation & Control

Through the evaluation and control process, MCE activities and performance are monitored so that actual performance can be compared with desired outcome benchmarks. This process provides the feedback necessary for the Board and leadership to evaluate the results of the strategic plan and, as needed, take corrective action.

The scope of services includes the following Deliverables:

1. A completed Organizational Analysis of the MCE which will involve up to thirty personal (30) interviews; including members of the Board of Directors, Leadership, Staff, and other key 'publics' as might be identified. The analysis will involve a review of the MCE's external environment and internal environment. A SWOT analysis, Trend analysis, and Competitors analysis will be integral components of the Organizational Analysis. The organizational analysis will also include an additional online survey in which ALL employees of MCE will be asked to respond (anonymously) to questions relating to their perceptions of suggested goals for the subsequent 2 year cycle, a general satisfaction survey, and related inquiry.

2. A presentation of the findings associated with the Organizational Analysis coupled with a half-day 'retreat' with the MCE leadership to discuss and consider the findings and prepare 'Action Steps' from which to proceed forward.

3. Drafting of an initial Strategic Plan for the Marin Clean Energy for review by the Board and Leadership.

4. A completed Strategic Plan document with organizational goals, enacting objectives for each goal, timeframe and responsibility assignments, and an assessment as to the organizational resources required to complete each of the prescribed goals (e.g. Financial requirements, marketing needs, human resources, IT, etc.). A PowerPoint presentation of the agreed upon tactical goals will be a final deliverable to Marin Clean Energy.

EXHIBIT B
FEES AND PAYMENT SCHEDULE

For services provided under this agreement, MCE shall pay the Contractor in accordance with the following payment fees/schedule:

50% due upon delivery of Deliverable 2
50% due upon delivery of Deliverable 4

Travel, lodging and other expenses are included in this proposal and will not be billed separately.

In no event shall the total cost to MCE for the service provided herein exceed the maximum sum of **$34,000** for the term of the agreement.

EXHIBIT C
INSURANCE REDUCTION/WAIVER (if applicable)

CONTRACTOR: D.A. JORDAN & ASSOCIATES

CONTRACT TITLE: First Agreement By and Between MCE and D.A. JORDAN & ASSOCIATES

This statement shall accompany all requests for a reduction/waiver of insurance requirements. Please check the box if a waiver is requested or fill in the reduced coverage(s) where indicated below:

	Check Where Applicable	***Requested Limit Amount***	***MCE Use Only***
General Liability Insurance	☒	$	
Automobile Liability Insurance	☐	$	
Workers' Compensation Insurance	☒		
Professional Liability Deductible	☒	$	

Please set forth the reasons for the requested reductions or waiver.

General & Professional Liability – Waived due to limited scope of services.
Workers' Compensation – Waived; contractor is a sole proprietor.

Contract Manager Signature: _____

Date: _____

Telephone: _____

Approved by: _____

Date: _____

EXHIBIT D
PROPOSAL

d.a .jordan & associates
Dr. David A. Jordan DHA, MPA
Organizational Development & Strategic Planning
djordan@sevenhills.org

To: Ms. Sarah Estes-Smith
Internal Operations Coordinator
Marin Clean Energy (MCE)
From: Dr. David A. Jordan
Date: September 23, 2015
Re: Organizational Analysis & Strategic Planning Proposal

For the organizational analysis initiative proposed for the ***Marin Clean Energy (MCE),*** it is recommended that a formal strategic management methodology be employed. Broadly stated, the construct of strategic management involves a descriptive analysis of an organization's internal and external environments as a means toward guiding its future strategic trajectory and the corresponding utilization of its resources – human or otherwise. More simply put, strategic management is a "matching process" in which the variables of strategy, capability, and environment are matched as the organization seeks to manage change. A more formal definition is:

> ***The term strategic management refers to the managerial process of forming a strategic vision, setting goals and objectives, crafting the strategy, implementing and executing the strategy, and then over time, initiating whatever corrective adjustments in the vision, goals/objectives, strategy, and execution as deemed appropriate.***
>
> (Thompson & Strickland, 2001)

For the purposes of this assignment, we will attempt to orchestrate a fit between the organization's ***external environment*** including it's current / future opportunities and threats; a review of similar organizations (competitors) ; and a review of the external trends which may impact the MCE in the near future (i.e. political, regulatory, economic, technological, social/cultural, and competitive forces). An assessment of the Marin Clean Energy's ***internal environment*** including it's perceived strengths and weaknesses and a review of the existing operational subsystems (i.e. marketing, finances, technology, etc.) will also be considered. The focus of this assignment will be to recommend certain ***"strategic initiatives"*** intended to support the efforts of the organizations longer term vision; ***that is, what best actions might the Marin Clean Energy undertake over the next 24 month cycle as a means toward positioning itself and achieving heightened competitive advantage in the future. This analysis will also consider and make recommendations concerning operational efficiencies.***

The Strategic Management Planning Model

It may be useful to think of the organizational analysis process proposed for the Marin Clean Energy as consisting of four (4) distinct 'phases':

1. **Environmental/Organizational Analysis:** The environmental/organizational analysis phase involves a thorough review of MCE's ***'external'*** and ***'internal'*** environments. Using a healthcare metaphor – this is the "diagnostic workup" of an organization intended to reveal its resources, capabilities, and competencies, and the projected societal/ sector trends in which it must compete. Just as a healthcare practitioner cannot prescribe a plan of treatment without first conducting a

comprehensive examination – an organization similarly cannot create a meaningful strategic – nor tactical - plan without first having a full and complete understanding of its strengths, weaknesses, opportunities, threats, and environmental trends. This process will involve interviewing key organizational stakeholders including the Board of Directors, leadership, and selected key *'publics'* – including MCE staff and members of the regulatory or other bodies MCE leadership would like to access.

2. **Strategy Formulation:** Strategy formulation considers the varied alternatives open to the MCE. These include adaptive strategies (i.e. expansion, contraction, or stabilization) , market strategies (i.e. purchasing, cooperation, or development), positioning strategies (i.e. market-wide or market segment), and implementation strategies (i.e. functional and organization-wide strategies). It is in this second phase – strategy formulation – where thoughtful tactical and strategic planning is created and articulated.

3. **Strategy Implementation:** Strategy implementation involves the activities and choices required for the execution of MCE's tactical and strategic plans. In this phase, strategies and policies are put into action through the development of programs, budgets, and procedures. To begin the implementation process, strategy makers consider 3 questions:

    - Who are the people who will carry out the tactical / strategic plan?
    - What must be done?
    - How are they going to do what is needed?

    We will work with the Board and leadership of MCE to ensure that the formal organizational analysis and resultant strategic planning document clearly responds to each of these questions prior to strategy implementation.

4. **Strategy Evaluation & Control:** Through the evaluation and control process, MCE activities and performance are monitored so that actual performance can be compared with desired outcome benchmarks. This process provides the feedback necessary for the Board and leadership to evaluate the results of the strategic plan and, as needed, take corrective action.

Deliverables to Marin Clean Energy (MCE)

This proposal includes the following deliverables:

5. A completed Organizational Analysis of the MCE which will involve up to thirty personal (30) interviews; including members of the Board of Directors, Leadership, Staff, and other key 'publics' as might be identified. The analysis will involve a review of the MCE's external environment and internal environment. A SWOT analysis, Trend analysis, and Competitors analysis will be integral components of the Organizational Analysis. The organizational analysis will also include an additional online survey in which ALL employees of MCE will be asked to respond (anonymously) to questions relating to their perceptions of suggested goals for the subsequent 2 year cycle, a general satisfaction survey, and related inquiry.

6. A presentation of the findings associated with the Organizational Analysis coupled with a half-day 'retreat' with the MCE leadership to discuss and consider the findings and prepare 'Action Steps' from which to proceed forward.

7. Drafting of an initial Strategic Plan for the Marin Clean Energy for review by the Board and Leadership.

8. A completed Strategic Plan document with organizational goals, enacting objectives for each goal, timeframe and responsibility assignments, and an assessment as to the organizational resources required to complete each of the prescribed goals (e.g. Financial requirements, marketing needs, human resources, IT, etc.). A PowerPoint presentation of the agreed upon tactical goals will be a final deliverable to Marin Clean Energy.

Fees for Consultation

For the above services, the consulting fee would be $34,000 (Thirty Four Thousand) payable as follows: 50% at the presentation of the Organizational Analysis at the half-day 'retreat' and 50% at delivery of the final Strategic Plan document with identified 2 year Goals, Objectives and Implementation Strategies. Travel, lodging, and other expenses are included in this proposal. This assignment will entail spending between 7 - 10 days on site at MCE headquarters in California.
Projected Start Date: October 17, 2015
Anticipated Completion Date: January 31, 2016

Respectfully Submitted

David A. Jordan, DHA, MPA

Acceptance / Authorization To Proceed

The above scope and terms are accepted by Marin Clean Energy and confirmed by the signature below:

On Behalf of Marin Clean Energy,

_____ _____

Authorized Signature / Title Date

October 15, 2015

TO: Marin Clean Energy Board

FROM: Allison Hang, Community Development Manager

RE: Charles F. McGlashan Advocacy Award Nominations (Agenda Item #06)

Dear Board Members:

SUMMARY:

On June 2, 2011, your Board established the Charles F. McGlashan Advocacy Award to recognize individuals and organizations who have demonstrated passion, dedication and leadership to promote MCE, as exemplified by the late Charles McGlashan, founding Chair of Marin Clean Energy.

To date, the Charles F. McGlashan Advocacy Award has been awarded to Barbara George in 2011; the Mainstreet Moms in 2012; Lea Dutton in 2013; and Doria Robinson in 2014.

On October 7, 2015, the MCE Executive Committee voted unanimously to honor Constance Beutel as the fifth recipient of the Charles F. McGlashan Advocacy Award.

Constance Beutel was instrumental to Benicia's membership in MCE. Ms. Buetel was the first chairperson of Benicia's Community Sustainability Commission when it was formed in 2010. The commission has a strong emphasis on public outreach and education, and hosted workshops about MCE such as "The Energy Symposium" and "Clean Energy/Community Choice Aggregation" panel. Under Ms. Beutel's leadership, the Sustainability Commission recommended Community Choice Aggregation to the City of Benicia. Ms. Beutel played a pivotal role in MCE's enrollment outreach in Benicia. She distributed information, provided regular feedback on outreach activities, and connected MCE with customers to answer questions. These efforts made a tangible impact on the success of MCE's outreach. Ms. Beutel remains engaged with MCE's work. She recently provided feedback on MCE's 2016 and beyond Energy Efficiency programs and attended MCE's advocacy training to continue effective outreach in her community.

Recommendation: Honor Constance Beutel as the fifth recipient of the Charles. F. McGlashan Advocacy Appreciation Award.

October 15, 2015

TO: Marin Clean Energy

FROM: Greg Brehm, Director of Power Resources

RE: MCE Integrated Resource Plan (Agenda Item #07)

ATTACHMENTS: A. Draft 2015 Marin Clean Energy Integrated Resource Plan
B. Summary of Key Adjustments to Integrated Resource Plan

Dear Board Members:

BACKGROUND:

The purpose of Marin Clean Energy's Integrated Resource Plan ("IRP") is threefold: (1) to quantify resource needs over the ten-year planning period, which includes calendar year 2015 through 2024; (2) to prioritize resource preferences and set forth other relevant energy procurement policies; and (3) to provide guidance to program management with regard to the procurement of various energy products that will be necessary to promote successful, ongoing operation of the MCE program. In practical terms, the IRP documents the planning and procurement policies established by your Board to which program management adheres during day-to-day operations.

The IRP documents how the MCE program will fulfill key policy objectives that have been established for the program, which include:

1. Reducing greenhouse gas emissions related to the electric power sector through increased use of renewable energy resources and reduced reliance on fossil-fueled resources;
2. Maintaining competitive electric rates and increasing control over energy costs through management of a diversified resource mix;
3. Benefiting the area's economy through investments in local infrastructure and other complementary energy programs;
4. Helping customers reduce energy consumption and electric bills through investment in and administration of enhanced customer energy efficiency, cost effective distributed generation and other demand-side programs; and
5. Enhancing system reliability through investment in supply and demand-side resources.

The IRP translates these broad policy objectives into more specific planning elements focused on the use of various resource types, taking into consideration MCE's projected customer needs and MCE's existing resource commitments. The IRP identifies the timing and magnitude of any additional energy procurement that may be required to meet the specified resource goals – this element of the plan provides guidance to

prospective third-party suppliers with regard to MCE's future resource needs and preferences. More specifically, the IRP quantifies MCE's anticipated load and resource balances, identifying instances in which existing supply commitments fall short of anticipated customer energy requirements. To the extent that such "open", or "short", positions exist, MCE will utilize this information for purposes of structuring future solicitations for necessary energy products. As MCE enters into contracts for such open positions, MCE's load and resource balance will be updated and information related to such contracts will be incorporated in the IRP. To the extent that open positions exist, the IRP describes the procurement methods that MCE will utilize and the specific procurement authorities that will apply when addressing various resource commitments. Additionally, the IRP provides power supply contracting guidelines, which serve as an important hedging strategy as MCE continues to expand its membership and diversify its portfolio of counterparties over the planning period.

MCE's IRP is annually updated following a collaborative process involving your Board, its committees, management, staff and consultants. Annual updates typically commence during the summer season and are completed each fall. Through the plans set forth in the IRP, MCE will continue to pursue its long-term vision of delivering 100% renewable energy to MCE customers, while retaining flexibility that may be necessary in a frequently changing marketplace and regulatory environment.

PROCEDURAL OVERVIEW:

As previously noted, the 2015 IRP update is the result of an extensive, collaborative planning process, which commenced in July 2015. Public discussion was initiated at the August 2015 Technical Committee meeting, focusing on potential changes to MCE's future resource mix, particularly planned increases to the proportion of renewable energy and carbon-free energy to be provided over the upcoming 10-year period. During this meeting, management and staff received feedback regarding the preferred course of action, indicating a preference for aggressive increases in MCE's future clean energy purchases. This item was subsequently discussed with your Board during the September 2015 retreat. At this meeting, specific direction was given to management and staff regarding your preference for a supply portfolio that would reflect proportionate increases in both renewable and carbon-free energy over the next ten years, culminating in the delivery of 80% renewable energy in 2025 (with an overall carbon-free content of 95%, achieved through the procurement of supplemental energy supplies from regional hydroelectric resources). Based on this direction, the IRP was updated, reflecting the gradual transition from MCE's current resource mix to the desired 2025 targets. The draft IRP update, which reflected such changes, was recently discussed at MCE's October 2015 Technical Committee meeting during which the Committee recommended adoption of the updated IRP.

SUMMARY OF CHANGES:

The 2015 IRP update, which is provided as an attachment to this staff report, represents a significant advance in MCE's procurement objectives, including:

1. For MCE's default Light Green product, MCE will increase the procurement of RPS-eligible renewable energy supplies from 50% to 80% by 2025. Open positions associated with this transition have been identified in the IRP.

2. MCE will also increase the supplemental procurement of carbon-free resources to achieve an overall carbon-free resource mix of 95% by 2025. This transition

will result in substantial increases to MCE's current carbon-free content, which approximates 60%. Open positions associated with this transition have been identified in the IRP.

The 2015 IRP update also reflects a planned transition focused on the location of generating resources that will be used to supply the electric energy requirements of MCE customers. In particular, MCE intends to incorporate increased proportions of new, in-state generation when assembling it supply portfolio. Such resources will promote a transition away from unbundled renewable energy certificates in favor of "bundled" renewable resources, which are located in closer proximity to MCE's customer base. In consideration of these objectives, MCE's IRP update reflects the following changes:

1. MCE has determined to limit the use of unbundled, or "Bucket 3" as defined under California's RPS program, renewable energy certificates ("unbundled RECs"), which are sold separately from the electric commodity also produced by the renewable generator. Recently, use of unbundled RECs has been the topic of intense philosophical debate and environmental policy transitions. While such products are explicitly permitted (in limited quantities) under California's RPS program and are widely used throughout the electric utility industry, MCE has determined to limit the use of such products in an effort to promote increased use of California-based renewable energy sources.

2. The IRP update describes the transition that will be undertaken by MCE as bundled renewable energy purchases displace the use of unbundled RECs throughout the planning period. A significant element of this transition will occur in 2015 (relative to 2014) with incremental transitions occurring thereafter.

The 2015 IRP update also reflects a variety of other changes, including the following:

1. MCE has updated its load forecast (based on recent inclusion activities), contracted resources (in consideration of contracts executed following MCE's 2014 IRP update), energy efficiency projections (based on MCE's updated energy efficiency plans), net energy metering participation and reserve capacity requirements.

2. The IRP update also highlights the development of local renewable resources through MCE's Feed-In Tariff and Local Sol programs as well as ongoing development activities associated with the MCE Solar 1 project.

RECOMMENDATION:
Approve Marin Clean Energy's 2015 Integrated Resource Plan Update.

Marin Clean Energy – Integrated Resource Plan: 2015 Update

November 2015

Approved by MCE Board of Directors on _____

MCE Integrated Resource Plan: 2015 Update

Contents

Introduction

Marin Clean Energy (MCE), formerly known as the Marin Energy Authority, provides retail electric generation services to customers within its service area, which comprises the political boundaries of Marin County, unincorporated Napa County, the cities of Richmond, San Pablo and El Cerrito (all of which are located in Contra Costa County) and the City of Benicia (located in Solano County). MCE provides service to nearly eight out of ten electricity customers within these communities and is the default electric generation provider for any new or relocated customers therein. MCE strives to provide electric services to its customers at stable and competitive rates, utilizing the cleanest possible sources of electric energy. With these objectives in mind, MCE plans for and secures commitments from a diverse portfolio of electric resources to reliably serve its customers' electric energy needs over the near-, mid- and long-term planning horizons. This Integrated Resource Plan (the "IRP") documents MCE's resource planning objectives over the upcoming ten year planning period. This IRP will be updated and approved by MCE's Governing Board on an annual basis in consideration of applicable legislative and regulatory requirements, current policy objectives, customer participation, anticipated electricity sales and related energy product requirements, planned inclusion/expansion, new procurement activities, and any other known or reasonably anticipated considerations that may affect the manner in which MCE carries out its resource planning functions.

Purpose of Resource Plan

The IRP has three primary purposes: (1) quantify resource needs over the planning period; (2) prioritize resource preferences and articulate relevant energy procurement policies; and (3) provide guidance to the energy product procurement processes undertaken by program management. In practical terms, the IRP documents the energy procurement policy guidelines established by MCE's Governing Board ("MCE Board") to which program management adheres when carrying out MCE's day-to-day energy planning and procurement activities.

Highlights of this IRP include the following:

- MCE will manage a portfolio of electric resources to maintain a minimum renewable energy content of 50% during the ten-year planning period, keeping in mind MCE's long term goal of increasing such renewable content to 100%.

- MCE currently manages a portfolio of twenty active energy contracts with twelve different energy suppliers and anticipates managing an increasing number of energy contracts in administering the IRP.

- For the next several years, MCE's existing supply commitments are generally sufficient to fulfill the expected energy product requirements of its customers:

    - MCE has contracted for most of its projected renewable energy needs through 2019;

- MCE's non-renewable, or "conventional", energy requirements are also substantially addressed via contractual commitments that are in place through 2017, and MCE is actively soliciting offers for conventional and carbon free resources to fill open positions that exist in calendar year 2018 and beyond;
- Required reserve capacity is substantially addressed under contractual commitments extending through the 2016 calendar year;
- Due to favorable market conditions, MCE has contracted for higher than expected bundled renewable energy volumes, which will displace the use of un-bundled renewable energy products (also referred to as "unbundled renewable energy certificates" or "unbundled RECs") during the ten-year planning period.

- MCE currently has more than 5,300 customers participating in its Net Energy Metering (NEM) Tariff option; the smaller-scale renewable generating projects that have been installed by such customers represent more than 35,000 kW (or 35 MW) of local renewable generating capacity[1]. MCE aspires to increase total customer-sited NEM generating capacity within its service area to approximately 47,000 kW (or 47 MW) by 2021.

- MCE is planning for an additional 25,000 kW (25 MW, above and beyond the aforementioned increases to NEM generating capacity) of locally situated photovoltaic solar (PV) generation by 2021. To support the achievement of this planning objective, MCE began promoting in-area distributed generation in June of 2013 through direct investment in pre-development permitting for new projects, subject to MCE Board approval. Currently MCE has 10.5 MW of local Solar PV under development in the city of Richmond, CA, has identified two additional development sites, and is completing predevelopment due diligence. These sites could support up to 150MW of Solar PV.

- MCE's feed-in tariff program (FIT) continues to promote additional local renewable project buildout through the availability of a standard offer (meaning, non-negotiable) contract with eligible renewable energy projects. Specific terms and conditions for the FIT program have been approved by the MCE Board and are readily available on MCE's website. Eligible projects may participate on a first come, first served basis, subject to MCE's aggregate participatory cap of 15,000 kW (15 MW). To date, MCE's FIT has supported completion of the 972 kW (≈1 MW) San Rafael Airport solar project, which began producing renewable energy for MCE customers on October 23, 2012. Since the San Rafael Airport project commenced operations, MCE has entered into several additional FIT contracts, totaling approximately 6,700 kW (6.7 MW) of new generating capacity; such projects are expected to begin producing electric power over the next 24 months.

[1] NEM statistics include customer-sited generation as of May 2015 (impacts associated with the February 2015 Napa expansion and the May 2015 San Pablo expansion are reflected in such totals).

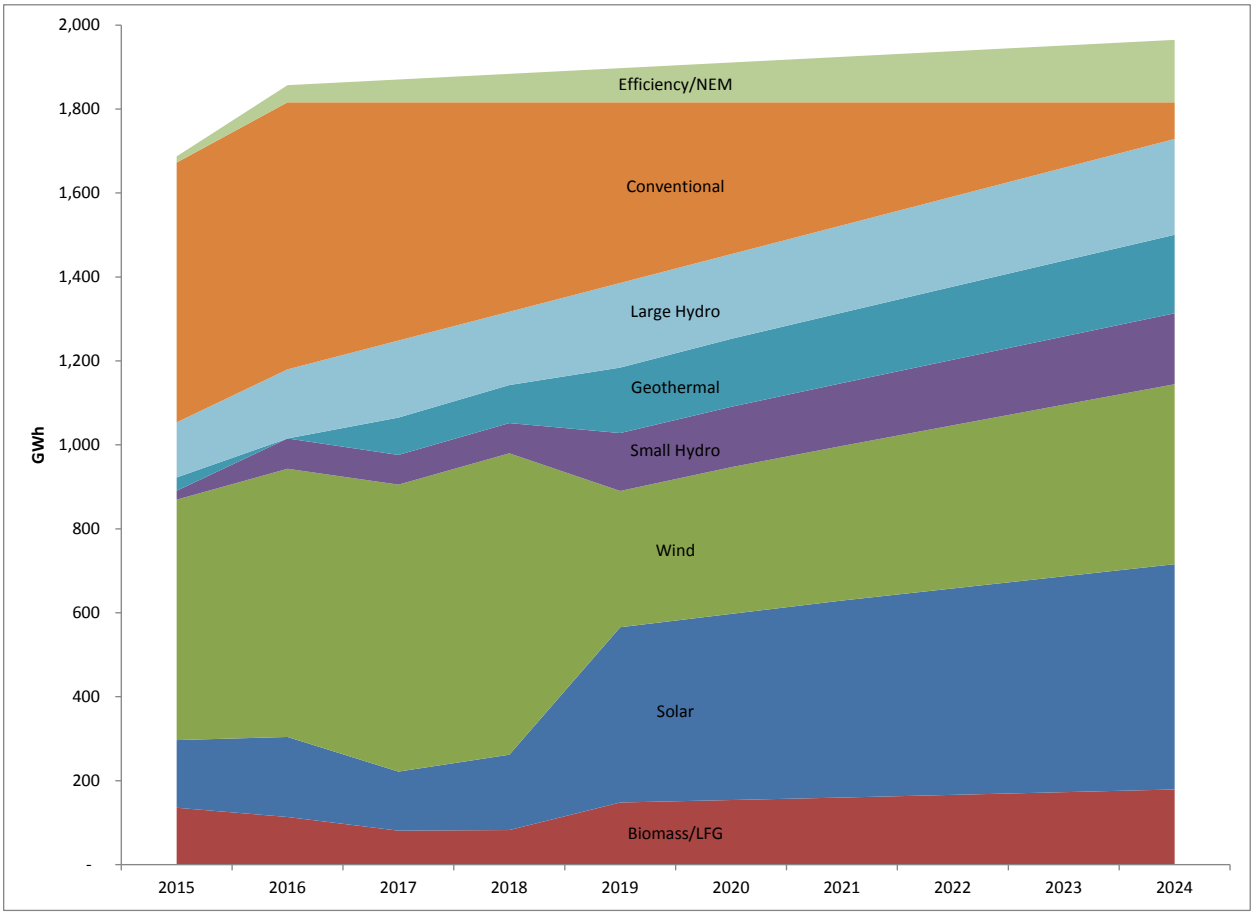
- MCE is working towards a long term goal of relying on energy efficiency (EE) and distributed generation programs to offset MCE's annual energy and capacity requirements by approximately 2%. MCE is applying to the California Public Utilities Commission (CPUC) to significantly ramp up the ratepayer funded EE programming and has incorporated targets for the next ten years based on this upcoming application. MCE is also working to develop capacity in demand response programs, with a goal of offsetting MCE's annual capacity requirements by 5%. MCE is developing an Automated Demand Response Pilot Program for up to 200 residential customers and is exploring behavioral demand response programs for small commercial customers. Depending on the outcome of these pilot programs, MCE may ramp up its demand response programs and / or seek funding from the CPUC for more robust programs in this sector.

- During the ten-year planning period, MCE will procure requisite energy products through various mechanisms, including bilaterally negotiated agreements, public solicitations (such as the annual Open Season process), and standard offers (such as the FIT).

- Specific authorities for entering into energy procurement contracts are allocated among management, the MCE Board, and subsets of the MCE Board, depending upon the term of the resource commitment and whether the procurement is consistent with the adopted IRP.

Figure 1a illustrates the projected resource mix during the period covered by this IRP. The projected mix is illustrative; actual resource utilization will depend upon market conditions and resource availability at the time MCE engages in additional energy procurement.

Figure 1a: MCE Resource Mix, 2015-2024



Regulatory Considerations

On September 28, 2015, Senate Bill 350, the Clean Energy and Pollution Reduction Act of 2015, was enrolled and presented to Governor Brown. If signed, SB 350 would increase California's RPS procurement target to 50% by 2030 amongst other clean-energy initiatives. To enact the provisions of SB 350, Governor Brown must sign the bill no later than October 11, 2015. Many details regarding implementation of SB 350 will be developed over time with oversight by applicable regulatory agencies, including the CPUC. With regard to MCE's ongoing resource planning efforts, SB 350 includes certain procedural changes that will be directly relevant during the development of MCE's future IRP documents. In particular, SB 350 requires that CCAs submit Integrated Resource Plans to the CPUC for certification while retaining the governing authority and procurement autonomy administered by each CCA's respective governing board. While the specific elements of this process, including applicable timing and IRP content requirements, have not yet been defined, it is reasonable to assume that MCE may need to incorporate certain changes in the form and content of its IRP. As additional information becomes available regarding the details of SB 350 implementation, staff will update MCE's Governing Board. SB 350 also includes specific resource planning and procurement requirements, which will be imposed on CCAs. However, these requirements should not materially impact MCE, as existing planning

objectives are substantially responsive to anticipated SB 350 requirements. In particular, SB 350 requires that: 1) beginning in 2021, CCAs must have at least 65% of their RPS procurement under long-term contracts of 10 years or more; and 2) CCA energy efficiency programs will be able to count towards statewide energy efficiency targets. Again, based on the planning elements reflected in this IRP, MCE does not anticipate any requisite adjustments to its future procurement practices as a result of SB 350 implementation.

General Resource Planning Principles

MCE's resource planning considers three planning horizons:

1. The long-term planning horizon addresses the electric energy requirements of MCE customers during the next ten years or longer;
2. The medium-term planning horizon addresses similar requirements during the next one to five years; and
3. The short-term planning horizon addresses MCE's electric energy requirements, which are expected to occur over the upcoming twelve months.

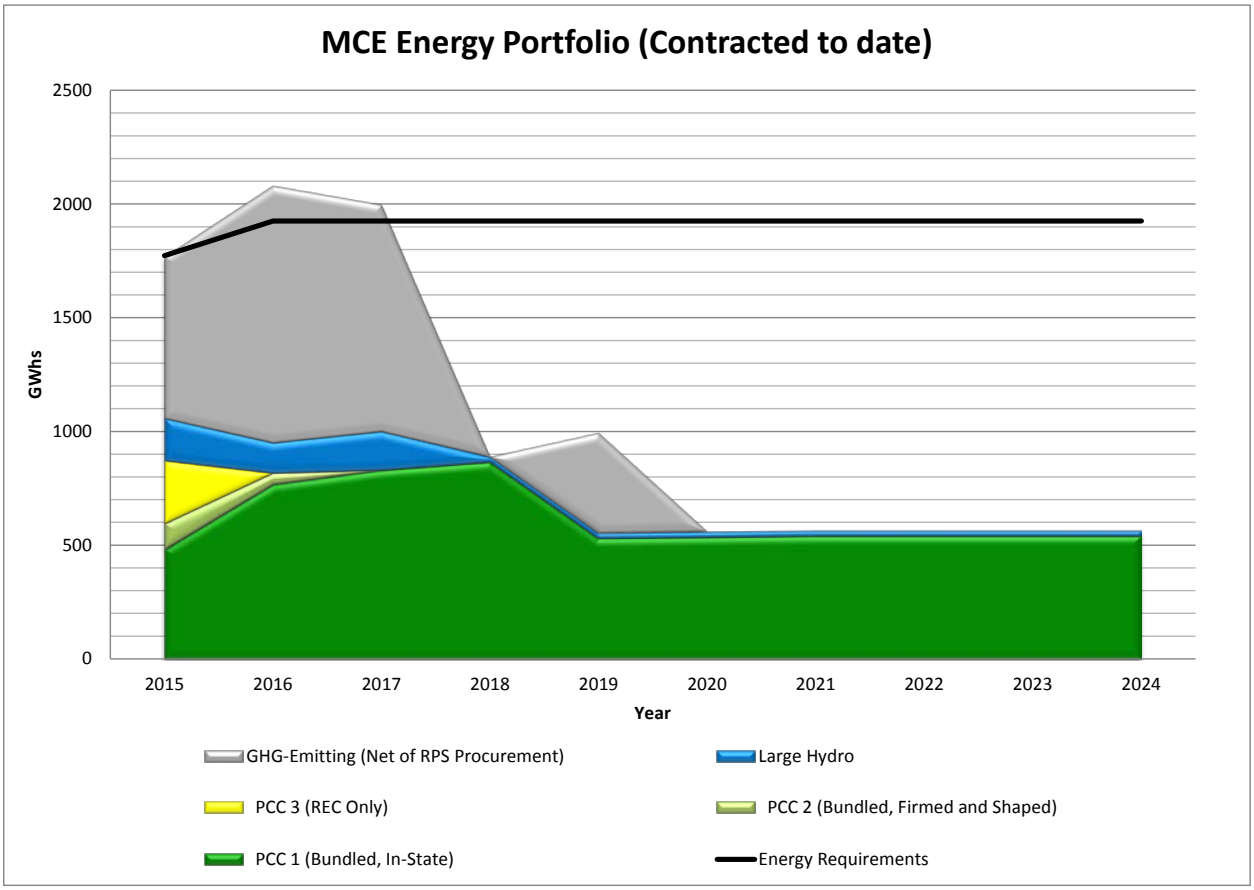
MCE also actively manages the operating horizon, which is focused on the immediate needs of MCE customers. The operating horizon is intended to address energy requirements that may occur as soon as the "Hour Ahead" market and the 90 days that follow – during this period all or virtually all resource commitments have been made and only adjustments necessary to address short term operating variability related to weather and other uncertainties are considered (e.g., production variations associated with intermittent renewable energy resources from which MCE may be purchasing power). While longer-term planning horizons typically reflect a combination of firm resource commitments and unfilled or "open" positions, such open positions are typically "filled" (i.e., addressed via contracts with qualified suppliers of requisite energy products) with firm resource commitments as the operating horizon approaches.

MCE policy, established by MCE's founding documents and directed on an ongoing basis by MCE's Board, guides development of the resource plan and the ensuing resource procurement activities that are conducted in accordance with the plan. MCE's key resource planning policies are as follows:

- Reduce green-house gas emissions and other pollutants associated with the electric power sector through increased use of renewable energy resources and reduced reliance on fossil-fueled resources.
- Maintain competitive electric rates and increase control over energy costs through management of a diversified resource mix.
- Benefit the area's economy through investments in local infrastructure and energy programs.
- Help customers reduce energy consumption and electric bills through investment in and administration of enhanced customer energy efficiency, cost effective distributed generation and other demand-side programs.
- Enhance system reliability through investment in supply and demand-side resources.

The IRP translates these broad policy objectives into more specific plans for the use of various types of electric resources, taking into consideration MCE's projected customer needs and MCE's existing resource commitments. MCE has benefited from recent market conditions, securing additional bundled, "Bucket 1" renewable energy supply from resources located within California. The price premium associated with such incremental renewable energy volumes has been relatively modest, approximating $10/MWh relative to conventional supply alternatives, namely market purchases or "system power". Greenhouse Gas Free ("GHG-Free", "Carbon-Free", or "Carbon Neutral", a term which is also used to categorize power resources that do not impose additive, adverse environmental impacts during electric power production) resources are also proving to be available at nominal price premiums ranging from $1 -$2/MWh relative to conventional supply alternatives.

Figure 2b: MCE Energy Portfolio, contracted to date



Increasing Renewable Energy volumes to 80% by 2025

Over the ten-year planning period addressed by the IRP, MCE plans to gradually replace the conventional energy content in its overall resource portfolio by advancing procurement of additional renewable energy supplies.

In this year's IRP, MCE's Governing Board has elected to increase the agency's Light Green product content from 50% to 80% of its energy requirements from renewable energy resources by 2025. MCE plans to achieve this goal through incremental annual procurement increases as outlined in the table

below. The specific proportions of renewable products may vary based on resource availability and prevailing market prices with the goal of achieving an 80% overall renewable supply portfolio no later than 2025. Under this strategy, Deep Green and Local Sol customers will continue to receive 100% renewable energy, consistent with applicable product descriptions.

MCE will continue to administer its annual Open Season procurement program in an attempt to cost-effectively fill open positions for various energy products. With regard to renewable energy procurement, MCE continues to pursue a "balanced" product portfolio, utilizing various bundled and unbundled renewable energy products to increase overall renewable energy content at cost-competitive rates. However, MCE plans to limit the use of unbundled RECs, otherwise known as "Bucket 3" RECs under the product definitions relating to California's RPS program, to no more than 3% of retail energy supply, beginning in 2016. To promote progress towards its 80% overall renewable energy procurement objective, MCE plans to replace previously specified Bucket 3 volumes with incremental bundled renewable energy supply (meeting delivery specifications pertaining to the Bucket 1 and Bucket 2 product options, as defined under California's RPS program) during the ten-year planning period, as reflected in the following table.

Table 1a: MCE's 10 Year Portfolio Mix Targets

10 Year Portfolio Mix (%)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Bucket 1	30%	35%	38%	40%	43%	45%	48%	50%	53%	55%	58%
Bucket 2	5%	12%	13%	14%	14%	15%	16%	17%	17%	18%	19%
Bucket 3	15%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Large Hydro	11%	11%	12%	12%	12%	13%	13%	14%	14%	15%	15%
System/Conventional Energy	39%	39%	35%	31%	28%	24%	20%	16%	13%	9%	5%

Electric Sales Forecast

MCE's long term sales forecast is primarily influenced by certain structural or macro variables related to the number of customers receiving service under the MCE program. These macro variables include the potential for expansion/inclusion of new member communities within the MCE service footprint and expected customer participation/opt-out rates (with inclusion of the cities of Benicia and El Cerrito being the most recent examples). These macro variables are the primary drivers of the load forecast and tend to dominate the effects of typical load influencing micro variables related to weather, economic cycles, population growth, and changes in customer consumption patterns. The long-term load forecast incorporates impacts of the macro variables as well as seasonal electricity consumption patterns of MCE's customer base, while the other, micro variables are considered in MCE's short-term operational load forecasts used for day-to-day scheduling of loads and resources.

Enrolled Customers

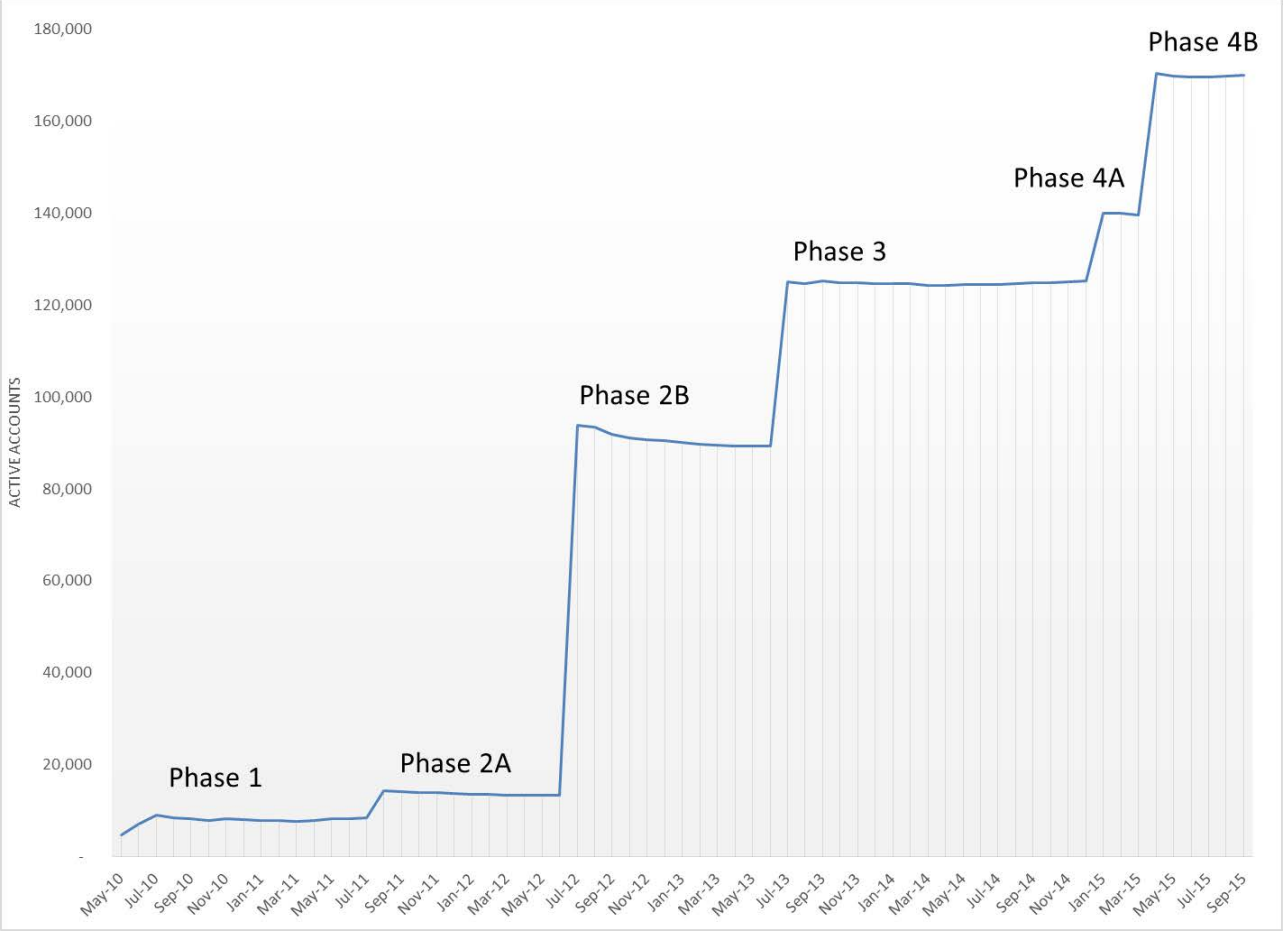
MCE currently serves approximately 170,000 customers. Additional membership inclusion may take place during the ten-year planning horizon, if supported by the MCE Board. The resource planning effects of increased MCE membership are addressed prior to related membership decisions by MCE's Board – the results of such an analysis will be quantified, including anticipated budgetary and environmental impacts related to the prospective expansion, and presented to the Board with

opportunity for discussion and public comment. Any impacts related to future inclusion/expansion activities will be addressed in future updates to this IRP.

Customer participation rates are measured in consideration of the proportion of customers that have been offered MCE service without voluntarily opting to return to the incumbent utility, Pacific Gas & Electric (PG&E). Today, the customer participation rate associated with MCE's initial membership (based on jurisdictional participation as of May 2010) is approximately 77%. The vast majority of customer "opt-outs" tend to occur during the period of time surrounding MCE enrollment. Typically, such decisions are made by customers prior to customer enrollment or within 120 days thereafter - during this period of time, prospective and enrolled customers receive multiple notices, which explain their respective service options and provide information regarding opt-out procedures (i.e., the process by which customers may elect to discontinue MCE service and return to PG&E). Following the initial opt-out period, MCE's customer base tends to stabilize, with new customers generally offsetting the effects of customer attrition. It is noteworthy that customer participation rates have increased in subsequent MCE enrollment phases: 81% of customers who were offered service following inclusion of the City of Richmond have continued with MCE; and 89% of customers included in MCE's subsequent processes (to unincorporated Napa County as well as the cities of Benicia, San Pablo, and El Cerrito) have continued with MCE. This trend is very positive, reflecting the impacts of MCE's highly effective outreach programs, increased awareness of the MCE brand, and general familiarity with the CCA service model, which continues to expand throughout California.

Figure 2 shows the recorded numbers of active customers since MCE's Phase 1 launch in May, 2010. The customer base shows considerable stability between the phased expansions that occurred in May, 2010 (Phase 1A), July, 2010 (Phase 1B), August, 2011 (Phase 2A), July, 2012 (Phase 2B), July, 2013 (Phase 3), February, 2015 (Phase 4A) and May, 2015 (Phase 4B). The downward trend immediately following phased enrollments is an indication of customer opt-outs which gradually taper off during the post enrollment period.

Figure 3: Active MCE Customers



Deep Green Program Participation

MCE offers a voluntary 100% renewable energy option for customers through its Deep Green program. Participation in the Deep Green program ultimately determines the incremental renewable energy volumes that must be procured to supply such customers. Historically, the energy requirements of Deep Green customers were supplied from MCE's portfolio of renewable energy resources and through incremental purchases of Green-e Energy eligible renewable energy certificates to achieve an overall 100% renewable energy content for the Deep Green product. In this year's IRP, MCE's Governing Board has elected to procure the energy requirements of Deep Green customers with increasing levels of bundled renewable energy supply throughout the planning period, subject to eligible resource availability as well as economic and operational constraints. Currently, 3,244 customers are enrolled in the Deep Green program, equating to 1.9% of MCE's total customer base. The participation rate has increased slightly from 1.7% in 2014. The expected Deep Green participation rate is expected to increase to 5% over the ten-year planning period as MCE continues to market this program. On a kWh basis, Deep Green participation currently represents 1.60% of annual residential electricity sales, and 3.72% of annual commercial electricity sales.

Table 1b: MCE Deep Green Participation, 2015

	Total Active Accounts	Total Deep Green	Residential Deep Green	Commercial Deep Green
Number of Customers	170,343	3,248	2,761	487
		1.90%	1.62%	0.29%
Retail Sales net of NEM Generation (kWh)	1,424,390,343	39,581,312	10,167,990	29,413,322
		5.32%	1.60%	3.72%
Total Retail Sales Generation (kWh)	1,434,685,473	39,969,319	10,380,372	29,588,947
		2.79%	0.72%	2.06%

Baseline Customer and Consumption Forecast

MCE's electricity forecast starts with a forecast of customers by end-use classification (residential, commercial, etc.). Class-typical monthly energy consumption, derived based on historical data, is applied to yield a monthly energy forecast by customer class. Hourly class-specific load profiles are used to further break down the monthly energy forecast into hourly values for purposes of deriving time-of-use and peak demand values. Certain adjustments are incorporated in the base forecast to account for factors not reflected in the historical data. MCE also makes explicit adjustments to this forecast to account for the load impacts of its energy efficiency, NEM, and demand response programs.

Energy Efficiency

As referenced in the MCE Implementation plan, studies have indicated that a reasonable long-term goal for energy efficiency programs in MCE's service area is to reduce overall annual energy consumption by approximately 2%. MCE's 2015 peak demand forecast is 329 MW, and annual consumption is forecasted to be 1,687,000 MWh; 2% of which is 34,000 MWh. Achieving this level of savings will require development of specific programs, the requisite funding, and time to deploy the efficiency measures.

MCE has received ratepayer funding under the auspices of the CPUC for energy efficiency programs for 2013-2015. MCE's accomplishments to date are reported below in Table 1c[2].

Table 1c: MCE Energy Efficiency Impacts

	MWh	MW (summer peak)
2013	414	0.035
2014	1,626	0.109

MCE has applied to the CPUC for a much more robust set of programs, building on the steady ramp-up in activities since 2013. MCE has applied to offer energy efficiency programs in each customer sector and is looking at a tenfold increase in funding and associated targets. The application is pending at this time and the targets are reflected in MCE's procurement planning.

[2] Savings associated with the single family program are included here but are subject to confirmation following the *ex post* evaluation from the CPUC.

Net Energy Metering Program

MCE provides among the strongest incentives in the nation to promote customer-sited distributed generation through its NEM program. During periods in which surplus energy production occurs, the MCE NEM program pays eligible customer-generators their respective full retail generation rate plus an additional 1 cent per kWh incentive. There are currently more than 5,300 customers participating in MCE's NEM program, which have collectively installed a total of approximately 35,243 kW (35.2 MW) of local renewable generation; only 30 MW of this installed solar capacity reduces MCE's resource adequacy requirements because of the reduced capacity factor of solar generation during the peak demand month of June.[3] MCE anticipates increasing NEM participation to approximately 47,000 kW (47 MW) over the next ten years. During the planning period, management will periodically evaluate MCE's NEM program to balance the achievement of MCE's long-term distributed generation goals, overall budgetary impacts resulting from NEM incentives and related impacts to MCE's electric rates.

Demand Response Program

MCE does not yet administer a demand response program, although MCE customers are eligible for many of the programs administered by PG&E. MCE also receives capacity credits related to PG&E-administered demand response programs, which are allocated by the CPUC due to the fact the MCE customers participate in the funding of such programs through various PG&E charges. These capacity allocations marginally reduce MCE's need to procure resource adequacy capacity. Currently, demand response programs provide 2% of MCE's resource adequacy requirements. MCE's goal for the planning period is to meet 5% of its total capacity requirements through demand response programs that will be operated directly by MCE or through utility administered programs for which MCE customers are eligible. MCE requested participation in a CPUC administered demand response pilot program in August, 2013. However, due to various issues and cost burdens associated with the current demand response market as well as limitations affecting the availability of real-time customer usage data, MCE has placed this specific pilot program on hold until MCE's advocacy efforts promote fair and equitable treatment for MCE customers. MCE continues to research demand response alternatives and is working with third-party program vendors to develop an effective pilot program that will benefit MCE customers.

Resources

This section discusses MCE's resource needs during the planning period, taking into account the projected energy requirements of MCE customers and existing contractual commitments for such resources. The MCE supply portfolio consists of a diverse resource mix, which has been designed to promote the achievement of MCE's overarching policy objectives as well as compliance with applicable legal and regulatory requirements.

Existing Resource Commitments

MCE actively manages a portfolio of twenty unique power purchase commitments, which provide requisite conventional and renewable energy and unbundled RECs. Such contracts vary in term length

[3] NEM customer data includes the February 2015 Napa expansion and the May 2015 San Pablo expansion

based on a variety of considerations related to the specific products purchased thereunder. MCE's current portfolio of contracts is further described below.

Shell Energy North America (SENA): energy, bundled renewable energy, GHG-free energy, capacity and scheduling services

The SENA agreement and associated confirmations (there are a total of three unique transaction confirmations under the master SENA agreement, each of which includes specific quantities of the aforementioned energy products) require SENA to provide scheduling coordinator services for MCE as well as specified quantities of energy, capacity, and renewable energy. Under the confirmations, scheduling services will be provided through September 2016 while conventional energy deliveries extend through December 2017. SENA is also obligated to deliver certain quantities of reserve capacity through December 2015 as well as various bundled renewable energy products through December 2016. Through a series of related letter agreements, certain conventional energy volumes under the SENA agreement were replaced with GHG-free, hydroelectric production – the specific resources providing GHG-free supply to MCE are generally located within the Pacific Northwest but are delivering power to California on MCE's behalf. Following MCE's commencement of service in May 2010, the SENA agreement provided for all of MCE's resource requirements, but MCE's supplier relationships have substantially diversified since that time. This streamlined contracting strategy (at the time of MCE's launch) increased administrative simplicity during MCE's early operating history. Over the course of MCE's relationship with SENA, the proportion of energy deliveries from this supplier has diminished as MCE incrementally augmented its resource portfolio with a diverse mix of other power supply options.

Genpower LLC (Landfill Gas to Energy): bundled renewable energy

The Genpower agreement extends for a twenty-year term, which commenced on the commercial operation date of February 13, 2013. The generating resources supplying renewable energy under this agreement include a previously existing 2.4 MW landfill gas to energy project located in Lincoln, California which was subsequently expanded, adding 2.4 MW of additional generation capacity at the landfill – a total of 4.8 MW of potential renewable generating capacity currently produces electricity for the benefit of MCE customers. MCE is currently accepting delivery of energy production and renewable attributes from both engines at an average capacity of 3.55 MW. Starting in 2016, capacity attributes will be associated with the facility. Annual Energy deliveries are estimated at 27,000 MWh.

G2 Energy LLC (Landfill Gas to Energy): bundled renewable energy

MCE has two agreements with G2 Energy LLC, each relating to a unique renewable generating project located within California's Central Valley. The first agreement, G2 Hay Road, extends for a twenty-year term from the commercial operation date. The second agreement, G2 Ostrom Road, extends for an eighteen-year term from the commercial operation date. The Hay Road agreement supported the development and construction of a new, 1.6 MW landfill gas to energy project located in Solano County, California; commercial operation commenced on July 2, 2013. The Ostrom Road agreement supported the development and construction of a 1.6 MW capacity addition (to an existing 1.6 MW landfill gas to energy project) located in Yuba County, California; commercial operation commenced on September 11, 2013. MCE is scheduling and taking delivery of energy production from both engines and receiving the associated renewable attributes. Starting in 2016, capacity attributes will be associated with both of

the G2 Facilities. Aggregate energy deliveries for the projects are projected to average approximately 23,000 MWh per year during the contract term.

Cottonwood Solar LLC (PV Solar): bundled renewable energy and capacity

The Cottonwood agreement extends for a twenty-five year term, which commenced on May 22, 2015. In aggregate, the Cottonwood power purchase agreement provides MCE customers with renewable energy production from three new renewable generating projects located within California: 1) the City of Corcoran Solar project, located in Kings County, is a 11 MW power plant, which commenced commercial operation on May 22, 2015; 2) the Goose Lake Solar project, located in Kern County, is a 12 MW power plant, which commenced commercial operation on May 22, 2015; and 3) the Marin Carport solar project, located in the City of Novato, is a 1 MW power plant that is expected to achieve commercial operation in advance of May 23, 2016. MCE is currently scheduling and taking delivery of renewable energy production from the Corcoran and Goose Lake projects and is also receiving associated renewable attributes; capacity attributes are expected to become available in July 2016. Energy deliveries are projected to average approximately 64,000 MWh per year during the term.

Kansas LLC (PV Solar): bundled renewable energy and capacity

The Kansas agreement, originally a two year short term power purchase agreement (PPA) achieved commercial operation in November 2014, adding an additional year of renewable energy production from this new 20 MW project located in Kings County, California. MCE is currently scheduling and taking delivery of energy produced by the facility, including associated renewable and capacity attributes. Energy deliveries are projected to average approximately 51,000 MWh per year during the contract term. The original PPA contract with Recurrent Energy was transferred to Dominion Solar Holdings, LLC upon commercial operation.

US Western Area Power Administration (WAPA, Large Hydroelectric): GHG-free energy

Under the WAPA agreement, MCE will receive a specified allocation of hydroelectric energy produced by the federally owned Central Valley Project. The use of hydroelectric energy, including the deliveries received from WAPA, helps reduce the emissions intensity of MCE's supply portfolio, as the power provided by WAPA is produced by a carbon-free fuel source. Deliveries commenced in January 2015 and will continue for a ten-year term. Energy deliveries are projected to average 25,000 MWh per year during the contract term; however, due to current drought conditions, expected 2015 energy deliveries were reduced to 12,500 MWh.

Calpine Energy Services (Geothermal): bundled renewable energy and capacity

Under the master agreement and associated confirmations with Calpine, MCE will receive a specified allocation of geothermal energy produced by the Northern California-based Geysers Project. Pertinent confirmation agreements specify delivery of 10 MWs of energy, produced/delivered during each hour of the day, and capacity commencing in January of 2017 and continuing for a ten-year term. An additional agreement for 30,000 MWh of energy from the Geysers was executed during 2015. Energy deliveries are projected to approximate 30,000 MWh for 2015 (though a fire in the area may force a reduction in expected deliveries), and 88,000 MWh per year during the 2017 to 2026 term. MCE also executed a

purchase conventional energy from Calpine through a resource-specific (natural gas) purchase agreement for deliveries during 2015-2017.

Exelon Generation Company (Firm Energy; Wind), firm energy and bundled renewable energy

Under the agreement with Exelon, MCE will receive a firmed and shaped allocation of RPS-eligible bundled wind energy produced by existing renewable generating resources located within the Western Electric Coordinating Council (WECC). Renewable energy is expected to be sourced from two Washington state generators: White Creek Wind and Nine Canyon Wind. During the two year delivery period (2014 and 2015), 25 MWs of energy will be delivered during the months of July through December. A subset of these deliveries will be RPS-eligible renewable energy volumes, totaling 60,000 MWh in 2014 and 50,000 MWh in 2015. In addition to the aforementioned renewable energy volumes, MCE recently executed a 50 MW "block" purchase of "system" energy with Exelon; energy will be produced and delivered during the 2018 and 2019 calendar years replacing a portion of system energy deliveries previously contracted through SENA.

EDP Renewables LLC (Wind): bundled renewable energy

The EDP agreement is a four-year, short term power purchase agreement with the Rising Tree Wind Farm III facility, a new 99 MW generating project located in Kern County, California, which commenced commercial operation on June 25, 2015. MCE is scheduling and taking delivery of energy produced by the facility and is also receiving associated renewable attributes. Energy deliveries are projected to average approximately 180,000 MWh in 2015, and 340,000 MWh per year between 2016 and 2018.

RE Mustang LLC (PV Solar): bundled renewable energy and capacity

The RE Mustang agreement, is a fifteen-year power purchase agreement that will support the development of a new, 30 MW generating project located in Fresno County, California. The projected commercial operation date for this facility is December 2016. MCE will begin receiving energy and associated renewable attributes produced by this project January 1, 2018. MCE will assume scheduling responsibilities for all energy production, which is expected to average 86,000 MWh per year during the term. The project is currently under development.

Waste Management – Redwood Landfill (Landfill Gas to Energy): bundled renewable energy and capacity

The Redwood Landfill agreement extends for a twenty-year term from the expected commercial operation date of December 2016. The new, 4 MW landfill gas-to-energy project is located in Novato, California and will be a state of the art low emissions facility. MCE will accept delivery of energy production, renewable attributes, and capacity attributes associated with this facility. Annual energy deliveries are expected to approximate 30,000 MWh. This project is currently under development.

Direct Energy/Energy America, LLC (RPS-Eligible Hydroelectric, Biomass and/or Wind): bundled renewable energy

The Direct Energy agreement is a short-term renewable energy supply commitment that will augment MCE's 2015 renewable energy portfolio with 50,000 MWh of additional bundled (Bucket 1) renewable energy supply. A specified schedule of prospective renewable generating facilities, any of which may be

used to satisfy Direct's delivery obligations, is included in the transaction confirmation. These facilities reflect a diverse mix of fuel sources, including RPS-eligible hydroelectricity, biomass and wind. Year-to-date energy deliveries are generally tracking with MCE's expectations.

East Bay Municipal Utility District – Pardee and Comanchee Reservoirs (RPS-Eligible Hydroelectric): bundled renewable energy

The East Bay Municipal Utility District (EBMUD) agreement is a ten-year PPA with two, currently operating, California-based, RPS-eligible hydroelectric facilities that are actively delivering renewable energy to MCE. The facilities are located near the Amador-Calaveras county line, on the Mokelumne River. Both power plants are owned and managed by EBMUD. The resource is expected to provide between 20,000 MWh and 180,000 MWh per year, depending on annual rain and snow fall. For planning purposes, MCE has incorporated a relatively conservative annual energy production total of 70,000 MWh.

Unbundled Renewable Energy Certificate Resources

Starting in 2016, MCE will procure no more than 3% of its retail load from unbundled renewable energy resources.

Cedar Creek (Wind): unbundled renewable energy certificates

The Cedar Creek agreement provides for the delivery of RPS- and Green-e Energy-eligible renewable energy certificates during the 2015 calendar year. The specified product will be sourced from one or more wind facilities located within the WECC region. Specified volumes total 125,000 MWh during the 2015 calendar year. Deliveries will be completed by March 2016.

Feed-In Tariff Projects: Contracted and Proposed

San Rafael Airport Feed-In Tariff Project (PV Solar): renewable energy

The San Rafael Airport FIT agreement extends for a twenty-year term, which commenced on the facilities commercial operation date of October 23, 2012. The 972kW PV project is located in San Rafael, California. Energy deliveries offset MCE load and are in line with projected average generation of 1,800 MWh per year during the contract term.

Cooley Quarry Feed-In Tariff Project (PV Solar): renewable energy

The Cooley Quarry FIT agreement extends for a twenty-year term with an expected commercial operation date occurring during the first quarter of 2016. The project includes a 990 kW Local Solar PV project, which is now under contract with MCE, and a proposed 450 kW FIT PV project. Both projects are located in Novato, California. Energy deliveries offset MCE load and are projected to average 3,000 MWh per year during the contract term.

Richmond Feed-In Tariff Projects (PV Solar): renewable energy

Two proposed FIT projects are under development in Richmond, California. Both 998 kW agreements would extend for a twenty-year term with an expected commercial operation date of June 30, 2015.

Aggregate energy deliveries from the projects are expected to offset MCE load and are projected to average 3,600 MWh per year during the contract term.

Larkspur Feed-In Tariff Project (PV Solar): renewable energy

The 286 kW roof mounted FIT project is located in Larkspur, California. The agreement extends for a twenty-year term with an expected commercial operation date of November 30, 2015. Energy deliveries from the project are expected to offset MCE load and are projected to average 500 MWh per year during the contract term.

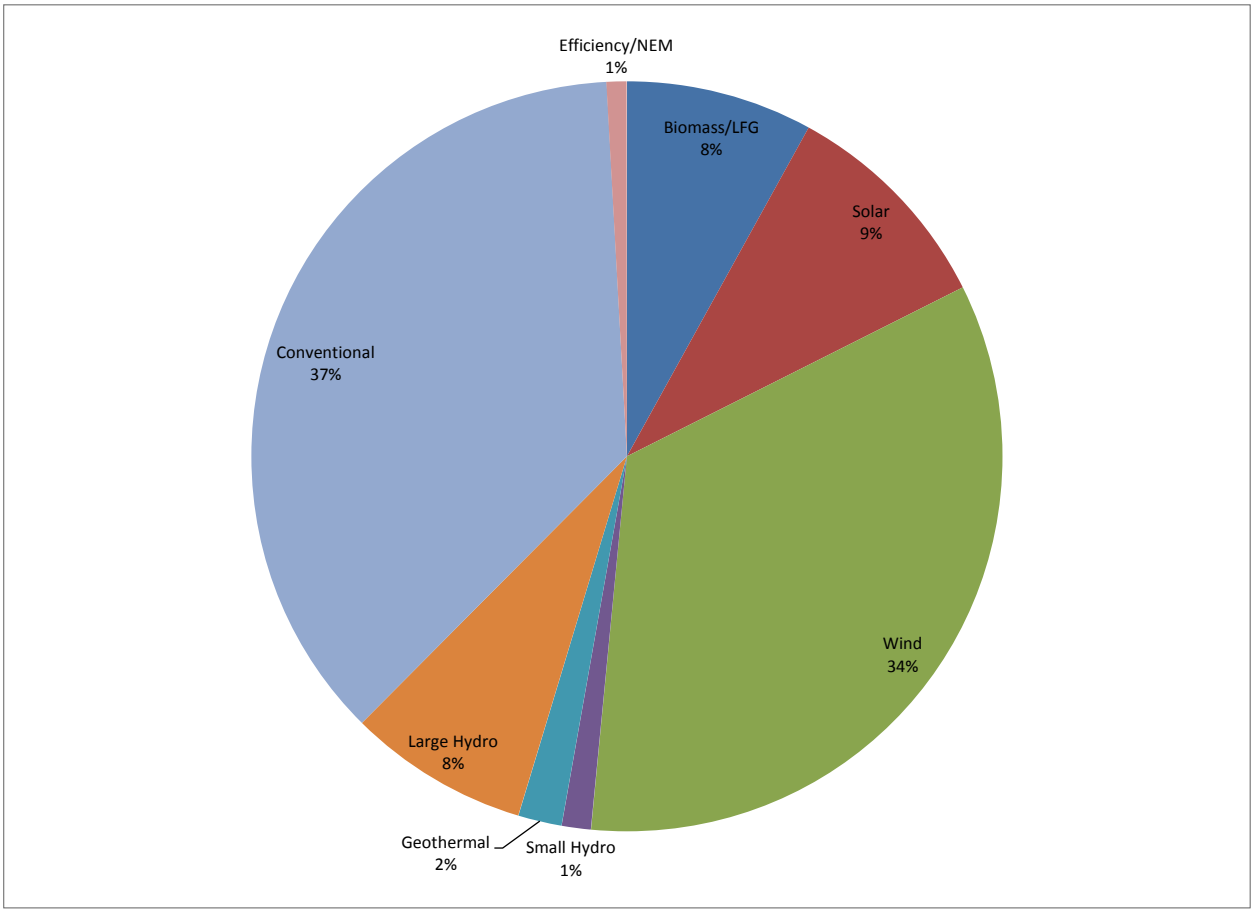
Binford Storage Feed-In Tariff Project (PV Solar): renewable energy

A proposed building-integrated 990 kW PV project is under development in Novato, California. The agreement would extend for a twenty-year term with an expected commercial operation date of September 30, 2015. Energy deliveries from the project are expected to offset MCE load and are projected to average 1,800 MWh per year during the contract term.

Current Resource Mix

MCE's current resource mix contains among the highest proportions of renewable energy (51%) when compared to other utilities in California. Figure 3 shows the current mix of resources attributable to the MCE Program.

Figure 4: MCE 2015 Resource Mix [estimated]



Resource Needs

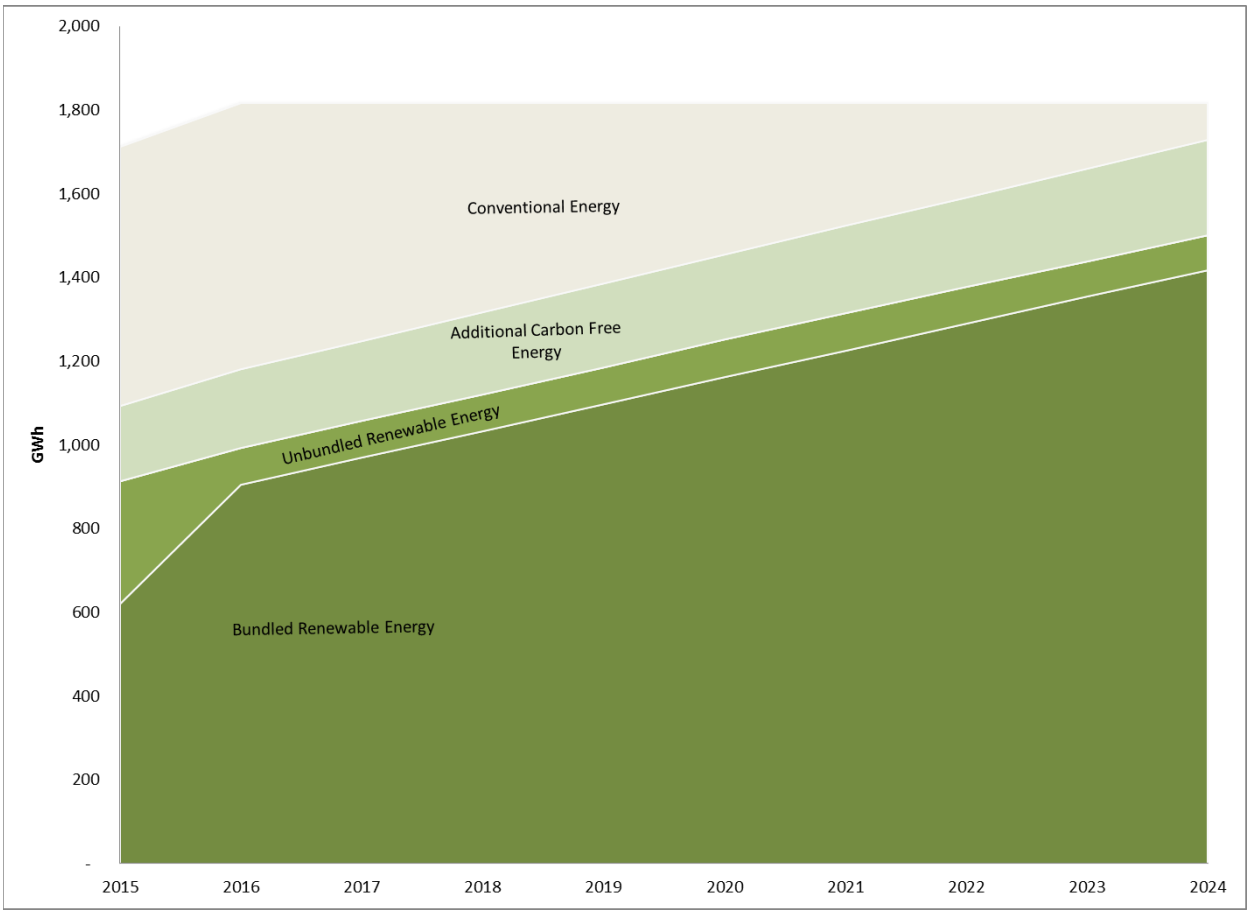
MCE will procure additional energy products to meet its resource targets. This section sets forth MCE's planned resource volumes and quantifies the net resource need or "open position" that remains after accounting for production from MCE's existing resource portfolio. MCE has established resource targets for the supply portfolio's overall renewable energy content as well as subcategories of renewable energy procurement, carbon neutral renewable resources, capacity resources, and other system resources.

Renewable Resources

MCE has committed to providing all of its customers with energy that meets a minimum 50% overall renewable energy content; incremental renewable energy supply will also be procured to ensure that the energy requirements of all customers participating in the voluntary Deep Green 100% renewable energy program will be served with appropriate quantities of renewable energy. MCE's renewable

energy requirements are fulfilled with a combination of RPS-eligible energy products.[4] As Figure 4 illustrates, the proportion of MCE's resource mix supplied by bundled renewable energy products is expected to significantly increase during the ten-year planning period, displacing purchases of unbundled RECs, while trending towards an overall 80% renewable energy content. MCE will seek to procure additional bundled renewable energy sources to contribute towards meeting MCE's longer-term goal of 80% renewable energy supply, subject to economic and technical feasibility.

Figure 4: MCE Renewable and Non-renewable Energy Volumes, 2015-2024



RPS Requirements

MCE's renewable power content significantly exceeds the state's minimum RPS requirements and will continue to do so during the ten-year planning period. According to applicable rules, California's RPS requirements can be met with a variety of renewable resource technology types and procurement methods. Under the currently effective RPS program renewable energy procurement requirements

[4] Certain of MCE's renewable energy volumes are produced by facilities that are both RPS-eligible and Green-e Energy-eligible, according to eligibility criteria established in the Green-e Energy National Standard: http://www.green-e.org/docs/energy/Green-eEnergyNationalStandard.pdf.

gradually increase from 20% to 33% by 2020; under Senate Bill 350, which was enrolled and presented to Governor Brown on September 28, 2015, California's RPS will increase to 50% by 2030 – specific details related to SB 350 implementation, including rules related to eligible renewable energy products and scheduled increases in renewable energy procurement obligations, have yet to be developed; MCE staff will remain engaged in related proceedings/discussions to ensure effective implementation of any applicable procurement requirements related to this legislation. Under California's currently effective RPS program, eligible renewable fuel sources include the following:

- Biodiesel
- Biogas
- Biomass
- Conduit hydroelectric
- Digester gas
- Fuel cells using renewable fuels
- Geothermal
- Hydroelectric incremental generation from efficiency improvements
- Landfill gas
- Municipal solid waste
- Ocean wave, ocean thermal, and tidal current
- Photovoltaic
- Small hydroelectric (30 megawatts or less)
- Solar thermal electric
- Wind

RPS compliance can be met with procurement from renewable resources located within or deliverable to the state ("Bucket 1"), and with certain quantity limitations, procurement of shaped and firmed renewable energy ("Bucket 2") as well as unbundled RECs from RPS-eligible resources ("Bucket 3").

MCE has a sufficient supply of RPS-eligible renewable resources to meet a 50% procurement standard in calendar years 2015 and 2016, well in excess of the 2016 procurement requirement of 25% (and generally equivalent to the new RPS standard of 50%, which will apply in 2030). MCE plans to incrementally increase its RPS eligible power content to 80% by 2025. MCE intends to continue exceeding the environmental performance standards mandated by state regulations with respect to renewable energy and GHG emissions.

RPS Open Positions

MCE has substantially focused its procurement efforts on long term PPAs with new RPS-eligible generation facilities located within California. Such generators produce the highest value renewable energy product, Bucket 1, which is not subject to procurement limitations under California's currently effective RPS program. In accordance with state regulations, a minimum of 65% of required RPS procurement must be sourced from Bucket 1 products (in Compliance Period 2, which extends from January 1, 2014 through December 31, 2016), which are generally produced by California-sited renewable generating projects. MCE engages in shorter term contract arrangements for the more readily available Bucket 2 and Bucket 3 product options. As shown in Table 2-A, MCE has secured

contracts for renewable energy volumes well in excess of applicable RPS requirements through 2018; beginning in 2019, MCE's resource balance reflects a need for additional RPS-eligible renewable energy supply to support regulatory compliance and voluntary renewable supply commitments.

Table 2-A: MCE RPS Compliance Energy Balance, 2015-2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Retail Sales (GWh)	1,672	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816
State RPS %	23%	25%	27%	29%	31%	33%	35%	36%	38%	40%
RPS Energy Required (GWh)	390	454	490	527	563	599	630	661	692	723
RPS Energy Contracted (GWh)	847	703	715	750	418	423	428	428	428	428
Net Short/(Long)	**(457)**	**(249)**	**(225)**	**(224)**	**145**	**176**	**202**	**233**	**264**	**295**
Category 1 Required (GWh)	253	295	368	395	422	449	473	496	519	542
Category 1 Contracted (GWh)	484	652	715	750	418	423	428	428	428	428
Net Short/(Long)	(231)	(357)	(347)	(355)	5	27	44	68	91	114

Voluntary Renewable Open Positions

Voluntary renewable energy volumes reflect purchases that are necessary to exceed applicable RPS mandates. In particular, voluntary renewable energy purchases are necessary in order to fulfill MCE's commitment to deliver a minimum 50% renewable energy supply to Light Green customers as well as 100% renewable energy supply to Deep Green customers. Prior to 2015, voluntary renewable energy requirements were generally met with short-term purchases of unbundled RPS- and Green-e Energy-eligible RECs. Based on the success of recent renewable energy procurement activities, which were administered for the purpose of displacing unbundled REC volumes, MCE has contracted for increased quantities of bundled renewable energy for 2015 and beyond. Such purchases will support a transition away from unbundled renewable energy products, resulting in significant increases[5] to the proportion of voluntary renewable energy volumes sourced from bundled renewable products. The remaining open positions related to meeting MCE's voluntary renewable energy targets for the Light Green and Deep Green retail energy product offerings are shown in Table 2B and Table 3.

Table 2-B: MCE Light Green Renewable Energy Balance, 2015-2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
MCE RPS Procurement Goal %	50%	50%	53%	57%	60%	63%	67%	70%	73%	77%
RPS Energy Target (GWh)	886	962	1,027	1,091	1,155	1,219	1,283	1,347	1,412	1,476
RPS Energy Contracted (GWh)	847	703	715	750	418	423	428	428	428	428
Net Short/(Long)	39	260	311	340	737	796	855	919	983	1,048

Table 3: MCE Deep Green Renewable Energy Balance, 2015-2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Targeted Renewable Energy Volume (GWh)	27	31	31	30	29	33	31	29	27	25
Renewable Energy Under Contract (GWh)	27	-	-	-	-	-	-	-	-	-
Net Short/(Long)	(0)	31	31	30	29	33	31	29	27	25

[5] Estimated to account for an average of 25% of MCE's voluntary renewable energy targets per year between 2015 and 2018

GHG-Free Resources

Prior to 2016, MCE policy generally specified that MCE's annual attributed portfolio emissions rate, which reflects the proportionate use of GHG-emitting power sources, would be lower than the similar annual emissions rate published by PG&E. Recently, MCE established a goal to achieve a 95% carbon-free supply portfolio by 2025. With respect to MCE's emissions calculation methodology, MCE utilizes industry standards, such as the reporting conventions established by The Climate Registry, to quantify attributed GHG emissions associated with its supply portfolio. To promote achievement towards its voluntary longer-term portfolio emission goals, MCE will require additional carbon-free/neutral energy in 2018 and beyond.

Table 4: MCE Carbon-Free Energy Balance, 2015-2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Retail Load (Net of EE/DG)	1,672	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816
Carbon Free Target	61%	61%	65%	69%	72%	76%	80%	84%	88%	91%
Carbon Free Targeted Volumes	1,022	1,110	1,178	1,247	1,316	1,384	1,453	1,521	1,590	1,659
CF Under Contract	1,062	837	886	775	443	448	453	453	453	453
Future Generic Renewables	39	290	342	370	766	829	887	949	1,011	1,072
Open Position, Carbon Free	**(79)**	**(18)**	**(50)**	**101**	**107**	**107**	**113**	**120**	**126**	**133**

Capacity Resources

MCE meets California's resource adequacy standards by procuring qualifying capacity sufficient to meet MCE's projected peak demand plus a 15% reserve margin. In addition to this general requirement, MCE must ensure that mandated proportions of such capacity resources are procured from local reliability areas defined by the California Independent System Operator (CAISO). MCE has a need for capacity purchases to meet resource adequacy obligations beginning in 2016. It is noteworthy that resource adequacy purchases are typically conducted via shorter-terms transactions without a great deal of lead time. MCE is already engaged in procurement processes related to the open position existing in 2016 and expects to fill such position during the balance of 2015. In addition, MCE has long-term capacity rights under several of its PPAs, which will provide a portion of MCE's local resource adequacy needs during the ten-year planning period.

Table 5: MCE Resource Adequacy Capacity Balance, 2015-2024 (MW)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Load										
Peak Demand	337	345	346	348	349	351	352	354	355	357
New DG and Efficiency	(8)	(16)	(21)	(25)	(30)	(35)	(39)	(44)	(49)	(53)
Net Peak Demand	329	329	326	323	319	316	313	310	306	303
RA Requirements										
Greater Bay Area	35	38	38	38	38	38	38	38	38	38
Other PG&E Area	66	74	73	72	71	70	69	68	67	66
System	200	164	162	160	158	156	154	152	150	148
Flexible	79	35	35	35	35	35	35	35	35	35
RA Contracted										
Greater Bay Area	35	38	-	-	-	-	-	-	-	-
Other PG&E Area	66	74	45	32	32	32	32	32	32	32
System	201	164	-	-	-	-	-	-	-	-
Flexible	79	35	-	-	-	-	-	-	-	-
Net Short/(Long)										
Greater Bay Area	0	-	38	38	38	38	38	38	38	38
Other PG&E Area	(0)	-	29	41	40	39	38	37	36	35
System	(1)	-	162	160	158	156	154	152	150	148
Flexible	-	-	35	35	35	35	35	35	35	35

System Energy

The remaining energy supply, after accounting for renewable and additional GHG-free energy supplies, can be met with unspecified system energy purchases or specified purchases of conventional generation (within California, conventional generation generally refers to power sources that rely on the combustion of natural gas to produce electric energy). MCE policy prohibits unit-specific purchases from coal or nuclear generation facilities. MCE supplies its remaining load through a combination of short- to medium-term, fixed priced power purchases with specified conventional generators and short-term purchases from the CAISO markets. MCE has contracts in place to supply virtually 100% of its load (at fixed prices) through the end of 2017. Any remaining energy balancing is conducted through the CAISO market, via purchases and sales during the operating horizon, and other variable priced supply contracts. Based on current forecasts, MCE has significant system/conventional resource needs in 2018 and beyond, following expiration of the SENA supply agreement. MCE is actively engaged in planning and procurement discussions to address significant portions of this expected open position.

Table 6: MCE System Energy Balance, 2015-2024 (GWh)

Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Retail Sales	1,687	1,857	1,870	1,884	1,897	1,911	1,924	1,938	1,951	1,965
DG and Efficiency	(14)	(19)	(24)	(28)	(33)	(38)	(43)	(47)	(52)	(57)
Distribution Losses	100	109	109	109	109	109	109	109	109	109
Total Load Requirement	1,773	1,947	1,956	1,964	1,973	1,982	1,991	1,999	2,008	2,017
Less Renewables/Carbon Free										
Existing and Planned Renewables, Bundled	620	905	969	1,033	1,097	1,161	1,226	1,290	1,354	1,418
Existing and Planned Renewables, Unbundled	293	89	88	88	87	91	89	87	85	82
Existing and Planned Other Carbon Free	109	116	121	126	132	132	138	145	151	158
Total Existing and Planned Carbon Free Energy	1,022	1,110	1,178	1,247	1,316	1,384	1,453	1,521	1,590	1,659
Total System/Null Energy Requirements										
Null Energy Associated with Unbundled RECs	293	89	88	88	87	91	89	87	85	82
Remaining System Energy Requirement	751	837	777	717	657	598	538	478	418	358
Less System/Null Energy Contracted	1,083	1,198	1,065	438	438	-	-	-	-	-
System/Null Energy Net Short/(Long)	(39)	(272)	(200)	367	306	689	627	565	503	441

New Resource Requirements

Integration of additional intermittent renewable energy resources on the California electricity grid in order to meet the state's 50% renewable energy target has presented new energy scheduling challenges for the CAISO. Due to the influx of renewable generating resources, particularly large-scale solar and wind generators, historical load patterns and peak consumption hours have shifted, requiring increased responsiveness for certain generators that must be dispatched to promote ongoing load and resource balances. These changes have necessitated the consideration of two new resource types within the MCE resource plan: flexible capacity and energy storage.

Flexible Capacity

The CAISO, in collaboration with the CPUC and other local regulatory authorities, must ensure that the energy supply has sufficient flexibility, including load following capabilities, to address unexpected system variability. Flexible capacity capabilities of resources such as distributed generation, demand response, and storage should ultimately count towards a load-serving entity's (LSE) flexible capacity procurement obligation. Each LSE must demonstrate procurement of 90 percent of its flexible capacity requirement on its annual resource adequacy filing and 100 percent of the specified requirement on its monthly resource adequacy filings. Compliance mandates related to flexible capacity began in 2015, and MCE has been successful in satisfying such mandates.

Table 7: MCE Flexible Capacity Targets, 2016

Results of Energy Commission Review and Adjustment to the 2016 Year-Ahead Load Forecast for MCE											
Monthly Flexible Capacity Targets (MW)											
Jan - 16	Feb - 16	Mar - 16	Apr - 16	May - 16	Jun - 16	Jul - 16	Aug - 16	Sep - 16	Oct -16	Nov - 16	Dec - 16
74	71	64	60	37	35	25	29	39	51	83	94

Energy Storage

The California Energy Storage Bill, AB 2514, was signed into law in September of 2010, and as a result, the CPUC established energy storage targets for investor owned utilities, community choice aggregators (CCAs), and LSEs in September 2013. The applicable CPUC decision established an energy storage procurement target for CCAs and electric service providers equal to 1 percent of their forecasted 2020 peak load; this procurement target must also be satisfied by 2020. The decision will require MCE to install 3 MW of energy storage no later than 2024 based upon the current load forecast. Beginning on January 1, 2016, and every two years thereafter, MCE must file an advice letter demonstrating compliance with this requirement, progress towards meeting this target, and a description of the methodologies for insuring projects are cost-effective.

Procurement

MCE will procure its net open positions using a combination of PPAs of various terms (short, medium, long), demand-side programs, and potentially MCE owned generation projects. This section describes the types of resources MCE may procure and discusses various considerations that may influence MCE's procurement efforts.

MCE is continuing a transition from the initial full requirements contract that was used to launch MCE, under which all supplies of energy, capacity and renewable energy were provided through a single agreement with a single counterparty. Subsequent to that initial contract, MCE has put into place a robust renewable energy buying program that now supplies the majority of the MCE renewable energy supplies from a variety of renewable energy providers. MCE is similarly developing an independent buying program for non-renewable energy and capacity. MCE intends to soon initiate the non-renewable resource buying program with purchases of resource adequacy capacity to begin filling its 2015 open positions. A non-renewable energy buying program will also be put into place during the next few years to begin filling the 2018 open energy positions.

MCE Generation Development

MCE does not currently own any generation assets. MCE has historically utilized long term PPAs (typically 20-25 years) to obtain rights to renewable energy supplies at stable costs for its customers. MCE considers long term PPAs to offer similar benefits to asset ownership in regards to price certainty and supply security; however MCE does not have an explicit bias towards either PPAs or asset ownership. MCE examines opportunities for asset ownership on a case-by-case basis, considering such factors as risk allocation, asset location, technology, and, most critically, supply of electricity at the least cost to MCE ratepayers.

Current federal tax policy generally favors private versus public ownership of renewable assets due to the tax credits that are uniquely available to the private sector. These tax credit policies are set to expire at the end of 2016 and if they are not extended, renewable energy prices may see a 30% increase. MCE's experience has been that PPAs for production by privately owned renewable generation facilities have typically been the least cost option for MCE. MCE has secured buyout option provisions in some of its renewable PPAs, which provide a path to MCE asset ownership after a defined period of time when

the tax benefits have been exhausted by the private developer. MCE will typically seek buyout option provisions in its renewable PPAs, although not all projects are suitable for acquisition, and not all PPAs will contain such provisions.

Assessing a generation project's operational risk becomes more important for assets owned by MCE because MCE could be at risk for production shortfalls and for cost over-runs, which are risks typically absorbed by the developer under a PPA structure. With these risks in mind, MCE is most likely to own small, local PV projects as these projects are technologically proven, have relatively low operational and maintenance risks, and provide benefits to the local economy. MCE is targeting development of 10 MW of new PV within its service territory during the next ten years.[6] MCE may invest directly in these projects as necessary to ensure development of certain project opportunities that will promote the achievement of MCE's goals and objectives. MCE may consider ownership of other generation projects and will examine such opportunities on a case-by-case basis. Direct generation investment becomes an increasingly viable option during the planning period as MCE gains additional operational experience and more robust access to credit markets. As part of this approach, MCE may also consider joint ventures and turnkey development approaches to ensure appropriate allocation of project risks.

MCE Solar 1 – Local Solar Development

In September of 2014, MCE entered into an option agreement to lease 60 acres from Chevron Products Company (CPC) at the Richmond oil refinery for the development of 2 to 12 MWs of photovoltaic solar generation. The initial evaluation of this brownfield development site by MCE staff yielded no significant development, permitting, or interconnection concerns. As a result, MCE is in the process of completing a site development plan, and expects the development to begin in late 2015. MCE's development of the Project will benefit the public by allowing MCE to provide electricity from local renewable resources to customers in alignment with MCE's role as a California Joint Powers Authority. MCE's status as a California Joint Powers Authority and the public benefit that will result from this Agreement and MCE's involvement in the Project were key factors in CPC's decision to lease the property to MCE on the terms of this Agreement.

Renewable Resource Power Purchases

MCE uses a portfolio risk management approach in its power purchasing program, seeking low cost supply as well as diversity among technologies, production profiles, generation project sizes, project locations, counterparties, length of contract, and timing of market purchases. These factors are taken into consideration when MCE engages the market.

MCE continually manages its forward load obligations and supply commitments with the objective of balancing cost stability and cost minimization, while leaving some flexibility to take advantage of market opportunities or technological improvements that may arise. MCE monitors its open position separately for renewable resources (by compliance category), conventional resources, and on a total portfolio basis. MCE maintains portfolio coverage targets of up to 100% in the near-term (0 to 5 years)

[6] The 10 MW local PV target is in addition to the 14 MW of distributed generation installed under the NEM program

and leaves a greater portion open in the mid to long term, consistent with generally accepted industry practice.

Generally, the renewable portion of the portfolio is met with longer term contracts, providing cost stability for the supply portfolio. MCE's guidelines for long term, bundled renewable energy purchases are shown in Table 5.

Table 8: MCE Renewable Energy Contracting Guidelines

Time Horizon	Contracting Guideline (Contracts/Total RE Need)
Current Year	90% to 100%
Years 2 – 3	80% to 100%
Years 4 – 5	60% to 100%
Beyond Year 5	50% to 80%

MCE's supply preference is for a mix of renewable energy technologies that will deliver energy in a pattern that is generally consistent with MCE's load shape. Preferred purchase volumes from baseload (e.g., biomass, landfill gas, renewable fuel cells) and peaking renewable technologies (e.g., solar PV or CSP) is in rough proportion to the load profile (75% baseload/25% peaking), subject to adjustments for market conditions and technology price differentials that exist at the time of purchase. Recent market data suggests that peaking resources are likely to comprise a larger proportion of the renewable supply portfolio due to the recent rapid declines in prices for solar PV generation projects and the abundance of such projects in development. The actual renewable portfolio during the planning period will likely be more heavily weighted toward peaking energy production due to the prevalence of competitively priced solar projects. MCE may also engage in purchases from as-available renewable generation (e.g., wind) to the extent that energy prices reflect a lower value due to their intermittency.

MCE has no explicit policy preference for any specific qualifying renewable energy technology, apart from the pricing and production profile considerations described above.

In regards to generation project location, MCE places greater value on locally-sited renewable energy projects, particularly those located within the MCE service area. Of next highest preference are projects sited in the North Path 15 region followed by projects in the South Path 15 region and finally out-of-state resources.

Feed In Tariff

MCE's current Feed-In Tariff (FIT) program was established as a 2 MW pilot program. The program was expanded to 10 MW in aggregate capacity, with 6.7 MW currently under contract. MCE anticipates conducting a review of the FIT program once the cap is reached along with other refinements that may be made. This expansion will support achievement of MCE's local renewable generation development objectives. MCE's first FIT project, the San Rafael Airport FIT came online in October of 2012, and is producing 10% more renewable energy than originally estimated. Table 9 shows all existing and proposed MCE FIT projects and the associated capacity, annual output, and commercial operation date.

Table 9: MCE Existing and Proposed Feed-In Tariff Projects

Project Name	Project Status	Capacity (kW)	Annual Output (kWh)	Commercial Operation Date
San Rafael Airport	Existing	972	1,800	October 2012
Cooley Quarry 100% Local Solar	Under Contract	990	2,000	March 2016
Cooley Quarry	In Queue	450	1,000	March 2016
Richmond NWC Goodrick	In Queue	998	1,800	June 2016
Richmond Parkway	In Queue	998	1,800	June 2016
Larkspur RE	In Queue	261	500	November 2015
Binford Road Storage	In Queue	990	1,800	September 2016
TOTAL		**5,659**	**10,700**	

MCE established a 100% Local Solar program in 2014, which is a new community based program that diverts select FIT projects and enables subscribers to sign up for 100% local solar generation as an alternative to MCE's Light Green 50% renewable or 100% Deep Green renewable programs. The 100% Local Solar program is not yet fully subscribed but is expected to be on line in early 2015.

Carbon-Free Power Purchases

MCE anticipates that its GHG-free energy supplies will be substantially met through MCE's renewable procurement policies, supplemented as necessary with short- and medium-term purchases of GHG-free energy sources, particularly large hydroelectric energy resources and, to a lesser extent, unbundled renewable energy certificates or verifiable environmental credit offset products. As previously noted, MCE will not engage in unit-specific purchases from nuclear generators to meet its GHG-free power supply objectives.

System Resources and Specified Power Purchases

MCE may engage in purchases of unspecified system energy or unit specific purchases from natural gas-fueled generation. Energy products may include peak, off-peak, baseload, and shaped energy. MCE may purchase energy and/or capacity at fixed prices, indexed prices or through tolling agreements. Under a tolling agreement, MCE would obtain the right to electricity produced by a natural gas generation facility, and MCE would deliver the natural gas to the facility for conversion into electrical energy. Purchases of system energy will typically be for short and medium terms (< 5 years). Unit-specific and tolling agreements may be for short, medium and long terms. Natural gas purchases associated with tolling agreements will typically be for short to medium terms.

With respect to MCE's total supply and load obligations, MCE will manage exposure to market price risk by executing forward electric supply commitments for its projected energy sales obligations. MCE considers a variety of factors including the desire to maintain cost stability for MCE customers, the need to maintain competitive rates relative to PG&E and other energy service providers, and cost minimization for MCE customers. MCE's budgeting and rate setting processes benefit from maximizing cost certainty within the budgetary fiscal year and avoiding significant year-to-year changes caused by energy market volatility. However, it is appropriate to maintain flexibility for incorporation of new, but

as yet unplanned, resources or load reducing programs and to maintain limited exposure to market pricing in order to maintain relative cost parity with competing energy service alternatives offered by the incumbent utility. In light of these considerations, the following market price contracting guidelines shall be maintained during operation of the MCE program.

Table 10: MCE Power Supply Contracting Guidelines

Time Horizon	Contracting Guideline (Contracts/Total Energy Need)
Current Year	80% to 105%
Year 2	70% to 100%
Year 3	60% to 95%
Year 4 and Beyond	Up to 70%

As MCE continues to contract with additional counterparties for supply of system energy and capacity, the contracting guidelines in Table 10 help to mitigate forward price risk. The contracting guidelines also serve as an important hedging strategy as MCE continues to expand its membership over the next several years. Execution of master power purchase and sale agreements with multiple, credit-worthy counterparties in the near term will enable energy purchases through execution of transaction-specific confirmations at the appropriate time.

Reserve Capacity Purchases

MCE may engage in purchases or sales of resource adequacy capacity from generation resources that qualify to meet resource adequacy requirements in accordance with CPUC and CAISO rules. Terms may range from one month up to ten years. Capacity is also often bundled with energy and renewable attributes under MCE's renewable energy PPAs.

Procurement Methods and Authorities

MCE may use a variety of procurement methods for energy and capacity products. Authorized methods include bilaterally negotiated agreements, competitive solicitations (request for proposals or "RFPs"), the Open Season process, and standard offer approaches, such as MCE's FIT.

Energy procurement authority varies depending upon the nature of the energy product being procured and the financial commitment the purchase entails. The appropriate procurement method and procurement authority are generally defined by the term of the energy product purchase, consistency with an approved resource plan, and whether capital financing is required.

Procurement Methods

For long term purchase commitments, MCE will typically use competitive solicitations which may take the form of an RFP, the Open Season or a similar process where a comparative analysis of proposals is made at a single point in time. An RFP may be used where a specific resource need has been identified, some degree of urgency exists in fulfilling the identified need, sufficient time exists to conduct an RFP, and management believes that an RFP would yield the most competitive outcome. For less urgent procurement needs, the annual Open Season process will typically be used. MCE annually conducts an

Open Season where it accepts proposals for renewable power purchase opportunities. MCE evaluates the proposals against each other and in the context of other market information available to MCE and may elect to negotiate PPAs with any number of respondents.

Bilaterally negotiated agreements in response to unsolicited proposals may be used for unique opportunities that are fleeting in nature such that timelines associated with an RFP or the Open Season process would prevent MCE from engaging in beneficial procurement opportunities.

Short and medium term power purchases will typically be negotiated on a bilateral basis or via independent energy brokers, particularly in markets with sufficient market price transparency to ensure competitive procurement outcomes. These markets include 1) system energy at a defined CAISO trading hub for peak, off-peak, or baseload products; 2) unbundled RECs; and 3) short term resource adequacy capacity. This process allows for maximum operational flexibility to manage supply and demand imbalances in an efficient manner.

Procurement Authorities

The MCE Board establishes procurement policies and objectives through adoption of the resource plan. The MCE Chief Executive Officer (CEO) is authorized to execute certain contracts for energy products that are consistent with the approved resource plan, while other resource commitments require MCE Board pre-approval prior to execution.

For shorter term power purchases, it is appropriate for management to have discretion in contracting, consistent with its responsibilities and expertise in efficiently operating the MCE program. Time is often of the essence in such transactions, and these transactions are unlikely to raise policy considerations that require MCE Board input. For long-term commitments, it is appropriate for the MCE Board to exercise a greater degree of oversight. The various energy procurement authorities are as follows:

Short-term contracts

PPAs (energy, capacity, RECs) with terms of 12 months or less may be entered into on MCE's behalf by the CEO. The CEO will report all such contracts to the MCE Board on a monthly basis.

Medium-term contracts

PPAs (energy, capacity, RECs) with terms of greater than 12 months and less than or equal to 5 years and which are made pursuant to a MCE Board approved resource plan may be entered into on MCE's behalf by the CEO in conjunction with the MCE Board Chair. A committee of the MCE Board will be consulted prior to execution of any medium-term contracts. The CEO will report all such contracts to the MCE Board on a monthly basis.

Long-term contracts

PPAs (energy, capacity, RECs) with terms of greater than five years shall require Board approval prior to execution.

Capital Projects and Debt

Contracts associated with MCE ownership of generation assets or the assumption of debt by MCE in support of generation projects or PPAs require MCE Board pre-approval.

Other Energy Procurement

Any procurement of energy products that is inconsistent with or that is not addressed in the adopted resource plan requires MCE Board pre-approval.

Appendix A-1: Load and Resource Tables

Marin Clean Energy Resource Balance

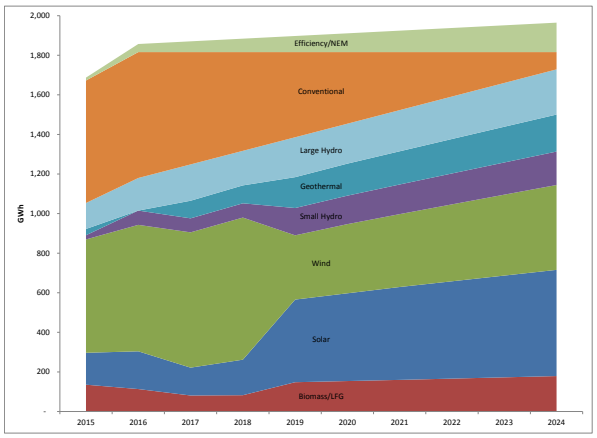
Sep-15

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Energy Requirements (GWh)										
Retail Load	1687	1857	1870	1884	1897	1911	1924	1938	1951	1965
New Energy Efficiency	(0)	(22)	(31)	(39)	(48)	(57)	(66)	(74)	(83)	(92)
New Distributed Generation	(14)	(19)	(24)	(28)	(33)	(38)	(43)	(47)	(52)	(57)
Retail Load (Net of EE/DG)	1,672	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816
Distribution Line Losses and Unaccounted For Energy	100	109	109	109	109	109	109	109	109	109
Total Energy Requirements	1,773	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925
	34									
Light Green Renewable Energy Content (%)	50%	50%	53%	57%	60%	63%	67%	70%	73%	77%
Light Green Portfolio Content Category Targets (% of Renewable Energy)										
PCC 1 Target	60%	70%	70%	71%	71%	71%	72%	72%	72%	72%
PCC 2 Target	10%	24%	24%	24%	24%	24%	24%	24%	24%	24%
PCC 3 Target	30%	6%	6%	5%	5%	5%	5%	4%	4%	4%
Deep Green Participation	3%	3%	4%	4%	4%	5%	5%	5%	6%	6%
Overall MCE Renewable Energy Content (Light Green and Deep Green)	**52%**	**52%**	**55%**	**58%**	**62%**	**65%**	**68%**	**72%**	**75%**	**78%**
Light Green Renewable Energy Volume Targets GWh)										
PCC 0 (SENA P1)	3	-	-	-	-	-	-	-	-	-
PCC 1 (Bundled, In-State)	529	674	723	772	821	871	920	969	1,018	1,067
PCC 2 (Bundled, Firmed and Shaped)	89	231	246	261	276	291	306	321	336	351
PCC 3 (REC Only)	266	58	58	58	58	58	58	58	58	58
Subtotal, Light Green Renewable Energy Volume Targets	**886**	**962**	**1,027**	**1,091**	**1,155**	**1,219**	**1,283**	**1,347**	**1,412**	**1,476**
Deep Green Renewable Energy Volume Targets (GWh)										
Deep Green Retail Sales	54	62	65	69	73	91	94	98	102	105
Deep Green Incremental Renewable Energy Volume	**27**	**31**	**31**	**30**	**29**	**33**	**31**	**29**	**27**	**25**
Conventional Energy Requirements (includes energy w/ unbundled RECs)	**1,152**	**1,020**	**956**	**892**	**828**	**764**	**699**	**635**	**571**	**507**
Renewable Resources Under Contract (GWh)										
Product Content Category 0	3	-	-	-	-	-	-	-	-	-
Product Content Category 1	482	652	715	750	418	423	428	428	428	428
Product Content Category 2	115	51	-	-	-	-	-	-	-	-
Product Content Category 3	248	-	-	-	-	-	-	-	-	-
Subtotal, Light Green Renewable Resources Under Contract	**847**	**703**	**715**	**750**	**418**	**423**	**428**	**428**	**428**	**428**
Deep Green RECs Under Contract	27	-	-	-	-	-	-	-	-	-
Open Position, Light Green Renewables (GWh)										
Product Content Category 1	48	22	8	22	404	448	492	541	590	639
Product Content Category 2	(26)	180	246	261	276	291	306	321	336	351
Product Content Category 3	18	58	58	58	58	58	58	58	58	58
Subtotal, Open Position, Light Green Renewables	**39**	**260**	**311**	**340**	**737**	**796**	**855**	**919**	**983**	**1,048**
Open Position, Deep Green RECs	**(0)**	**31**	**31**	**30**	**29**	**33**	**31**	**29**	**27**	**25**
Conventional Resources Under Contract (GWh)	1,270	1,332	1,236	463	463	25	25	25	25	25
Open Position, Conventional Energy (GWh)	(118)	(312)	(280)	429	365	739	674	610	546	482
Total Energy Under Contract (GWh)	**1,869**	**2,035**	**1,951**	**1,213**	**881**	**448**	**453**	**453**	**453**	**453**
Less Variable Price Contracts (GWh)	-100	-70	-70	-70	-70	-70	-70	-70	-70	-70
Net Open, All Physical Energy (GWh)	**4**	**(40)**	**44**	**782**	**1,114**	**1,547**	**1,542**	**1,542**	**1,542**	**1,542**
Total Market Price Contract Coverage (%)	**100%**	**102%**	**98%**	**59%**	**42%**	**20%**	**20%**	**20%**	**20%**	**20%**

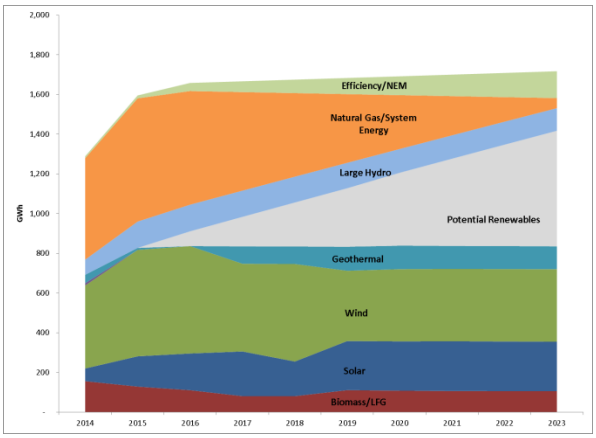
2015 Draft Integrated Resource Plan – Summary of Key Adjustments

1. Revised overall renewable energy procurement objective of 80% RE by 2025

Figure 1: MCE Resource Mix, 2014-2023



Revised Resource Mix 2014 -2023



Resource Mix 2014 IRP

2. MCE will replace previously specified Bucket 3 volumes with incremental bundled renewable energy supply (Bucket 1 and Bucket 2) during the ten-year planning period.

Table 1a: MCE's 10 Year Portfolio Mix Targets

10 Year Portfolio Mix (%)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Bucket 1	30%	35%	38%	40%	43%	45%	48%	50%	53%	55%	58%
Bucket 2	5%	12%	13%	14%	14%	15%	16%	17%	17%	18%	19%
Bucket 3	15%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Large Hydro	11%	11%	12%	12%	12%	13%	13%	14%	14%	15%	15%
System/Conventional Energy	39%	39%	35%	31%	28%	24%	20%	16%	13%	9%	5%

Starting in 2016, MCE will procure no more than 3% of its retail load from unbundled renewable energy resources.

3. Regulatory Considerations

On September 28, 2015, Senate Bill 350, the Clean Energy and Pollution Reduction Act of 2015, was enrolled and presented to Governor Brown. If signed, SB 350 would increase California's RPS procurement target to 50% by 2030.

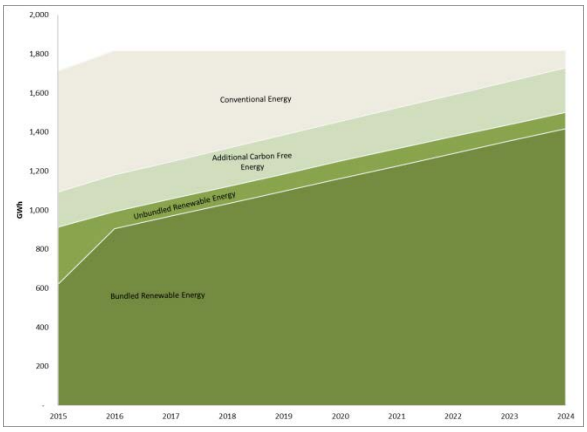
With regard to MCE's ongoing resource planning efforts, SB 350 includes procedural changes that will influence MCE's future IRP documents. In particular, SB 350 requires that CCAs submit Integrated Resource Plans to the CPUC for certification while retaining the governing authority and procurement autonomy administered by each CCA's respective governing board.

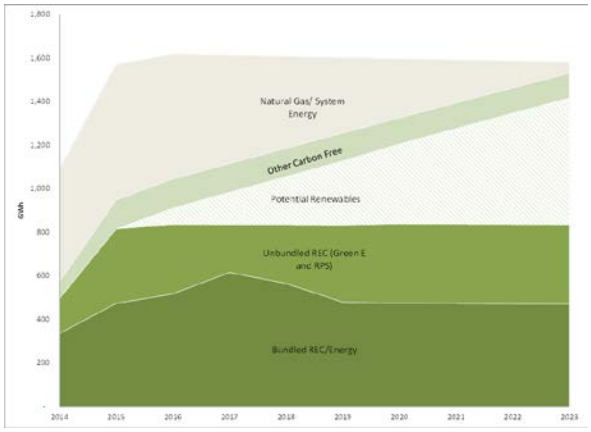
Beginning in 2021, CCAs must have at least 65% of their RPS procurement under long-term contracts of 10 years or more. Based on the planning elements reflected in this IRP, MCE does not anticipate any adjustments to its procurement practices as a result of SB 350.

4. Renewable Resources

   MCE has committed to providing all of its customers with energy that meets a minimum 50% overall renewable energy content; incremental renewable energy supply will also be procured to ensure that the energy requirements of all customers participating in the voluntary Deep Green 100% renewable energy program will be served with appropriate quantities of renewable energy. MCE's renewable energy requirements are fulfilled with a combination of RPS-eligible energy products.[1] As Figure 4 illustrates, the proportion of MCE's resource mix supplied by bundled renewable energy products is expected to significantly increase during the ten-year planning period, displacing purchases of unbundled RECs, while trending towards an overall 80% renewable energy content. MCE will seek to procure additional bundled renewable energy sources to contribute towards meeting MCE's longer-term goal of 100% renewable energy supply, subject to economic and technical feasibility.

Figure 2: MCE Renewable and Non-renewable Energy Volumes, 2015-2024





5. RPS Open Positions

   MCE has substantially focused its procurement efforts on long term PPAs with new RPS-eligible generation facilities located within California. Such generators produce the highest value renewable energy product, Bucket 1, which is not subject to procurement limitations under California's currently effective RPS program. In accordance with state regulations, a minimum of 65% of required RPS procurement must be sourced from Bucket 1 products (in Compliance Period 2, which extends from January 1, 2014 through December 31, 2016), which are generally produced by California-sited renewable generating projects. MCE engages in shorter term contract arrangements for the more readily available Bucket 2 and Bucket 3 product options.

6. Table 2-A, MCE has secured contracts for renewable energy volumes well in excess of applicable RPS requirements through 2018; beginning in 2019, MCE's resource balance reflects a need for additional RPS-eligible renewable energy supply to support regulatory compliance and voluntary renewable supply commitments.

[1] Certain of MCE's renewable energy volumes are produced by facilities that are both RPS-eligible and Green-e Energy-eligible, according to eligibility criteria established in the Green-e Energy National Standard: http://www.green-e.org/docs/energy/Green-eEnergyNationalStandard.pdf.

2015 Draft Integrated Resource Plan – Summary of Key Adjustments

Table 2-A: MCE RPS Compliance Energy Balance, 2015-2024

This Year's IRP

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Retail Sales (GWh)	1,672	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816
State RPS %	23%	25%	27%	29%	31%	33%	35%	36%	38%	40%	42%
RPS Energy Required (GWh)	390	454	490	527	563	599	630	661	692	723	754
RPS Energy Contracted (GWh)	847	703	715	750	418	423	428	428	428	428	428
Net Short/(Long)	**(457)**	**(249)**	**(225)**	**(224)**	**145**	**176**	**202**	**233**	**264**	**295**	**325**
Category 1 Required (GWh)	253	295	368	395	422	449	473	496	519	542	565
Category 1 Contracted (GWh)	484	652	715	750	418	423	428	428	428	428	428
Net Short/(Long)	(231)	(357)	(347)	(355)	5	27	44	68	91	114	137

From Last Year's IRP

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Retail Sales (GWh)	1,279	1,580	1,617	1,612	1,607	1,602	1,597	1,592	1,587	1,582
State RPS %	22%	23%	25%	27%	29%	31%	33%	33%	33%	33%
RPS Energy Required (GWh)	278	368	404	435	466	497	527	525	524	522
RPS Energy Contracted (GWh)	349	516	517	615	564	348	353	358	358	358
Net Short/(Long)	(71)	(148)	(113)	(180)	(98)	149	174	167	165	164

7. Voluntary Renewable Open Positions

   Voluntary renewable energy volumes reflect purchases that are necessary to exceed applicable RPS mandates. In particular, voluntary renewable energy purchases are necessary in order to fulfill MCE's commitment to deliver a minimum 50% renewable energy supply to Light Green customers as well as 100% renewable energy supply to Deep Green customers.

   Prior to 2015, voluntary renewable energy requirements were generally met with short-term purchases of unbundled RPS- and Green-e Energy-eligible RECs. Based on the success of recent renewable energy procurement activities, which were administered for the purpose of displacing unbundled REC volumes, MCE has contracted for increased quantities of bundled renewable energy for 2015 and beyond. Such purchases will support a transition away from unbundled renewable energy products, resulting in significant increases[2] to the proportion of voluntary renewable energy volumes sourced from bundled renewable products. The remaining open positions related to meeting MCE's voluntary renewable energy targets for the Light Green and Deep Green retail energy product offerings are shown in Table 2B and Table 3.

[2] Estimated to account for an average of 25% of MCE's voluntary renewable energy targets per year between 2015 and 2018

2015 Draft Integrated Resource Plan – Summary of Key Adjustments

Table 2-B: MCE Light Green Renewable Energy Balance, 2015-2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
MCE RPS Qualifying Goal %	50%	50%	53%	57%	60%	63%	67%	70%	73%	77%	80%
RPS Energy Targeted (GWh)	886	962	1,027	1,091	1,155	1,219	1,283	1,347	1,412	1,476	1,540
RPS Energy Contracted (GWh)	847	703	715	750	418	423	428	428	428	428	428
Net Short/(Long)	39	260	311	340	737	796	855	919	983	1,048	1,112

From Last Year's IRP

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
MCE RPS Qualifying Goal %	29%	31%	32%	33%	33%	33%	33%	33%	33%	33%
RPS Energy Required (GWh)	371	490	517	532	530	529	527	525	524	522
RPS Energy Contracted (GWh)	349	516	517	615	564	348	353	358	358	358
Net Short/(Long)	22	(26)	1	(83)	(34)	181	174	167	165	164

Table 3: MCE Deep Green Renewable Energy Balance, 2015-2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Targeted Renewable Energy Volume (GWh)	27	31	31	30	29	33	31	29	27	25	22
Renewable Energy Under Contract (GWh)	27	-	-	-	-	-	-	-	-	-	-
Net Short/(Long)	(0)	31	31	30	29	33	31	29	27	25	22

From Last Year's IRP

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
RECs Required (GWh)	288	326	319	303	304	304	311	312	313	313
RECs Contracted (GWh)	320	107	-	-	-	-	-	-	-	-
Bundled Energy/RECs Contracted (GWh)	(32)	26	(1)	83	34	-	-	-	-	-
Net Short/(Long)	-	192	319	220	270	304	311	312	313	313

8. GHG-Free Resources

   Prior to 2016, MCE policy generally specified that MCE's annual attributed portfolio emissions rate, which reflects the proportionate use of GHG-emitting power sources, would be lower than the similar annual emissions rate published by PG&E. MCE's revised goal to achieve a 95% carbon-free supply portfolio by 2025 is reflected in the tables below.

Table 4: MCE Carbon-Free Energy Balance, 2015-2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Retail Load (Net of EE/DG)	1,672	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816
Carbon Free Target	61%	61%	65%	69%	72%	76%	80%	84%	88%	91%
Carbon Free Targeted Volumes	1,022	1,110	1,178	1,247	1,316	1,384	1,453	1,521	1,590	1,659
CF Under Contract	1,062	837	886	775	443	448	453	453	453	453
Future Generic Renewables	39	290	342	370	766	829	887	949	1,011	1,072
Open Position, Carbon Free	**(79)**	**(18)**	**(50)**	**101**	**107**	**107**	**113**	**120**	**126**	**133**

From Last Year's IRP

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Retail Load (Net of EE/DG)	1,279	1,580	1,617	1,612	1,607	1,602	1,597	1,592	1,587	1,582
Carbon Free Target	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
Carbon Free Targeted Volumes	767	948	970	967	964	961	958	955	952	949
CF Under Contract	584	721	572	640	589	373	378	383	383	383
Future Generic Renewables	22	192	289	220	270	485	485	479	478	477
Open Position, Carbon Free	**(33)**	**35**	**109**	**107**	**105**	**103**	**95**	**93**	**91**	**89**

2015 Draft Integrated Resource Plan – Summary of Key Adjustments

9. System Energy

   The remaining energy supply, after accounting for RE, GHG-free energy supplies, *and transmission losses,* can be met with unspecified system energy purchases or specified purchases of conventional generation. MCE supplies its remaining load through a combination of short- to medium-term, fixed priced power purchases with specified conventional generators and short-term purchases from the CAISO markets. Based on current forecasts, MCE has significant system/conventional resource needs in 2018 and beyond, following expiration of the SENA supply agreement. MCE is actively engaged in planning and procurement discussions to address significant portions of this expected open position.

Table 6: MCE System Energy Balance, 2015-2024 (GWh)

Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Retail Sales	1,687	1,857	1,870	1,884	1,897	1,911	1,924	1,938	1,951	1,965
DG and Efficiency	(14)	(19)	(24)	(28)	(33)	(38)	(43)	(47)	(52)	(57)
Distribution Losses	100	109	109	109	109	109	109	109	109	109
Total Load Requirement	1,773	1,947	1,956	1,964	1,973	1,982	1,991	1,999	2,008	2,017
Less Renewables/Carbon Free										
Existing and Planned Renewables, Bundled	620	905	969	1,033	1,097	1,161	1,226	1,290	1,354	1,418
Existing and Planned Renewables, Unbundled	293	89	88	88	87	91	89	87	85	82
Existing and Planned Other Carbon Free	109	116	121	126	132	132	138	145	151	158
Total Existing and Planned Carbon Free Energy	1,022	1,110	1,178	1,247	1,316	1,384	1,453	1,521	1,590	1,659
Total System/Null Energy Requirements										
Null Energy Associated with Unbundled RECs	293	89	88	88	87	91	89	87	85	82
Remaining System Energy Requirement	751	837	777	717	657	598	538	478	418	358
Less System/Null Energy Contracted	1,083	1,198	1,065	438	438	-	-	-	-	-
System/Null Energy Net Short/(Long)	(39)	(272)	(200)	367	306	689	627	565	503	441

From Last Year's IRP

Load	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Retail Sales	1,289	1,595	1,658	1,666	1,675	1,683	1,691	1,700	1,708	1,717
DG and Efficiency	(10)	(15)	(41)	(54)	(68)	(81)	(95)	(108)	(122)	(135)
Distribution Losses	77	95	97	97	96	96	96	95	95	95
Total Load Requirement	1,356	1,675	1,714	1,709	1,703	1,698	1,692	1,687	1,682	1,677
Less Renewables/Carbon Free										
Existing and Planned Renewables, Bundled	335	473	517	615	564	479	474	473	471	470
Existing and Planned Renewables, Unbundled	161	342	319	220	270	354	364	364	365	365
Existing and Planned Other Carbon Free	77	133	134	132	130	128	120	118	116	114
Total Existing and Planned Carbon Free Energy	572	948	970	967	964	961	958	955	952	949
Total System/Null Energy Requirements										
Null Energy Associated with Unbundled RECs	161	342	319	220	270	354	364	364	365	365
Remaining System Energy Requirement	783	727	744	742	739	737	734	732	730	728
Less System/Null Energy Contracted	867	887	946	920	-	-	-	-	-	-
System/Null Energy Net Short/(Long)	77	183	117	41	1,009	1,091	1,098	1,097	1,095	1,093

2015 Draft Integrated Resource Plan – Summary of Key Adjustments

Appendix A-1: Load and Resource Tables

Marin Clean Energy Resource Balance

Sep-15

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Energy Requirements (GWh)										
Retail Load	1687	1857	1870	1884	1897	1911	1924	1938	1951	1965
New Energy Efficiency	(0)	(22)	(31)	(39)	(48)	(57)	(66)	(74)	(83)	(92)
New Distributed Generation	(14)	(19)	(24)	(28)	(33)	(38)	(43)	(47)	(52)	(57)
Retail Load (Net of EE/DG)	1,672	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816	1,816
Distribution Line Losses and Unaccounted For Energy	100	109	109	109	109	109	109	109	109	109
Total Energy Requirements	1,773	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925
	34									
Light Green Renewable Energy Content (%)	50%	50%	53%	57%	60%	63%	67%	70%	73%	77%
Light Green Portfolio Content Category Targets (% of Renewable Energy)										
PCC 1 Target	60%	70%	70%	71%	71%	71%	72%	72%	72%	72%
PCC 2 Target	10%	24%	24%	24%	24%	24%	24%	24%	24%	24%
PCC 3 Target	30%	6%	6%	5%	5%	5%	5%	4%	4%	4%
Deep Green Participation	3%	3%	4%	4%	4%	5%	5%	5%	6%	6%
Overall MCE Renewable Energy Content (Light Green and Deep Green)	**52%**	**52%**	**55%**	**58%**	**62%**	**65%**	**68%**	**72%**	**75%**	**78%**
Light Green Renewable Energy Volume Targets GWh)										
PCC 0 (SENA P1)	3	-	-	-	-	-	-	-	-	-
PCC 1 (Bundled, In-State)	529	674	723	772	821	871	920	969	1,018	1,067
PCC 2 (Bundled, Firmed and Shaped)	89	231	246	261	276	291	306	321	336	351
PCC 3 (REC Only)	266	58	58	58	58	58	58	58	58	58
Subtotal, Light Green Renewable Energy Volume Targets	**886**	**962**	**1,027**	**1,091**	**1,155**	**1,219**	**1,283**	**1,347**	**1,412**	**1,476**
Deep Green Renewable Energy Volume Targets (GWh)										
Deep Green Retail Sales	54	62	65	69	73	91	94	98	102	105
Deep Green Incremental Renewable Energy Volume	**27**	**31**	**31**	**30**	**29**	**33**	**31**	**29**	**27**	**25**
Conventional Energy Requirements (includes energy w/unbundled RECs)	**1,152**	**1,020**	**956**	**892**	**828**	**764**	**699**	**635**	**571**	**507**
Renewable Resources Under Contract (GWh)										
Product Content Category 0	3	-	-	-	-	-	-	-	-	-
Product Content Category 1	482	652	715	750	418	423	428	428	428	428
Product Content Category 2	115	51	-	-	-	-	-	-	-	-
Product Content Category 3	248	-	-	-	-	-	-	-	-	-
Subtotal, Light Green Renewable Resources Under Contract	**847**	**703**	**715**	**750**	**418**	**423**	**428**	**428**	**428**	**428**
Deep Green RECs Under Contract	27	-	-	-	-	-	-	-	-	-
Open Position, Light Green Renewables (GWh)										
Product Content Category 1	48	22	8	22	404	448	492	541	590	639
Product Content Category 2	(26)	180	246	261	276	291	306	321	336	351
Product Content Category 3	18	58	58	58	58	58	58	58	58	58
Subtotal, Open Position, Light Green Renewables	**39**	**260**	**311**	**340**	**737**	**796**	**855**	**919**	**983**	**1,048**
Open Position, Deep Green RECs	**(0)**	**31**	**31**	**30**	**29**	**33**	**31**	**29**	**27**	**25**
Conventional Resources Under Contract (GWh)	1,270	1,332	1,236	463	463	25	25	25	25	25
Open Position, Conventional Energy (GWh)	(118)	(312)	(280)	429	365	739	674	610	546	482
Total Energy Under Contract (GWh)	**1,869**	**2,035**	**1,951**	**1,213**	**881**	**448**	**453**	**453**	**453**	**453**
Less Variable Price Contracts (GWh)	-100	-70	-70	-70	-70	-70	-70	-70	-70	-70
Net Open, All Physical Energy (GWh)	**4**	**(40)**	**44**	**782**	**1,114**	**1,547**	**1,542**	**1,542**	**1,542**	**1,542**
Total Market Price Contract Coverage (%)	**100%**	**102%**	**98%**	**59%**	**42%**	**20%**	**20%**	**20%**	**20%**	**20%**

October 15, 2015

TO: Marin Clean Energy Board of Directors

FROM: Greg Brehm, Director of Power Resources

RE: MCE Solar One Draft EIR (Agenda Item #08)

ATTACHMENTS:
A. MCE Solar One Draft EIR (Richmond Solar PV Project)
B. Comments from Adams Broadwell for Bay Area Citizens for Responsible Solar (BACRS) and California Unions for Reliable Energy (C.U.R.E)
C. Comments from California Department of Fish and Wildlife
D. State Clearing House Compliance

Dear Board Members:

Background
On August 14, 2015 MCE initiated the preparation of an Environmental Impact Report (EIR) to determine the nature and extent of the MCE Solar One project's potential impact on the environment. Pursuant to Sections 15086 and 15087, Title 14, California Code of Regulations notice was given to advise interested parties that the MCE had completed a Draft Environmental Impact Report (Draft EIR) for the proposed project and that the Draft EIR was available for public review and comment. On September 29, 2015 the public comment period closed, with several comments having been timely received. Staff and its EIR consultants are currently drafting responses to those comments and addressing any additional mitigation measures that may be required for inclusion into the final EIR. The proposed project and the final EIR will require approvals by the Marin Clean Energy Board of Directors and the City of Richmond's Design Review Board.

The project description, location, and the potential environmental effects are discussed below.

Project Sponsor: Marin Clean Energy, 1125 Tamalpais Avenue, San Rafael, California 94901

Project Location: The project site is located due west of the intersection of Castro Street and West Hensley Street in the City of Richmond, in the County of Contra Costa, California. The 40-acre project site would occupy portions of three individual assessor parcels (561-100-038-0, 561-100-034-9, and 561-100-037-2) totaling approximately 60 acres. Approximately 40 acres are the site of a capped landfill, and 20 acres are filled and compacted fertilizer ponds; the site is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5. MCE has an option to lease

the site from the current landowner, Chevron Products Company, for solar energy development.

Project Description: The proposed project would involve site preparation, installation and operation of a 10.5 megawatt (MW) solar photovoltaic (PV) system at the project site. The installation would include approximately 80,000 thin-film, non-reflective solar panels, which, in combination with 11 utility-scale inverters, would convert sunlight into electricity. The electricity would be fed directly into the Pacific Gas & Electric (PG&E) utility grid from a point adjacent to the site.

The project would be built in two phases. Phase I would involve installation of a 2 MW non-penetrating, ballasted, fixed-tilt PV array on the southern portion of the landfill area (approximately 13 acres of the 40 acre landfill). The panels would extend from about 30 inches above grade to a maximum height of eight feet. Phase 2 would involve installation of a 3.5 MW PV array on the 20 acre filled and compacted fertilizer pond. The array on the compacted fertilizer pond site would use single axis tracking arrays. These arrays would extend from at least 30 inches above grade to a maximum of height of 14 feet in its highest position. Phase 2 would also include installation of a 5 MW non-penetrating, ballasted, fixed-tilt PV array on the northern portion of the landfill area (27 acres of the 40 acre landfill). The panels would extend from about 30 inches above grade to a maximum height of eight feet. All inverters and transformers would be mounted on concrete pads. The pads on the capped landfill would be placed above ground so as to not penetrate the landfill cap. Multiple pad mounted transformers would be connected by above-grade conduits to switching substations and pole mounted metering connected to existing 12.47 kilovolt PG&E distribution lines.

Site access during construction and operation would be along existing paved roadways. All deliveries and materials would primarily enter by the existing Hensley Street gate onto paved access roads to the project site. Larger vehicles may be required to access the site through existing paved roads and security gates within the Chevron refinery to the west of the project site. Construction staging and parking would occur adjacent to the northwest of the landfill. Site preparation would require placement of up to 500 cubic yards of fill on the landfill and removal and redistribution of a temporary berm on the fertilizer pond area of approximately 3,400 cubic yards of soil among various low spots on this portion of the project site. Grading would be balanced onsite; no export or import of cut or fill material is proposed. Disturbed areas would be re-vegetated with native grasses and wildflowers.

Potential Significant Environmental Effects:
The Draft EIR and the comments received identified potentially significant environmental impacts in the following issue topics:

☐ Biological Resources

☐ Hazards and Hazardous Materials

☐ Hydrology/Water Quality

Recommendation: Discussion item only.

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September 29, 2015

VIA EMAIL AND OVERNIGHT MAIL

Greg Brehm, Director of Power Resources
Marin Clean Energy
1125 Tamalpais Avenue
San Rafael, California 94901
gbrehm@mcecleanenergy.org

Re: Comments on the Draft Environmental Impact Report for the Richmond Solar PV Project (SCH 2015042040)

Dear Mr. Brehm:

We are writing on behalf of Bay Area Citizens for Responsible Solar to comment on the Richmond Solar PV Project ("Project") Draft Environmental Impact Report ("DEIR") prepared for Marin Clean Energy ("MCE") pursuant to the California Environmental Quality Act ("CEQA").[1] The Project is a 10.5 megawatt solar photovoltaic system, which includes approximately 80,000 solar panels, 11 utility-scale inverters, transformers, switching substations, overhead conductors and poles. The Project site is located on 60 acres at the Chevron Richmond Refinery property in the City of Richmond. Approximately 40 of these acres are a capped landfill and the remaining 20 acres consist of filled and compacted fertilizer ponds.

As explained more fully below, the DEIR does not comply with the requirements of the CEQA, including requirements to provide an accurate and complete Project description, to adequately describe the environmental setting, to support findings with substantial evidence and to identify and mitigate the Project's potentially significant impacts. MCE cannot approve the Project until the errors in the DEIR are remedied and a revised DEIR is circulated for public review and comment.

[1] Pub. Resources Code §§ 21000 et seq.

We prepared these comments with the assistance of hazardous materials expert Matt Hagemann and biological resources expert Scott Cashen. Mr. Hagemann's and Mr. Cashen's technical comments on the DEIR and their qualifications are attached and submitted to MCE in addition to the comments in this letter. MCE must address and respond to the comments of Mr. Hagemann and Mr. Cashen separately from the comments in this letter.

I. STATEMENT OF INTEREST

Bay Area Citizens for Responsible Solar ("BACRS") is a coalition of individuals and labor organizations that may be affected by the potential health and safety hazards and environmental impacts of the Project. The coalition includes City of Richmond residents Daneal Harris, Quincy Harris, Bryan Hicks and Dennis Hicks, and California Unions for Reliable Energy ("CURE") and its local union affiliates and their members and their families ("Coalition"). The Coalition was formed to advocate for responsible and sustainable solar development in the San Francisco Bay Area to protect public health and safety and the environment where the Coalition members and their families live, work and recreate.

Daneal Harris lives, works and recreates in the City of Richmond. Mr. Harris has a personal interest in protecting the Project area from unnecessary, adverse impacts to plants, wildlife, water resources and public health. Mr. Harris visits, appreciates and enjoys the ecosystem in and around the Project area.

Quincy Harris lives, works and recreates in the City of Richmond. Mr. Harris has a personal interest in protecting the Project area from unnecessary, adverse impacts to plants, wildlife, water resources and public health. Mr. Harris visits, appreciates and enjoys the ecosystem in and around the Project area.

Bryan Hicks lives, works and recreates in the City of Richmond. Mr. Hicks has a personal interest in protecting the Project area from unnecessary, adverse impacts to plants, wildlife, water resources and public health. Mr. Hicks visits, appreciates and enjoys the ecosystem in and around the Project area.

Dennis Hicks lives, works and recreates in the City of Richmond. Mr. Hicks has a personal interest in protecting the Project area from unnecessary, adverse

impacts to plants, wildlife, water resources and public health. Mr. Hicks visits, appreciates and enjoys the ecosystem in and around the Project area.

CURE is a coalition of labor organizations whose members encourage sustainable development of California's energy and natural resources. Environmental degradation destroys cultural and wildlife areas, consumes limited fresh water resources, causes air and water pollution, and imposes other stresses on the environmental carrying capacity of the State. This in turn jeopardizes future development by causing construction moratoriums and otherwise reducing future employment opportunities for those members. Additionally, the labor organization members live, recreate, work and raise their families in the City of Richmond and surrounding areas. Accordingly, they would be directly affected by the Project's adverse environmental impacts. The members may also work on the Project itself. They will, therefore, be the first in line to be exposed to any hazardous materials and other health and safety hazards that exist onsite.

II. THE DEIR FAILS TO SATISFY CEQA'S FUNDAMENTAL PURPOSES AND GOALS

CEQA has two basic purposes, neither of which the DEIR satisfies. First, CEQA is designed to inform decisionmakers and the public about the potential, significant environmental effects of a project.[2] Except in certain limited circumstances, CEQA requires that an agency analyze the potential environmental impacts of its proposed actions in an environmental impact report ("EIR").[3] An EIR's purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, an EIR "protects not only the environment but also informed self-government."[4]

To fulfill this function, the discussion of impacts in an EIR must be detailed, complete, and "reflect a good faith effort at full disclosure."[5] CEQA requires an EIR to disclose all potential direct and indirect, significant environmental impacts of a

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[2] Cal. Code Regs., tit. 14, (hereinafter, "CEQA Guidelines") § 15002(a)(1).
[3] See, e.g., Pub. Resources Code § 21100.
[4] *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.
[5] CEQA Guidelines § 15151; *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 721-722.

project.[6] In addition, an adequate EIR must contain the facts and analysis necessary to support its conclusions.[7]

The second purpose of CEQA is to require public agencies to avoid or reduce environmental damage when possible by requiring appropriate mitigation measures and through the consideration of environmentally superior alternatives.[8] If an EIR identifies potentially significant impacts, it must then propose and evaluate mitigation measures to minimize these impacts.[9] CEQA imposes an affirmative obligation on agencies to avoid or reduce environmental harm by adopting feasible project alternatives or mitigation measures.[10] Without an adequate analysis and description of feasible mitigation measures, it would be impossible for agencies relying upon the EIR to meet this obligation.

The DEIR fails to perform either of these roles adequately. The DEIR fails to reflect a good faith effort at public disclosure because it does not adequately describe the Project, fails to set forth an accurate and complete environmental setting, and fails to adequately disclose, analyze and mitigate the Project's significant impacts on biological resources, water quality and public health and safety. Due to these significant informational gaps in MCE's analysis, the DEIR's findings that the Project's potentially significant impacts will be reduced to a less than significant level are not supported by substantial evidence. Moreover, these informational gaps preclude the public and decisionmakers from being able to meaningfully evaluate and comment on the potential impacts of this Project or the adequacy of the DEIR.

III. THE PROJECT DESCRIPTION IS INADEQUATE

The DEIR violates CEQA because it contains an incomplete and inadequate Project description. An accurate and complete project description is necessary to perform an adequate evaluation of the potential environmental effects of a proposed

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[6] Pub. Resources Code § 21100 (b)(1); CEQA Guidelines § 15126.2(a).
[7] See *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 568.
[8] CEQA Guidelines § 15002(a)(2)-(3); see also, *Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners* (2001) 91 Cal.App.4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564; *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 391, 400.
[9] Pub. Resources Code §§ 21002.1(a), 21100(b)(3).
[10] Pub. Resources Code §§ 21002-21002.1.

project.[11] In contrast, an inaccurate or incomplete project description renders the analysis of environmental impacts inherently unreliable.[12] Without a complete project description, the environmental analysis under CEQA will be impermissibly narrow, thus minimizing the project's impacts and undercutting public review.[13] The courts have repeatedly held that "[a]n accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR."[14]

Here, the DEIR fails to meet this basic threshold. The DEIR fails to adequately describe basic Project components. Without an adequate description of the Project's components, decision makers and the public cannot assess the Project's impacts. Further, because the DEIR fails to describe key details, it lacks foundation for many of its conclusions regarding the insignificance of environmental impacts. Moreover, it renders public comment and review meaningless since the public is not provided with basic information about the Project necessary to assess potential impacts. This has the very real consequence of defeating the public's efforts to understand and assess the Project's impacts. MCE must prepare and circulate a revised EIR containing a complete Project description and analysis of Project impacts.

A. The DEIR Fails to Describe the Project's Construction Water Demand

The DEIR completely fails to describe the Project's construction water demand. The Initial Study for the Project (Appendix A to the DEIR) states that to minimize dust during Project construction, "exposed ground areas" would be watered twice a day.[15] Construction will take approximately 18 months.[16] The DEIR fails to describe the amount of water required to minimize dust during the 18-month construction period. The DEIR also fails to describe other Project construction water demands typical of solar facilities, such as water for concrete mixing and soil compaction. Without a complete description of the Project's construction water demand, it is impossible to determine whether there is sufficient water supply for the Project and the DEIR's conclusion that there is a sufficient

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[11] *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185,192.
[12] *Id.* at 192-193.
[13] See, *e.g., Laurel Heights Improvement Association v. Regents of the University of California* (1988) 47 Cal.3d 376.
[14] *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 193.
[15] DEIR, Appendix A, p. 10.
[16] DEIR, p. 2-15.

water supply is unsupported. The DEIR must be revised to include a description of the Project's construction water demand.

B. The DEIR Fails to Adequately Describe the Project's Operation Water Demand

The Initial Study states that Project operation "requires a limited amount of water."[17] It states that "solar panels would be washed once per year."[18] Neither the Initial Study nor the DEIR describe the actual amount of water required for Project operation. Without a complete description of the Project's operation water demand, it is impossible to determine whether there is sufficient water supply for the Project and the DEIR's conclusion that there is a sufficient water supply is unsupported. The DEIR must be revised to include an adequate description of the Project's operation water demand.

C. The DEIR Fails to Describe the Project's Water Supply

The DEIR provides no information regarding the Project's water supply. The DEIR merely states that "a portable water tank on maintenance vehicles or a water truck" would be used for panel washing.[19] Without any information regarding the Project's water supply, there is no support for the DEIR's conclusion that the Project's impacts on water supplies would be less than significant.

D. The DEIR Fails to Describe Decommissioning Activities with Sufficient Specificity to Assess Potential Impacts

The DEIR's Project description is inadequate because it fails to adequately describe decommissioning activities that are part of the Project design. The DEIR's "Project Description" states that "[a]t the end of the project's useful life (anticipated being 30 years or more), the proposed solar facility and associated infrastructure may be decommissioned."[20] The "Hazards" section of the DEIR states that "it is too speculative to provide details in this EIR describing specific decommissioning activities and potential impacts that could occur far in to the future."[21] The DEIR

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[17] DEIR, Appendix A, p. 30.
[18] *Id.*
[19] *Id.*
[20] DEIR, p. 2-15.
[21] *Id.*, p. 4.2-8.

purports to evaluate Project decommissioning "based on current standard decommissioning practices, which include dismantling and repurposing, salvaging/recycling, or disposing of project components, and site restoration."[22] However, the DEIR's "analysis" of decommissioning is actually deferred until after Project approval. For example, mitigation measure HAZ-3 requires the Project operator to prepare a recycling or disposal plan for PV modules and support structures prior to construction permit issuance.[23] The DEIR provides few details for decommissioning activities useful to an impact analysis.

Despite identifying decommissioning as part of the Project, the DEIR fails to adequately describe the decommissioning phase of the Project. The DEIR does not describe decommissioning activities in sufficient detail to allow the public or decisionmakers to meaningfully assess these impacts on their own. As a result, the DEIR did not (and could not) adequately assess the Project's impacts from decommissioning.

Under CEQA, the whole of the action that is required to be described in the project description includes any future activities that are reasonably anticipated to become part of the project, including "later phases of the project."[24] The requirements of CEQA cannot be avoided by excluding reasonably foreseeable future activities that may become part of the project.[25] The EIR must supply enough information so that the decision makers and the public can fully understand the scope of the project.[26] Without an accurate description on which to base an EIR's analysis, CEQA's objective of furthering public disclosure and informed environmental decision-making would be impossible and consideration of mitigation measures and alternatives would be rendered useless.[27] If key project features are not described, then the related direct, indirect and cumulative impacts cannot be evaluated, mitigation measures cannot be imposed, and alternatives cannot be effectively evaluated.

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[22] *Id.*
[23] *Id.*, p. 4.2-13.
[24] *Bozung v. Local Agency Formation Com.* (1975) 13 Cal.3d 263, 283-84; CEQA Guidelines §15378.
[25] Pub. Resources Code § 21159.27 (prohibiting piecemealing); *see also, Rio Vista Farm Bureau Center v. County of Solano* (1992) 5 Cal.App.4th 351, 370.
[26] *Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 26.
[27] *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 192-193, 197-198, 203.

The DEIR here fails to adequately describe the full scope of the Project being approved, including decommissioning, and thus fails to disclose the full range and severity of the Project's environmental impacts. The public and decision makers have this, and only this, opportunity to comment on the Project. For this reason, every phase of the Project must be assessed now, including the decommissioning phase.

There is no question that decommissioning activities may result in environmental impacts, including impacts to air quality, biological resources, water and solid waste capacity, among other impacts. "Decommissioning entails a range of considerations to restore a site to its original environment, including removal of all structures, foundations, wires and hazardous materials."[28] In addition, restoration of topsoil and vegetation may be necessary.[29] Decommissioning may require significant excavation, grading and demolition activities that could result in "environmental disturbances like noise, dust, water quality and impact on local wildlife and vegetation."[30]

The DEIR must be revised to provide an adequate description of what activities decommissioning entails and an analysis of the potential impacts from such activities. Because such revisions would be significant, the revised DEIR must be recirculated for public review and comment.[31]

IV. THE DEIR FAILS TO ADEQUATELY ESTABLISH THE EXISTING ENVIRONMENTAL SETTING AGAINST WHICH THE DEIR IS REQUIRED TO ANALYZE THE PROJECT'S POTENTIALLY SIGNIFICANT IMPACTS

The DEIR describes the existing environmental setting inaccurately and incompletely, thereby skewing the impact analysis. The existing environmental setting is the starting point from which the lead agency must measure whether a

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[28] Voegele & Changala, Decommissioning Funds for Renewable Energy Facilities, Vermont Law School Institute for Energy and Environment (Sept. 2010), p. 1.
[29] *See Id.*; *see also* Proposed Policies for Solar Energy Facilities in Rural Alameda County, Alameda County Planning Department (Sept. 13, 2011), p. 2.
[30] Voegele & Changala, Decommissioning Funds for Renewable Energy Facilities, Vermont Law School Institute for Energy and Environment (Sept. 2010), p. 1.
[31] Pub. Resources Code § 21092.1; CEQA Guidelines § 15088.5; *Laurel Heights Improvement Association v. Regents of Univ. of Cal.* (1993) 6 Cal.4th 1112, 1129.

proposed project may cause a significant environmental impact.[32] CEQA defines the environmental setting as the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, from both a local and regional perspective.[33]

Describing the environmental setting accurately and completely for each environmental condition in the vicinity of the Project is critical to an accurate, meaningful evaluation of environmental impacts. The importance of having a stable, finite, fixed environmental setting for purposes of an environmental analysis was recognized decades ago.[34] Today, the courts are clear that, "[b]efore the impacts of a project can be assessed and mitigation measures considered, an [environmental review document] must describe the existing environment. It is only against this baseline that any significant environmental effects can be determined."[35] In fact, it is:

> a central concept of CEQA, widely accepted by the courts, that the significance of a Project's impacts cannot be measured unless the DEIR first establishes the actual physical conditions on the property. In other words, baseline determination is the first rather than the last step in the environmental review process.[36]

The DEIR must also describe the existing environmental setting in sufficient detail to enable a proper analysis of Project impacts.[37] Section 15125 of the CEQA Guidelines provides that "[k]nowledge of the regional setting is critical to the assessment of environmental impacts."[38] This level of detail is necessary to "permit the significant effects of the Project to be considered in the full environmental context."[39]

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[32] *See, e.g., Communities for a Better Env't v. S. Coast Air Quality Mgmt. Dist.* (March 15, 2010) 48 Cal.4th 310, 316; *Fat v. County of Sacramento* (2002) 97 Cal.App.4th 1270, 1278 ("*Fat*"), citing Remy, et al., Guide to the Calif. Environmental Quality Act (1999) p. 165.
[33] CEQA Guidelines §15125(a) (emphasis added); *Riverwatch v. County of San Diego* (1999) 76 Cal.App.4th 1428, 1453 ("*Riverwatch*").
[34] *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185.
[35] *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 952.
[36] *Save our Peninsula Comm. v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99, 125.
[37] *Galante Vineyards v. Monterey Peninsula Water Mgmt. Dist.* (1997) 60 Cal.App.4th 1109, 1121-22.
[38] CEQA Guidelines § 15125(d).
[39] *Id.*

The description of the environmental setting in the DEIR is inadequate because it omits highly relevant information regarding biological resources. MCE must gather the relevant data and provide an adequate description of the existing environmental setting in a revised DEIR.

A. The DEIR Fails to Establish the Environmental Setting From Which to Analyze the Project's Potentially Significant Impacts on Biological Resources

The DEIR grossly misrepresents the environmental setting from which to analyze the Project's impacts on biological resources, including several federal and/or State protected species, such as the salt-marsh harvest mouse and burrowing owl, among other protected species. Without an accurate description of the environmental setting, there is no way to determine the Project's impacts to biological resources and, therefore, no way to apply appropriate mitigation for those impacts. To comply with CEQA, the DEIR must be revised to include accurate and complete descriptions of baseline conditions as follows:

1. The DEIR's Environmental Setting for Biological Resources Must be Based on Adequate Survey Effort and Information

The DEIR states that impact analyses on sensitive biological resources are based on a "reconnaissance-level field survey conducted within the project site by Rincon biologists on January 26, 2015."[40] No protocol-level special status species surveys were conducted.[41] Expert biologist Scott Cashen explains in his comments that the information in the DEIR regarding the survey is insufficient to determine the extent of the Project's impacts on biological resources, or to ensure effective mitigation is imposed to reduce impacts to a less than significant level.

According to Mr. Cashen, the following information related to the survey is necessary to determine the Project's impacts on biological resources, but is missing from the DEIR:

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[40] DEIR, p. 4.1-1.
[41] *Id.*

- A description of the survey methods, including the level of effort (e.g., man-hours) and techniques that were used to detect plant and animals species;
- A description of the survey area (it appears from Figure 4.1-1 that the survey area was limited to the Project footprint and excluded habitats north and south of the Project site that could be indirectly impacted by the Project);
- Information on habitat conditions for the tidal marsh that bisects the Project site, the freshwater emergent marsh immediately south of the Project site and the ponds immediately north of the Project site;
- A complete list of the plant species detected during the survey; and
- A complete list of wildlife detected during the survey.

Further, Mr. Cashen explains that due to the timing of the survey (January), birds that occur at the Project site during the breeding season could not have been detected, and "most of the special-status plant species that could occur at the site would not have been evident and identifiable."[42]

These deficiencies preclude reliable impact analyses and effective mitigation. MCE must prepare a revised DEIR that is based on an adequate survey effort and sufficiently describes the survey effort and findings.

2. The DEIR Must Adequately Describe Habitat for Special-Status Plants and Animals that May be Indirectly Affected by the Project

The DEIR provides a list of plant species and their potential to occur on the Project site.[43] However, the DEIR provides no information on the potential for these species to occur outside of the Project footprint in areas that may be indirectly affected by the Project, such as the tidal channel between the fertilizer pond and landfill.

Similarly, the DEIR provides a table of special-status animal species that could occur on the Project site,[44] but fails to provide information on the potential for

[42] **Attachment A**: Letter from Scott Cashen to Rachael Koss re Comments on the Draft Environmental Impact Report Prepared for the Richmond Solar PV Project, September 22, 2015 ("Cashen Comments"), p. 2.
[43] DEIR, Table 4.1-1.
[44] *Id.*, Table 4.1-2.

these species to occur outside of the Project footprint in areas that may be indirectly affected by the Project. For example, the DEIR states that suitable nesting habitat for the California clapper rail is "not present on site," but that the species "may forage in adjacent salt and freshwater marshes."[45] Yet, the DEIR does not state whether there is suitable nesting habitat for the California clapper rail in the adjacent marshes. As a result, the public and decision makers cannot evaluate the Project's potentially significant indirect impacts on the California clapper rail (or several other species whose habitat is inadequately described in the DEIR).

3. The DEIR Must Adequately Describe Raptor Use of the Project Site

The DEIR provides inconsistent and unreliable information on raptor use of the Project site. Specifically, the DEIR states "limited observations of burrowing owl, northern harrier, short-eared owl and white-tailed kite within the vicinity of the project site" occurred "over the last five years."[46] This conflicts with another statement in the DEIR that "numerous" observations of white-tailed kites and northern harriers have occurred within two miles of the Project site.[47]

In his comments, Mr. Cashen notes that MCE's consultant did not conduct surveys to establish raptor use of the Project site (and surrounding vicinity).[48] Rather, the DEIR relies on the reconnaissance-level survey and information from two databases, the California Natural Diversity Database ("CNDDB") and the eBird database to establish raptor use of the Project site.[49] According to Mr. Cashen, neither the survey nor these databases are sufficient to establish raptor use of the Project site.[50] First, the survey is inadequate because a single reconnaissance-level survey during the non-breeding season cannot establish raptor use of the site.[51] Second, the CNDDB and eBird database are inadequate because they are "positive sighting" databases, which means they are entirely dependent on survey effort and the subsequent submittal of the survey data to the databases.[52] Here, the Project site and many of the surrounding properties are private land that is inaccessible to

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[45] *Id.*
[46] *Id.*, p. 4.1-24.
[47] *Id.*, p. 4.1-15.
[48] Cashen Comments, p. 3.
[49] DEIR, pp. 4.1-1 and -15.
[50] Cashen Comments, p. 3.
[51] *Id.*, pp. 3-4.
[52] *Id.*, p. 4.

the public and no survey has been conducted. Consequently, the CNDDB and eBird databases likely have limited records of burrowing owl, northern harrier, short-eared owl, and white-tailed kite in the vicinity of the Project site.[53]

4. The DEIR's Analysis of Impacts on the Burrowing Owl Must be Based on Adequate Surveys

MCE's consultant conducted a single reconnaissance-level survey in January to determine burrowing owl use of the Project site. Mr. Cashen explains that the survey effort is inadequate to determine the environmental setting against which to measure the Project's impacts on the burrowing owl.

Mr. Cashen explains that, according to the California Department of Fish and Wildlife's ("CDFW") Staff Report on Burrowing Owl Mitigation ("Staff Report"), non-breeding season surveys (September 1 to January 31) "do not substitute for breeding season surveys because results are typically inconclusive." This is because "burrowing owls are more difficult to detect during the non-breeding season and their seasonal residency status is difficult to ascertain."[54] Burrowing owl researchers and the CDFW have concluded that four independent surveys are necessary to provide reliable information on the presence of burrowing owls.[55]

Without sufficient information regarding the presence of burrowing owls, it is impossible to determine the extent of the Project's impacts on the species. Until surveys that adhere to CDFW guidelines are conducted, there is no support for MCE's conclusion that impacts on the burrowing owl would be mitigated to a less than significant level.

5. The DEIR's Analysis of Impacts on Botanical Resources Must be Based on Adequate Surveys

CDFW survey guidelines provide that protocol-level botanical surveys should be conducted when any one of these factors exist: (1) natural (or naturalized) vegetation occurs on the site, it is unknown if special status plant species or natural communities occur on the site and the project has the potential for direct or indirect

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[53] *Id.*
[54] *Id.*
[55] *Id.*

effects on vegetation; (2) special status plants or natural communities have historically been identified on the project site; or (3) special status plants or natural communities occur on sites with similar physical and biological properties as the project site.[56] Mr. Cashen explains that protocol-level botanical surveys should be conducted for the Project because the Project site satisfies all three of these criteria.[57] Protocol-level botanical surveys were not conducted for the Project. Further, Mr. Cashen explains that, because the reconnaissance-level survey was conducted in January, it was impossible to detect special-status plants on the Project site since the plants do not bloom in January.[58] To establish the existing setting and comply with CDFW guidelines, MCE must conduct appropriately timed floristic surveys on the Project site and buffer zone containing natural or naturalized vegetation. Only then can the public and decisionmakers evaluate the Project's impacts on sensitive botanical resources.

6. The DEIR Must Adequately Describe the Environmental Setting for Salt-Marsh Harvest Mouse and San Pablo Vole

The salt-marsh harvest mouse is a federally and state listed endangered species that has a high to very high risk of extinction at both the global and statewide levels.[59] It is also "Fully Protected" under California Fish and Game Code.[60] The San Pablo vole is a California Species of Special Concern that has a high to very high risk of extinction at both the global and statewide levels.[61] The DEIR states the Project site does not provide suitable habitat for these species.[62] This conflicts with the Chevron Refinery Modernization Project EIR, which states that the salt-marsh harvest mouse and San Pablo vole could disperse through the solar facility site from nearby degraded marsh habitat.[63] Mr. Cashen explains that, "[b]y definition, habitat is defined by the behaviors of the organism. Therefore, if

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[56] *Id.*, p. 5.
[57] *Id.*, pp. 5-6.
[58] *Id.*, p. 6.
[59] California Department of Fish and Wildlife, Natural Diversity Database. July 2015. Special Animals List. Periodic publication. 51 pp. Available at: <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf>.
[60] *See* <https://www.dfg.ca.gov/wildlife/nongame/t_e_spp/fully_pro.html>.
[61] *Id.*
[62] DEIR, Table 4.1-2 and p. 4.1-13.
[63] *Id.*, p. 4.1-13.

these species could disperse through the solar facility site, the site provides habitat (i.e., dispersal habitat)."[64]

Mr. Cashen also explains why the DEIR's statement that the Project site does not provide suitable habitat for the salt-marsh harvest mouse or San Pablo vole conflicts with scientific information. Specifically, both species frequently utilize terrestrial grassland habitats adjacent to tidal marsh, similar to the habitat on the Project site.[65]

MCE must prepare a revised DEIR that adequately describes the environmental setting for the salt marsh harvest mouse and San Pablo vole. Without sufficient information, it is impossible to determine the extent of the Project's impacts on these species and there is no support for the DEIR's conclusion that the Project's impacts on them would be less than significant.

V. THE DEIR FAILS TO ADEQUATELY DISCLOSE, EVALUATE AND MITIGATE ALL POTENTIALLY SIGNIFICANT IMPACTS TO BIOLOGICAL RESOURCES

The Project area is rich in biological resources and ecological value. The North Coast Salt Marsh, tidal channels and freshwater emergent marsh are within the immediate vicinity of the Project site.[66] There are also five natural vegetation communities within the vicinity of the Project site.[67] There are 35 special status animal species known to occur within the vicinity of the Project site.[68] In addition, the Project site is located along the Pacific Flyway and is one mile from San Francisco Bay, which is recognized as a Western Hemisphere Shorebird Reserve Network Site of Hemispheric Importance for shorebirds.[69] San Francisco Bay is one of the most important wetland sites along the Pacific coast for waterbirds, hosting millions of wintering and breeding shorebirds, waterfowl and other birds annually.[70] Therefore, it is essential that MCE fully and adequately analyze and

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[64] Cashen Comments, p. 7.
[65] *Id.*
[66] DEIR, p. 4.1-15.
[67] *Id.*
[68] *Id.*, p. 4.1-13.
[69] *See* http://www.whsrn.org/site-profile/san-francisco-bay.
[70] *See* http://www.pointblue.org/uploads/assets/education/SFBayBirdPocketGuide4webPDFreduced.pdf.

mitigate the Project's potentially significant impacts on biological resources that are present on or around the Project site.

A. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Burrowing Owls

1. The DEIR Fails to Analyze the Project's Significant Impacts on Burrowing Owls from Passive Relocation

Mitigation measure BIO-2(c) states that passive relocation of burrowing owls may be necessary to reduce the Project's potentially significant impacts on burrowing owls to a less than significant level.[71] However, passive relocation itself causes significant impacts on burrowing owls. Despite this, the DEIR does not analyze the potentially significant impacts associated with passive relocation, as required by CEQA.[72]

In his comments, Mr. Cashen explains that passive relocation poses a significant risk to burrowing owls.[73] CDFW has concluded that passive relocation is a potentially significant impact under CEQA that must be analyzed.[74] According to the CDFW, temporary or permanent closure of burrows may result in: (a) significant loss of burrows and habitat for reproduction and other life history requirements; (b) increased stress on burrowing owls and reduced reproductive rates; (c) increased depredation; (d) increased energetic costs; and (e) risks posed by having to find and compete for available burrows.[75]

Moreover, research shows that most translocation projects have resulted in fewer breeding pairs of burrowing owls at the mitigation site than at the original site, and that translocation projects have generally failed to produce self-sustaining

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[71] DEIR, p. 4.1-25.
[72] CEQA requires that all potential environmental impacts must be analyzed and that all significant impacts must be mitigated, including impacts from mitigation measures themselves. Where mitigation measures would, themselves, cause significant environmental impacts, CEQA requires an evaluation of those secondary (indirect) impacts (see CEQA Guidelines § 15064(d)).
[73] Cashen Comments, p. 8.
[74] California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. p. 10. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843>.
[75] Cashen Comments, p. 8.

populations.[76] Investigators attribute the limited success of translocation to strong site tenacity exhibited by burrowing owls and potential risks associated with forcing owls to move into unfamiliar and less preferable habitats.[77]

2. The DEIR's Mitigation Measures do Not Reduce the Project's Impacts to Burrowing Owls to a Less than Significant Level

MCE's proposed mitigation for the Project's significant impacts to burrowing owls includes a pre-construction survey and establishment of buffer zones around active burrows. In Mr. Cashen's opinion, neither the proposed survey nor the buffer zones will reduce the Project's impacts to burrowing owls to a less than significant level.

First, the proposed pre-construction clearance survey is inconsistent with CDFW guidelines. The DEIR provides that the survey will be conducted within 14 days prior to construction and ground disturbance activities.[78] Under CDFW guidance, however, an initial pre-construction survey should be conducted within 14 days prior to ground disturbance and a subsequent survey should be conducted within 24 hours prior to ground disturbance.[79] This is because burrowing owls can re-colonize a site after only a few days.[80] Moreover, CDFW makes clear that pre-construction surveys are not a substitute for the four surveys required to evaluate the Project's impacts on burrowing owls. According to Mr. Cashen, "a single pre-construction survey up to 14 days in advance of construction is insufficient to avoid and minimize take of burrowing owls."[81] In other words, the pre-construction survey proposed in the DEIR is insufficient to reduce the Project's impacts on burrowing owls to a less than significant level.

Second, the buffers proposed in the DEIR are insufficient to reduce the Project's impacts on burrowing owls to a less than significant level. The DEIR proposes a 50-meter buffer around occupied burrows during the non-breeding season and a 100-meter buffer around burrows occupied during the breeding

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[76] *Id.*
[77] *Id.*
[78] DEIR, p. 4.1-25.
[79] Cashen Comments, p. 15.
[80] *Id.*
[81] *Id.*

season.[82] These buffer distances are inconsistent with CDFW standards. CDFW provides that activities involving a "low" level of disturbance should incorporate a buffer of 50 meters during the non-breeding season and 200 meters during the breeding season, and those buffers should be extended to 500 meters for activities that involve a "high" level of disturbance.[83] Here, the Project involves activities that constitute a "high" level of disturbance, such as pile-driving and grading. Therefore, the Project requries a 500-meter buffer around burrows.[84]

Finally, the DEIR makes no mention of compensatory mitigation to reduce the Project's impacts on burrowing owls and their foraging habitat to a less than significant level. According to CDFW, scientific literature shows that "mitigation for permanent habitat loss ***necessitates*** replacement with an equivalent or greater habitat area..."[85] Mr. Cashen explains that compensatory mitigation in this case is crucial "given the perilous status of the species in the Project region and the ongoing decline of the species throughout most of the state."[86]

MCE must prepare a revised DEIR that adequately discloses, analyzes and mitigates the Project's potentially significant impacts on burrowing owls.

B. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Valley Needlegrass Grassland

The DEIR states that the Project has been designed to avoid direct impacts to the Valley Needlegrass Grassland community on the Project site. However, it is impossible to verify the feasibility of avoiding direct impacts on this plant community because the DEIR does not provide a site plan that depicts the location of the solar arrays and internal access roads in relation to the Valley Needlegrass Grassland community. Moreover, the DEIR fails to disclose and analyze the Project's indirect impacts on the Valley Needlegrass Grassland community (and other sensitive natural communities adjacent to the Project site). According to Mr. Cashen, potentially significant indirect impacts on sensitive natural communities

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[82] DEIR, p. 4.1-25.
[83] Cashen Comments, p. 16.
[84] *Id.*
[85] *Id.*
[86] *Id.*

could occur from dust, erosion, spread of invasive weeds, shading and alterations in hydrology.[87]

MCE must prepare a revised DEIR that provides a site plan depicting the location of the solar arrays and roads in relation to the Valley Needlegrass Grassland community. The revised DEIR must also disclose, analyze and mitigate the Project's potentially significant indirect impacts on sensitive natural communities.

C. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Grassland Birds

The DEIR states that four special-status (grassland) bird species (burrowing owl, short-eared owl, white-tailed kite, and northern harrier) could occur at the Project site. However, the DEIR concludes that the loss of grassland habitat as a result of the Project would not adversely affect these species. The DEIR's conclusion is based on the following unsupported statements:

> Non-native grassland provides marginal foraging habitat for some species including white-tailed kite, burrowing owl, and northern harrier. The project site represents a small portion of the non-native grassland habitat available to these species along the shores of the San Pablo Bay and San Rafael Bay and inland. The permanent loss of the marginal non-native grassland habitat within the project site represents poor quality raptor foraging habitat and is a small and non-significant percentage of all suitable foraging habitat present within the broader San Francisco Bay region. Furthermore, based on the limited observations of burrowing owl, northern harrier, short-eared owl and white-tailed kite within the vicinity of the project site over the last five years, the loss of habitat on the project site is unlikely to adversely affect regional population numbers or contribute towards a trend to federal or state listing, or to the loss of viability to any special status population or species.[88]

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[87] *Id.*, p. 9.
[88] DEIR, p. 4.1-24 (internal citation omitted).

In his comments, Mr. Cashen provides three reasons why the DEIR's conclusion and statements regarding grassland habitat are unsupported. First, there is no evidence that the Project site "represents a small portion of the non-native grassland habitat available to these [grassland] species along the shores of the San Pablo Bay and San Rafael Bay and inland." However, Figure 1 in Mr. Cashen's comments shows that most grassland habitat that previously occurred around San Pablo Bay (including San Rafael Bay) has been lost to urban development.[89] According to Mr. Cashen, "[t]he loss of grassland habitat in the San Francisco Bay Area has had, and continues to have, a significant effect on grassland bird species. Indeed, grassland birds in the Bay Area have declined by over 45% since 1968, which is considerably more than birds in any other habitat guild."[90] Thus, the Project site may very well represent a great deal more than just "a small portion of the non-native grassland habitat available to these [grassland] species..."

Second, there is no support for the DEIR's statement that the site "represents poor quality raptor foraging habitat" or that it is "a small and non-significant percentage of all suitable foraging habitat present within the broader San Francisco Bay region." MCE's consultant conducted zero studies to quantify the prey base for raptors at the Project site.

Finally, there is no support for the DEIR's reasoning that "based on the limited observations of burrowing owl, northern harrier, short-eared owl and white-tailed kite within the vicinity of the project site over the last five years, the loss of habitat on the project site is unlikely to adversely affect regional population numbers or contribute towards a trend to federal or state listing, or to the loss of viability to any special status population or species." Mr. Cashen explains that, "[i]f the patches of habitats remaining in the Project region can support only a few birds (e.g., burrowing owls), then the loss of even one habitat patch could have significant implications on regional population numbers and viability."[91] Mr. Cashen provides burrowing owls as an example. He explains that burrowing owls have been extirpated or nearly extirpated from western Contra Costa County due to habitat loss from commercial and residential development.[92] Consequently, according to

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[89] Cashen Comments, p. 9.
[90] *Id.*
[91] *Id.*, p. 10.
[92] *Id.*

Mr. Cashen, "the loss of occupied burrowing owl habitat at the Project site would undoubtedly affect regional population numbers and contribute to a trend towards federal or state listing."[93]

The DEIR's conclusion that the loss of grassland habitat from the Project would not adversely affect four special-status (grassland) bird species is unsupported. MCE must prepare a revised DEIR that provides an adequate analysis, supported by substantial evidence, of the Project's potentially significant impact to grassland birds from the loss of grassland habitat.

D. The DEIR Fails to Adequately Analyze and Mitigate the Project's Impacts on Birds from Collision Hazard

Data shows that birds mistake the broad reflective surfaces of solar arrays for water, trees and other attractive habitat.[94] As a result, birds tend to collide with solar arrays and die or become injured and stranded. A recent study shows that solar facilities kill a greater number of waterbirds than other birds because the waterbirds mistake PV arrays for a water body. In addition, data shows that PV panels produce polarized light pollution that attracts insects and, in turn, attracts insect-eating birds.[95] The DEIR completely fails to analyze the Project's potentially significant impacts on birds from collision with the PV panels.

The DEIR's failure is particularly concerning because the Project site is located along the Pacific Flyway. It is approximately one mile from San Francisco Bay and immediately adjacent to several ponds and marshes. Mr. Cashen explains the importance of the Project region for birds. San Francisco Bay is a Western Hemisphere Shorebird Reserve Network Site of Hemispheric Importance for shorebirds, which is the highest possible ranking. It is one of the most important wetland sites along the Pacific coast for waterbirds. In addition, tidal marsh and upland habitat support large populations of landbirds around the San Francisco Bay.[96] Due to the Project's location in relation to San Francisco Bay and other aquatic habitat, it is Mr. Cashen's expert opinion that "there is a heightened risk

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[93] *Id.*
[94] *Id.*, p. 12.
[95] *Id.*
[96] *Id.*, pp. 12-13.

that birds will mistake the Project's solar arrays for water, resulting in bird strikes and entrapment."[97]

Mr. Cashen explains that there are feasible measures to facilitate avoidance of bird collisions, such as UV-reflective or solid contrasting bands on arrays with a maximum spacing of 28 cm.[98] MCE must require these feasible measures to reduce the Project's impacts on birds to a less than significant level. In addition, Mr. Cashen recommends that MCE implement a monitoring, reporting and adaptive management plan during Project construction and the first three years of operation (at a minimum).[99] Importantly, the plan should be included in a revised DEIR and, because many of the birds that would be impacted by the Project are federally protected (either under the Migratory Bird Treaty Act or the Endangered Species Act), should be approved by the U.S. Fish and Wildlife Service ("USFWS"). Further, because the Project site is located close to a relatively dense population of Ridgway's rails, it is Mr. Cashen's opinion that the Project will likely cause incidental take of the Ridgway rail.[100] Thus, MCE must apply for an incidental take permit from the USFWS.

The DEIR completely fails to analyze the potential for the Project to kill and injure birds from collision with the PV panels. MCE must prepare a revised DEIR that discloses and analyzes the Project's potentially significant impacts on birds associated with constructing a PV power plant in an area that is heavily populated by birds, including numerous listed species.

E. The DEIR Fails to Adequately Mitigate the Project's Potentially Significant Impacts on Nesting Birds

The DEIR states that MCE will conduct pre-construction surveys for nesting birds within 500 feet of Project disturbance areas.[101] But the DEIR does not establish minimum standards for the survey effort, including a requirement to adhere to scientific standards for nest site detection. Therefore, there is no evidence that the pre-construction surveys would be sufficient to reduce the Project's impacts on nesting birds to a less than significant level.

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[97] *Id.*, p. 13.
[98] *Id.*, p. 17.
[99] *Id.*
[100] *Id.*
[101] DEIR, p. 4.1-24.

Mr. Cashen explains that nest finding is labor intensive and can be extremely difficult because many species construct well-concealed or camouflaged nests.[102] Most studies that involve locating bird nests employ several search techniques.[103] There is a strong positive correlation between survey effort and abundance of nests detected. Moreover, Mr. Cashen explains that "several of the bird species that have the potential to nest within 500 feet of the Project site are extremely difficult to detect," such as the Ridgway's rail.[104] Therefore, the DEIR must specify the techniques to be used for nest surveys, the expected level of effort (i.e., hours per unit area), the search area, the time of day surveys will be permitted, and the techniques that should be used to minimize human-induced disturbance.

F. The DEIR Fails to Adequately Analyze or Mitigate the Project's Potentially Significant Impacts on Special-Status Mammals

The DEIR fails to adequately analyze or mitigate the Project's potentially significant impact on special-status mammals, including the salt-marsh harvest mouse and San Pablo vole. As explained above, evidence shows that the Project site provides dispersal habitat for these species. Despite this evidence, the DEIR completely fails to analyze the Project's impacts on these species. Consequently, the DEIR contains no measures to mitigate the Project's impacts on special-status mammal species to a less than significant level. Mr. Cashen recommends feasible measure, including clearance surveys, installation of a barrier fence, biological monitoring during construction and compensatory mitigation. In addition, because the Project could significantly affect the salt-marsh harvest mouse, a federally and State listed endangered species, MCE must consult with the USFWS and CDFW to determine measures needed to comply with the federal Endangered Species Act, the California Endangered Species Act and section 4700 of the Fish and Game Code.

G. The DEIR Fails to Analyze or Mitigate the Project's Potentially Significant Impacts from the Spread of Non-native Plants

In his comments, Mr. Cashen explains that it is well settled that construction and other ground disturbance activities promote the establishment and/or spread of

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[102] Cashen Comments, p. 14.
[103] *Id.*
[104] *Id.*

non-native plants both on and off-site.[105] Non-native plants can displace native (and perhaps sensitive) plant species and degrade wildlife habitat by eliminating food sources, cover and breeding sites.[106] The DEIR completely fails to disclose, analyze or mitigate these significant impacts.

VI. THE DEIR FAILS TO DISCLOSE, EVALUATE AND MITIGATE ALL POTENTIALLY SIGNIFICANT IMPACTS TO WATER QUALITY AND PUBLIC HEALTH FROM HAZARDOUS MATERIALS PRESENT ON THE PROJECT SITE

The Project site is located on a former landfill (Landfill 15) and fertilizer plant. The landfill received a variety of wastes, including sludges, oily soils and dredge spoils, resins, catalyst fines, lime and sulfur.[107] Soil contaminants on the landfill site include residual waste chemicals, such as volatile organic compounds, semi-volatile organic compounds, heavy metals and petroleum hydrocarbons.[108] The fertilizer plant was used for nitrogen-based fertilizer manufacturing.[109] Soil contaminants on the fertilizer plant site include residual metals, such as arsenic, beryllium, cadmium and cobalt,[110] and ammonia, nitrate, arsenic, lead, chlordane, lindane, DDD, DDE, DDT, trans-1,2dichloroethene and trichloroethene.[111] Substantial evidence shows that the Project's placement of PV panels on the former landfill and fertilizer plant may significantly impact water quality and public health from the release of these soil contaminants. The DEIR fails to adequately disclose, analyze and mitigate these significant impacts.

A. The DEIR Fails to Disclose, Analyze and Mitigate Impacts from Differential Settlement Potential at Landfill 15 Cap

The Project includes placement of PV panels on Landfill 15. Landfill 15 has a cap made of fill and a polyethylene liner or geomembrane, with a vegetated and

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[105] *Id.*, p. 18.
[106] *Id.*
[107] DEIR, p. 4.2-1.
[108] **Attachment B:** Letter from Matt Hagemann to Rachael Koss re Comments on the Richmond Solar PV Project, September 12, 2015 ("Hagemann Comments"), p.2; *see also* **Attachment C:** Dames & Moore, Landfill 15 Closure Certification Report, April 14, 1998.
[109] DEIR, p. 4.2-1.
[110] *Id.*, p. 4.2-2.
[111] **Attachment D:** Regional Water Quality Control Board Staff Summary Report, June 10, 2015, p. 4.

asphalt cover.[112] The cap was created to promote evapotranspiration of precipitation and to isolate underlying wastes from infiltrating water. The underlying landfill wastes include sludges, oily soil and dredge spoils, resins, catalyst fines, lime and sulfur.[113] As described more fully below, it is hazardous materials expert Matt Hagemann's opinion that, due to soft soils that may be present in the waste fill, placement of the Project's PV panels on Landfill 15 may cause differential settlement and compromise the integrity of the cap.[114] This, in turn, could contaminate groundwater and the San Pablo Bay.[115] The DEIR fails to adequately disclose, analyze and mitigate the Project's significant water quality impacts from differential settlement.

According to Appendix B to the DEIR, Landfill 15 has already settled more than a foot and the estimated lifetime settlement of Landfill 15 is 3.2 feet.[116] Further, "settlement is likely to continue, especially if additional material is placed on the cap."[117] Soft soils may be present in the waste fill and differential settlement could affect the liner.[118]

In his comments, Mr. Hagemann explains that "infiltration of water through a landfill cap will increase the generation of landfill leachate, potentially mobilizing contamination that could move offsite in groundwater."[119] Chemical components of Landfill 15 wastes, including volatile organic compounds, semi-volatile organic compounds, heavy metals and petroleum hydrocarbons, "may dissolve into groundwater and become mobile. If mobilized, the contaminated groundwater may move toward and enter the adjacent San Pablo Bay, a water body that is listed as impaired by the San Francisco Bay Regional Water Quality Control Board under the Clean Water Act, Section 303(d) for pesticides, dioxins and furans, and mercury."[120] Mr. Hagemann notes that other proposals to develop utility scale solar projects on landfills have been rejected. For example, Stanislaus County found that

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[112] ARCADIS, 2012. Landfill 15 Solar Array Installation – Engineering and Regulator Evaluation Presentation.
[113] *Id.*
[114] Hagemann Comments, p.2.
[115] *Id.*
[116] DEIR, Appendix B, p. 5.
[117] *Id.*
[118] Hagemann Comments, pp. 2-3 (referencing ARCADIS, 2012. Landfill 15 Solar Array Installation – Engineering and Regulatory Evaluation Presentation).
[119] *Id.*, p. 2.
[120] *Id.*

a landfill being considered for construction of the McHenry Solar Farm "would not be suitable for a utility-scale solar project due to differential settling of the landfill and construction restrictions on the landfill cap."[121]

Appendix B to the DEIR acknowledges that an "updated settlement evaluation will be necessary considering the increased loading due to placement of backfill and solar arrays on site."[122] Despite this, the DEIR provides no analysis of water quality impacts from differential settlement at Landfill 15. The DEIR provides no information on the ability of the liner to handle the significant weight of the PV panels and their ballasted footings.

DEIR mitigation measure HAZ-1(a) requires the applicant to provide, prior to issuance of building permits, parameters "to assure that the solar project would not reduce the effectiveness of the remediation measures currently implemented in the solar site area."[123] This measure fails to satisfy CEQA because it defers evaluation and mitigation of the Project's potentially significant impacts, including impacts on water quality and from hazards, from differential settlement until after Project approval. MCE must prepare a revised DEIR that analyzes differential settlement and mitigates significant impacts, including those on water quality and from hazards from settlement of the landfill cap. Mr. Hagemann recommends that the evaluation consider the potential to encounter soft soils during construction and include the loads of the construction equipment and solar panel infrastructure that would be placed on the cap.[124] Mr. Hagemann also recommends feasible measures to ensure that differential settlement does not affect the cap, including: (1) a survey, to be conducted once per year, to measure any settlement that is occurring; and (2) a thorough visual inspection of the landfill cap, once per year, to ensure any settlement has not caused a breach of the cap that would allow for percolation of runoff in the area of the array.[125]

The DEIR fails to evaluate and improperly defers assessment of the Project's forseeable potential to cause differential settlement and the Project's significant impacts from differential settlement. As a result, the DEIR fails to identify feasible mitigation measures to reduce the Project's impacts to less than significant.

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[121] *Id.*, p. 3.
[122] DEIR, Appendix B, p. 5.
[123] DEIR, p. 4.2-10.
[124] Hagemann Comments, p. 3.
[125] *Id.*

B. The DEIR Fails to Disclose, Analyze and Mitigate Water Quality Impacts from Increased Runoff and Erosion of the Landfill Cap

The DEIR states that "[t]he project is not anticipated to substantially affect runoff since the proposed project includes minimal changes in existing natural landforms, ongoing vegetation maintenance efforts during construction and operation, and limited areas of compaction."[126] This statement is unsupported. On the contrary, substantial evidence shows that the Project may cause significant water quality impacts from increased runoff and erosion of the cap.

First, the ARCADIS report referenced in Appendix B of the DEIR states that "new relatively impervious surfaces [such as solar panels] will cause an increased rate of runoff discharge during storm events."[127]

Second, Mr. Hagemann explains that "just 12 inches of soil (including 6 inches of 'random fill' [ ]) overlie an impermeable or relatively impermeable plastic membrane in areas of the Landfill 15 cap. Given the uncertain engineering properties of 'top soil' and 'random fill' and shallowness of these materials, [the DEIR's] conclusion is unsupported."[128] A revised DEIR must include information on the infiltration capacity of these materials, including measurements of porosity and permeability.

Third, the DEIR acknowledges that "it is anticipated that the 'drip line' effect of the modules, where surface runoff in direct response to precipitation events would be concentrated along the lowest edge of PV module installations, could cause localized increases in erosion."[129] However, the DEIR fails to address how "localized increases in erosion" might impact Landfill 15's soil/random fill layer or the stability of the underlying plastic membrane. According to Mr. Hagemann, erosion of cap soils would limit the growth of vegetation on the cap, resulting in limited potential for evapotranspiration.[130] Erosion of cap soils could also directly expose the plastic membrane to sunlight, causing UV-degradation and the potential for

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[126] DEIR, p. 4.3-10.
[127] ARCADIS, 2012. Landfill 15 Solar Array Installation – Engineering and Regulator Evaluation Presentation as referenced in the DEIR, p. 7-1
[128] Hagemann Comments, p. 4.
[129] DEIR, p. 4.3-10.
[130] Hagemann Comments, p. 4.

leakage.[131] An increase in leakage would cause greater infiltration, generating additional leachate which may lead to migration of contaminants offsite via groundwater.[132]

The DEIR fails to disclose, analyze or mitigate the Project's potentially significant water quality and hazard impacts from increased runoff and erosion of the landfill cap. The DEIR must be revised accordingly and circulated for public review and comment.

C. The DEIR Fails to Disclose, Analyze and Mitigate Water Quality, Biological and Public Health Impacts from Pile Driving on the Fertilizer Ponds

The Project includes construction of a pole-mounted solar array in the area of the former fertilizer ponds. Pole-mounting requires the use of pile driving. In Mr. Hagemann's opinion, this could mobilize contaminants, exposing people and aquatic organisms to toxic compounds, including arsenic, beryllium, cadmium, and cobalt. The DEIR fails to disclose, analyze or mitigate the Project's water quality, biological and public health impacts from pile driving on the fertilizer ponds.

The DEIR claims that "the likelihood that construction workers or operational staff could be exposed to residual chemicals in on-site soils is minor" because the "area contains clean, compacted fill."[133] However, the depth of fill on the fertilizer ponds is unknown. In fact, there is no evidence of any fill (or any cover, liner or cap) on the fertilizer pond.[134] Therefore, the DEIR's claim is unsupported.

On the contrary, substantial evidence shows that pile driving on the fertilizer ponds may expose people, water and aquatic organisms to toxic compounds. Mr. Hagemann explains that:

> driving piles into a layer of material of unknown thickness and unknown permeability may create conduits through which water may infiltrate and

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[131] *Id.*
[132] *Id.*
[133] DEIR, p. 4.2-9.
[134] Hagemann Comments, p. 5.

> move down to contact underlying contaminants. The underlying contaminants may be mobilized in this process to move with groundwater offsite and eventually toward San Pablo Bay, which is listed by the San Francisco Bay Regional Water Quality Control Board as an impaired water body.[135]

Mr. Hagemann recommends that an engineering evaluation of the material that covers the former fertilizer ponds be performed to assess the impacts from the Project's construction. According to Mr. Hagemann, the evaluation should include measurements of the thicknesses and permeability of the material and the integrity of the material as a barrier to infiltration.[136] In addition, the evaluation should determine the potential for the pole mounted supports to act as hydraulic conduits for downward infiltration into soil and mobilization of underlying contaminants.[137] Finally, Mr. Hagemann recommends that MCE evaluate construction worker health and safety implications from driving piles into underlying contaminants. Without this assessment, the DEIR's evaluation of the Project's impacts on public health and the environment is incomplete in violation of CEQA.

VII. THE DEIR FAILS TO DISCLOSE THE PROJECT'S INCONSISTENCIES WITH THE CITY OF RICHMOND'S GENERAL PLAN

Under California law, a general plan serves as a "charter for future development"[138] and embodies "fundamental land use decisions that guide the future growth and development of cities and counties."[139] The general plan has been aptly described as "the constitution for all future developments" within a city or county.[140] Further, the "propriety of virtually any local decision affecting land use and development depends upon consistency with the applicable general plan and its elements."[141] The consistency doctrine has been described as the "linchpin

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[135] *Id.*, p. 6.
[136] *Id.*
[137] *Id.*
[138] *Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal.3d 531, 54.
[139] *City of Santa Ana v. City of Garden Grove* (1979) 100 Cal.App.3d 521, 532.
[140] *Families Unafraid to Uphold Rural El Dorado County v. Board of Supervisors of El Dorado County* (1998) 62 Cal.App.4th 1334, 1335.
[141] *Citizens of Goleta Valley v. Board of Supervisors of County of Santa Barbara* (1990) 52 Cal.3d 553, 570.

of California's land use and development laws; it is the principle which infuses the concept of planned growth with the force of law."[142]

The DEIR fails to acknowledge the Project's conflicts with a number of the City of Richmond's General Plan goals and policies. These goals and policies were adopted for the purpose of avoiding or mitigating environmental impacts.[143] Therefore, these inconsistencies are significant environmental impacts. MCE must revisit the DEIR's General Plan consistency analysis and must disclose and mitigate any inconsistencies in a revised DEIR that is circulated for public review and comment. The following are examples of these inconsistencies:

A. The Project is Inconsistent with Goal CN3 and Policy CN3.2 -- Water Quality

The purpose of Goal CN3 and Policy CN3.2 is to protect, maintain and improve water quality and the overall health of the watershed.[144] The Project is inconsistent with this goal and policy because, as described above, the Project may contaminate groundwater and the San Pablo Bay from placing PV panels on Landfill 15 and the former fertilizer ponds.

B. The Project is Inconsistent with Policy CN1.1 -- Habitat and Biological Resources Protection and Restoration

Policy CN1.1 states,

> [a]t a minimum, require mitigation of impacts to sensitive species ensuring that a project does not contribute to the decline of the affected species populations in the region. Identify mitigations in coordination with the U.S. Fish and Wildlife service, the California Department of Fish and Game [now CDFW] and other regulatory agencies.[145]

There is no evidence that MCE has coordinated with the USFWS or CDFW to formulate appropriate mitigation for the Project. On the contrary, several

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[142] *Corona-Norco Unified School District v. City of Corona* (1993) 17 Cal.App.4th 985, 994.
[143] CEQA Guidelines §X(b).
[144] City of Richmond General Plan, Goal CN3 and Policy CN3.2.
[145] City of Richmond General Plan, Policy CN1.1.

discrepancies between the mitigation measures proposed in the DEIR and those promulgated by the USFWS and CDFW suggest a lack of coordination with the resource agencies. For example, MCE's surveys did not adhere to the USFWS and CDFW survey protocols for rare plants, burrowing owls or Ridgway's rail. The DEIR also fails to incorporate mitigation for potentially significant impacts from avian collisions with solar arrays. In addition, the DEIR fails to require consultation for potentially significant impacts to listed species. Finally, the burrowing owl mitigation proposed in the DEIR fails to adhere to CDFW mitigation guidelines.

In sum, the DEIR fails to identify and mitigate significant impacts due to the Project' s inconsistencies with General Plan goals and policies that were adopted for the purpose of avoiding or mitigating environmental impacts.

VIII. CONCLUSION

The DEIR fails to adequately describe the Project or the existing setting, and fails to disclose, analyze and mitigate numerous significant impacts from the Project. Therefore, the DEIR fails to comply with CEQA. The DEIR also fails to disclose the Project's inconsistencies with the City of Richmond's General Plan. MCE cannot approve the Project until it prepares a revised DEIR that resolves these issues and satisfies CEQA's requirements.

Sincerely,

Rachael Koss

REK:ric

Attachments

3285-018rc

ATTACHMENT A

Scott Cashen, M.S.—Independent Biological Resources Consultant

September 22, 2015

Ms. Rachael E. Koss
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Subject: Comments on the Draft Environmental Impact Report Prepared for the Richmond Solar PV Project

Dear Ms. Koss:

This letter contains my comments on the Draft Environmental Impact Report ("DEIR") prepared by Marin Clean Energy ("MCE") for the Richmond Solar PV Project ("Project"). MCE proposes to construct, operate, maintain, and decommission a 10.5-megawatt photovoltaic ("PV") solar generating facility on 60 acres of land in the City of Richmond, California.

I am an environmental biologist with 23 years of professional experience in wildlife ecology and natural resource management. I have served as a biological resources expert for over 100 projects, the majority of which have been renewable energy facilities. My experience and scope of work in this regard has included assisting various clients with evaluations of biological resource issues, reviewing environmental compliance documents prepared pursuant to the California Environmental Quality Act ("CEQA") and the National Environmental Policy Act ("NEPA"), and submitting written comments in response to CEQA and NEPA documents. My work on renewable energy projects has included the preparation of written and oral testimony for the California Energy Commission, California Public Utilities Commission, and U.S. district courts. In addition to my work on renewable energy projects, I have been involved in several scientific studies examining avian use of tidal marshlands in San Pablo, Suisun, and San Francisco Bays. My educational background includes a B.S. in Resource Management from the University of California at Berkeley, and a M.S. in Wildlife and Fisheries Science from the Pennsylvania State University.

I have gained particular knowledge of the biological resource issues associated with the Project through my work on numerous other projects in the San Francisco Bay Area, and through my work on numerous solar energy projects throughout the State of California. The comments herein are based on my review of the environmental documents prepared for the Project, a review of scientific literature pertaining to biological resources known to occur in the Project area, consultations with other biological resource experts, and the knowledge and experience I have acquired during more than 23 years of working in the field of natural resources management.

THE DEIR FAILS TO ADEQUATELY DESCRIBE EXISTING CONDITIONS

Inadequate Survey Effort

According to the DEIR, analysis of impacts to sensitive biological resources on the 60-acre Project site:

> "incorporates results of a reconnaissance-level field survey conducted within the project site by Rincon biologists on January 26, 2015. This field survey documented existing site conditions, the presence of any special status plant and animal species, sensitive vegetation communities, jurisdictional waters and wetlands, riparian habitat, and the potential suitability of onsite habitats to support special status species and/or nesting birds, based on our review of biological databases, literature, and agency documents. We did not, however, perform protocol-level special status species surveys at the time of this reconnaissance-level survey."[1]

This information is insufficient to evaluate direct and indirect impacts to sensitive biological resources, and perhaps more importantly, to ensure effective mitigation. Specifically,

1. The DEIR fails to describe the survey methods, including the level of effort (e.g., man-hours) and techniques that were used to detect plant and animals species.
2. The DEIR fails to identify the search area. However, based on the map provided in the DEIR, the search area apparently was limited to the Project footprint and perhaps the tidal channel between the fertilizer pond and landfill (i.e., it excluded habitats north and south of the Project site that could be subject to indirect impacts).[2]
3. The DEIR provides no information on the habitat conditions (e.g., vegetation species, water depth, canopy cover, and habitat patch size) associated with: (a) the tidal marsh that bisects the Project site, (b) the freshwater emergent marsh immediately south of the Project site, and (c) the ponds immediately north of the Project site.[3] This precludes an understanding of habitat conditions for special-status plants and animals.
4. The DEIR does not provide a complete list of the plant species detected during the reconnaissance-level survey.
5. The DEIR's list of wildlife detected during the survey is limited to seven species.[4] This indicates the biologists spent minimal effort attempting to detect wildlife, or that the DEIR does not provide a complete list of species detected during the survey.
6. Due to the timing of the survey (January), it was incapable of documenting birds that occur at the Project site during the breeding season. In addition, most of the

[1] DEIR, p. 4.1-1.

[2] *Ibid*, Figure 4.1-1.

[3] *Ibid* and p. 4.1-2.

[4] *Ibid*, p. 4.1-2.

special-status plant species that could occur at the site would not have been evident and identifiable.[5]

These deficiencies, and the lack of comprehensive survey data, preclude reliable impact analyses and effective mitigation.

Habitat for Special-Status Plants and Animals

The DEIR provides a table of special-status plant species and the author's opinion regarding the potential for each species to occur on the Project site.[6] The DEIR, however, does not provide any information on the potential for each species to occur outside of the Project footprint in areas that may be subject to indirect impacts (e.g., within the tidal channel between the fertilizer pond and landfill).

The DEIR also provides a table of special-status animal species that could occur at the Project site.[7] Similar to the table of special-status plants, the table of special-status animals does not provide the information needed to assess potentially significant, indirect effects of the Project on those animals. For example, the DEIR indicates suitable nesting habitat for the California clapper rail is "not present on site," but that the species "may forage in adjacent salt and freshwater marshes."[8] However, the DEIR does not indicate whether there is suitable nesting habitat for the California clapper rail in the adjacent marshes. This precludes the ability to evaluate potentially significant indirect impacts and the sufficiency of the DEIR's proposed mitigation (i.e., pre-construction nesting bird surveys).

Raptor Use of the Project Site

The DEIR provides inconsistent and unreliable information on raptor use of the Project site. Specifically, the DEIR states there have been "limited observations of burrowing owl, northern harrier, short-eared owl and white-tailed kite within the vicinity of the project site over the last five years."[9] This conflicts with the DEIR's statement that there have been "numerous" observations of white-tailed kites and northern harriers within two miles of the Project site.[10]

MCE's consultant did not conduct surveys to establish raptor use of the Project site (and surrounding vicinity).[11] A single reconnaissance-level survey during the non-breeding season is insufficient to establish raptor use of the Project site. Consequently, the DEIR relies on information from two databases: (1) the California Natural Diversity Database

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[5] *See blooming periods reported in* DEIR, Table 4.1-1.

[6] DEIR, Table 4.1-1.

[7] *Ibid*, Table 4.1-2.

[8] *Ibid.* The California clapper rail is now called Ridgway's rail.

[9] *Ibid*, p. 4.1-24.

[10] *Ibid*, p. 4.1-15.

[11] *Ibid*, p. 4.1-1.

("CNDDB"); and (2) the eBird database.[12] MCE and its consultant cannot use these databases to make inferences on raptor use of the Project site. The CNDDB and eBird are "positive sighting" databases, which means they are entirely dependent on survey effort and the subsequent submittal of the survey data to the database(s).[13] The Project site and many of the surrounding properties are located on private land that is inaccessible to the public. As a result, one would expect the CNDDB and eBird databases to have "limited" records of burrowing owl, northern harrier, short-eared owl, and white-tailed kite in the vicinity of the Project site (i.e., because individuals interested in surveying the land and submitting their data to the databases have been unable to do so).

Burrowing Owl

Although the Project site provides habitat for burrowing owls, MCE's consultant did not conduct the surveys necessary to establish burrowing owl use of the site.[14] Instead, the consultant's efforts were limited to a single reconnaissance-level survey during January, which is an unreliable time of the year for establishing owl use of the site. The California Department of Fish and Wildlife's ("CDFW") Staff Report on Burrowing Owl Mitigation ("Staff Report") states:

> "Non-breeding season (1 September to 31 January) surveys may provide information on burrowing owl occupancy, but do not substitute for breeding season surveys because results are typically inconclusive. Burrowing owls are more difficult to detect during the non-breeding season and their seasonal residency status is difficult to ascertain."[15]

Burrowing owls can be difficult to detect due to their cryptic coloration, extensive use of burrows, and tendency to flush (fly away) when approached.[16] As a result, burrowing owl researchers and the CDFW have concluded that: (a) four independent surveys are necessary to provide reliable information on the presence of burrowing owls; and (b) data from the four surveys is essential to avoiding, minimizing, and properly mitigating the impacts of a project.[17]

Because MCE's consultant failed to implement the CDFW survey protocol, there is insufficient information to fully disclose and evaluate Project impacts to burrowing owls, and perhaps more importantly, to ensure effective mitigation. The need to establish the

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[12] DEIR, pp. 4.1-1 and -15.

[13] *See* Bittman R. 2001. The California Natural Diversity Database: A Natural Heritage Program for Rare Species and Vegetation. Fremontia Vol. 29(3/4):57-62.

[14] DEIR, pp. 4.1-2, -8, -13, -15, and -23.

[15] California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. p. 6 and Appendix D. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843>.

[16] Klute DS, LW Ayers, MT Green, WH Howe, SL Jones, JA Shaffer, SR Sheffield, TS Zimmerman. 2003. Status assessment and conservation plan for the western Burrowing Owl in the United States. Bio Tech Pub FWS/BTP-R6001-2003. Washington: US Fish and Wildlife.

[17] *See Appendix D In:* California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. Available at: <www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf>.

baseline population of burrowing owls on a site prior to assessing impacts and mitigation measures is emphasized in CDFW's Staff Report, which states:

> "Adequate information about burrowing owls present in and adjacent to an area that will be disturbed by a project or activity will enable the Department, reviewing agencies and the public to effectively assess potential impacts and will guide the development of avoidance, minimization, and mitigation measures."[18]

It is not possible to effectively assess the extent of Project impacts on burrowing owls until surveys that adhere to CDFW guidelines have been conducted. As a result, MCE must conduct the protocol surveys described in CDFW's Staff Report, and the results of those surveys need to be released in a revised DEIR so that they can be thoroughly vetted by the public, resource agencies, and decision makers during the CEQA review process. This is especially important because the presence of a burrowing owl nest site at the Project site would represent the only known nest site in western Contra Costa County, and any impacts to owls at that nest site would have significant implications on conservation of the species.[19]

Botanical Resources

CDFW survey guidelines indicate protocol-level botanical surveys should be conducted when:

- Natural (or naturalized) vegetation occurs on the site, and it is unknown if special status plant species or natural communities occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- Special status plants or natural communities have historically been identified on the project site; or
- Special status plants or natural communities occur on sites with similar physical and biological properties as the project site.[20]

The Project site satisfies the first two criteria because: (1) natural (or naturalized) vegetation occurs on the site; (2) and a special natural community occurs on the site. In addition, the Project site potentially satisfies the third criterion because special-status plants are known to occur on non-native grasslands in Contra Costa County.[21] Therefore, to establish existing conditions and comply with CDFW guidelines MCE needs to conduct appropriately timed floristic surveys throughout all portions of the Project site

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[18] *Ibid,* p. 6.

[19] California Natural Diversity Database. 2015 Sep 1. RareFind 5 [Internet]. California Department of Fish and Wildlife.

[20] California Department of Fish and Game. 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Available at: <http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html#Plants>.

[21] California Natural Diversity Database. 2015 Sep 1. RareFind 5 [Internet]. California Department of Fish and Wildlife.

and buffer zone containing natural or naturalized vegetation.[22] Data from those surveys are required to fully assess existing conditions, analyze Project impacts, and formulate appropriate mitigation for impacts to sensitive botanical resources.

MCE's consultant did not conduct protocol-level botanical surveys, and due to the timing of the reconnaissance-level survey (January 2015), the consultant would have been incapable of detecting special-status plants present on the Project site.[23] Despite these shortcomings, the DEIR jumps to the conclusion that the Project site does not contain suitable habitat for special-status plant species because it is dominated by non-native and ruderal plant species (although the DEIR subsequently states most special-status plant species are *not expected* to occur and those that *may* occur have a low probability of being adversely affected by the proposed Project).[24] The presence of non-native and ruderal plants does not preclude the presence of special-status species. CNDDB records demonstrate that some of the special-status species that could occur at the Project site occupy disturbed sites dominated by non-native plants. For example, Santa Cruz tarplant (a federally threatened and state endangered species) is known to occur in many non-native grasslands, including a location where "topsoil was dumped during construction of houses."[25] Another population is "limited to the sides of a heavily used path" and reappeared in response to disturbance caused by road grading.[26]

Because MCE did not conduct botanical surveys, and because special-status plants can occur in disturbed environments, the DEIR has no basis to conclude Project impacts to special-status plants would be less than significant.

Salt-Marsh Harvest Mouse and San Pablo Vole

The salt-marsh harvest mouse is a federally and state listed endangered species with an element rank of G1G2/S1S2. Although not disclosed in the DEIR, it is also "Fully Protected" under California Fish and Game Code.[27] The element rank G1G2/S1S2 indicates the salt-marsh harvest mouse has a high to very high risk of extinction at both the global and statewide levels.[28]

The San Pablo vole is a California Species of Special Concern with an element rank of G5T2T1/S1S2. The San Pablo vole's element rank indicates it has a high to very high risk of extinction at both the global and statewide levels.[29]

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[22] Floristic surveys are defined by CDFW as "every plant taxon that occurs on site is identified to the taxonomic level necessary to determine rarity and listing status."

[23] *See blooming periods reported in* DEIR, Table 4.1-1.

[24] DEIR, pp. 4.1-13 and -23.

[25] California Natural Diversity Database. 2015 Sep 1. RareFind 5 [Internet]. California Department of Fish and Wildlife. EO Index #7408.

[26] *Ibid*, EO Index #7403.

[27] *See* <https://www.dfg.ca.gov/wildlife/nongame/t_e_spp/fully_pro.html>.

[28] California Department of Fish and Wildlife, Natural Diversity Database. July 2015. Special Animals List. Periodic publication. 51 pp. Available at: <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf>.

[29] *Ibid.*

The DEIR states the Project site does not provide suitable habitat for the salt-marsh harvest mouse or San Pablo vole.[30] This appears to conflict with the Chevron Refinery Modernization Project EIR, which concluded the salt-marsh harvest mouse, Suisun ornate shrew, saltmarsh wandering shrew, and San Pablo vole could disperse through the solar facility site from nearby degraded marsh habitat.[31] By definition, habitat is defined by the behaviors of the organism.[32] Therefore, if these species could disperse through the solar facility site, the site provides habitat (i.e., dispersal habitat).

The statement that the Project site does not provide suitable habitat for the salt-marsh harvest mouse or San Pablo vole contradicts scientific information. Both species frequently utilize terrestrial grassland habitats adjacent to tidal marsh, similar to the habitat present at the Project site.[33] According to the federal Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California:

- "The basic habitat of the salt marsh harvest mouse is *Sarcocornia*-dominated vegetation (Dixon 1908, Fisler 1965). Other highly important habitat considerations include...*seasonal use of terrestrial grassland*..."[34]
- "Studies conducted jointly by CDFW and CDWR have shown that salt marsh harvest mice move at least 100 meters (109 yds) from tidal wetland edges (Sustaita *et. al,* in press)."[35]
- "Salt marsh harvest mice in eastern San Pablo Bay and Suisun Marsh (northern subspecies) appear to be widespread in terrestrial grasslands and grassland-brackish marsh ecotones."[36]
- "Salt marsh harvest mice are sometimes also found in significant numbers in grasslands at the upper edge of diked marshes around San Francisco Bay."[37]
- "Studies have documented ecologically significant numbers of salt marsh harvest mice in what have been historically termed marginal, atypical, and suboptimal habitats."[38]

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[30] DEIR, Table 4.1-2 and p. 4.1-13.

[31] *Ibid*, p. 4.1-13.

[32] Morrison ML, BG Marcot, and RW Mannan. 2006. Wildlife-Habitat Relationships: Concepts and Applications. 3rd ed. Washington (DC): Island Press. 493 p.

[33] U.S. Fish and Wildlife Service. 2013. Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Vol I, pp. 125 through 139 and Vol II, pp. 25 though 28.

[34] *Ibid*, p. 133. [emphasis added].

[35] *Ibid,* p. 134.

[36] *Ibid.*

[37] *Ibid.*

[38] *Ibid*, p. 135.

San Pablo voles are known to occupy grassland habitats adjacent to salt marshes, similar to the habitat present at the Project site. Indeed, numerous San Pablo voles have been detected on grassland habitat just north of the Project site.[39]

THE DEIR FAILS TO DISCLOSE AND ANALYZE ALL POTENTIALLY SIGNIFICANT IMPACTS

Burrowing Owl

CDFW's Staff Report recommends against exclusion and burrow closure unless all other possible avoidance and minimization measures have been considered. Because MCE's consultant did not conduct the surveys needed to determine burrow occupancy, MCE is unable to consider all other possible avoidance and minimization measures prior to Project construction. Nevertheless, it may be infeasible for MCE to avoid impacts to occupied burrowing owl burrows, and passive relocation of owls may be necessary. Although the CDFW has established protocols for passive relocation, there still may be a risk to burrowing owls, especially if passive relocation is not done properly. This conclusion is expressly supported by CDFW, which has concluded passive relocation is a potentially significant impact under CEQA that must be analyzed.[40] According to the CDFW, temporary or permanent closure of burrows may result in: (a) significant loss of burrows and habitat for reproduction and other life history requirements; (b) increased stress on burrowing owls and reduced reproductive rates; (c) increased depredation; (d) increased energetic costs; and (e) risks posed by having to find and compete for available burrows.[41] MCE must disclose and analyze the effects of passive relocation if those techniques might be implemented at the Project site.

A full analysis of potential impacts from passive relocation is further supported by research that indicates most translocation projects have resulted in fewer breeding pairs of burrowing owls at the mitigation site than at the original site, and that translocation projects generally have failed to produce self-sustaining populations.[42] Investigators attribute the limited success of translocation to: (a) strong site tenacity exhibited by burrowing owls, and (b) potential risks associated with forcing owls to move into unfamiliar and perhaps less preferable habitats.[43]

Valley Needlegrass Grassland

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[39] California Natural Diversity Database. 2015 Sep 1. RareFind 5 [Internet]. California Department of Fish and Wildlife.

[40] California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. p. 10. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843>.

[41] *Ibid.*

[42] Smith BW, JR Belthoff. 2001. Burrowing owls and development: short-distance nest burrow relocation to minimize construction impacts. J. Raptor Research 35:385-391.

[43] *Ibid.*

The DEIR indicates the Project has been designed to avoid direct impacts to the Valley Needlegrass Grassland community present on the Project site. However, the feasibility of avoiding direct impacts cannot be evaluated because the DEIR does not provide a site plan that depicts the location of the solar arrays and internal access roads in relation to the Valley Needlegrass Grassland community. Moreover, the DEIR fails to disclose and analyze the indirect impacts the Project could have on the Valley Needlegrass Grassland community (and other sensitive natural communities adjacent to the Project site). Indirect Project impacts to sensitive natural communities could occur from dust, erosion, spread of invasive weeds, and alterations in hydrology and light regimes (i.e., shade from solar modules). These indirect impacts are potentially significant and must be analyzed in a revised DEIR.

Grassland Birds

The DEIR provides the following analysis of the four special-status (grassland) bird species (burrowing owl, short-eared owl, white-tailed kite, and northern harrier) that MCE's consultant concluded could occur at Project site:

> "Non-native grassland provides marginal foraging habitat for some species including white-tailed kite, burrowing owl, and northern harrier. The project site represents a small portion of the non-native grassland habitat available to these species along the shores of the San Pablo Bay and San Rafael Bay and inland.[44] The permanent loss of the marginal non-native grassland habitat within the project site represents poor quality raptor foraging habitat and is a small and non-significant percentage of all suitable foraging habitat present within the broader San Francisco Bay region. Furthermore, based on the limited observations of burrowing owl, northern harrier, short-eared owl and white-tailed kite within the vicinity of the project site over the last five years, the loss of habitat on the project site is unlikely to adversely affect regional population numbers or contribute towards a trend to federal or state listing, or to the loss of viability to any special status population or species."[45]

As described below, this analysis is not supported by scientific evidence.

First, the DEIR does not provide any scientific evidence to support its claim that the Project site "represents a small portion of the non-native grassland habitat available to these [grassland] species along the shores of the San Pablo Bay and San Rafael Bay and inland." Data available through the Conservation Lands Network Explorer demonstrates that most grassland habitat that previously occurred around San Pablo Bay (which includes San Rafael Bay) has been lost to urban development (Figure 1).[46] The loss of grassland habitat in the San Francisco Bay Area has had, and continues to have, a significant effect on grassland bird species. Indeed, grassland birds in the Bay Area have declined by over 45% since 1968, which is considerably more than birds in any other

[44] San Rafael Bay is an embayment of San Pablo Bay.

[45] DEIR, p. 4.1-24.

[46] *See* <http://www.bayarealands.org/explorer/#>. (Accessed 2015 Sep 15).

habitat guild.[47]

Second, MCE's consultant did not conduct any studies to quantify the prey base for raptors at the Project site. Therefore, there is no basis to conclude the site "represents poor quality raptor foraging habitat" or that it is "a small and non-significant percentage of all suitable foraging habitat present within the broader San Francisco Bay region."

Third, the rationale that "based on the limited observations of burrowing owl, northern harrier, short-eared owl and white-tailed kite within the vicinity of the project site over the last five years, the loss of habitat on the project site is unlikely to adversely affect regional population numbers or contribute towards a trend to federal or state listing, or to the loss of viability to any special status population or species" is illogical. If the patches of habitats remaining in the Project region can support only a few birds (e.g., burrowing owls), then the loss of even one habitat patch could have significant implications on regional population numbers and viability. For example, burrowing owls have been extirpated or nearly extirpated from western Contra Costa County due to habitat loss associated with commercial and residential development.[48] Therefore, the loss of occupied burrowing owl habitat at the Project site would undoubtedly affect regional population numbers and contribute to a trend towards federal or state listing.

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[47] Pitkin M, J Wood (Editors). 2011. The State of the Birds, San Francisco Bay. PRBO Conservation Science and the San Francisco Bay Joint Venture. p. 22. Available at: <http://data.prbo.org/sfstateofthebirds/>.

[48] Townsend SE, C Lenihan. 2003. Burrowing Owl Status in the Greater San Francisco Bay Area. Proceedings of the California Burrowing Owl Syposium. Bird Populations Monographs No. 1:60-70. Available at: <http://www.calenv.com/California_Environmental_Services/Publications_files/Townsend%20and%20Lenihan_Burrowing%20Owl.pdf>.

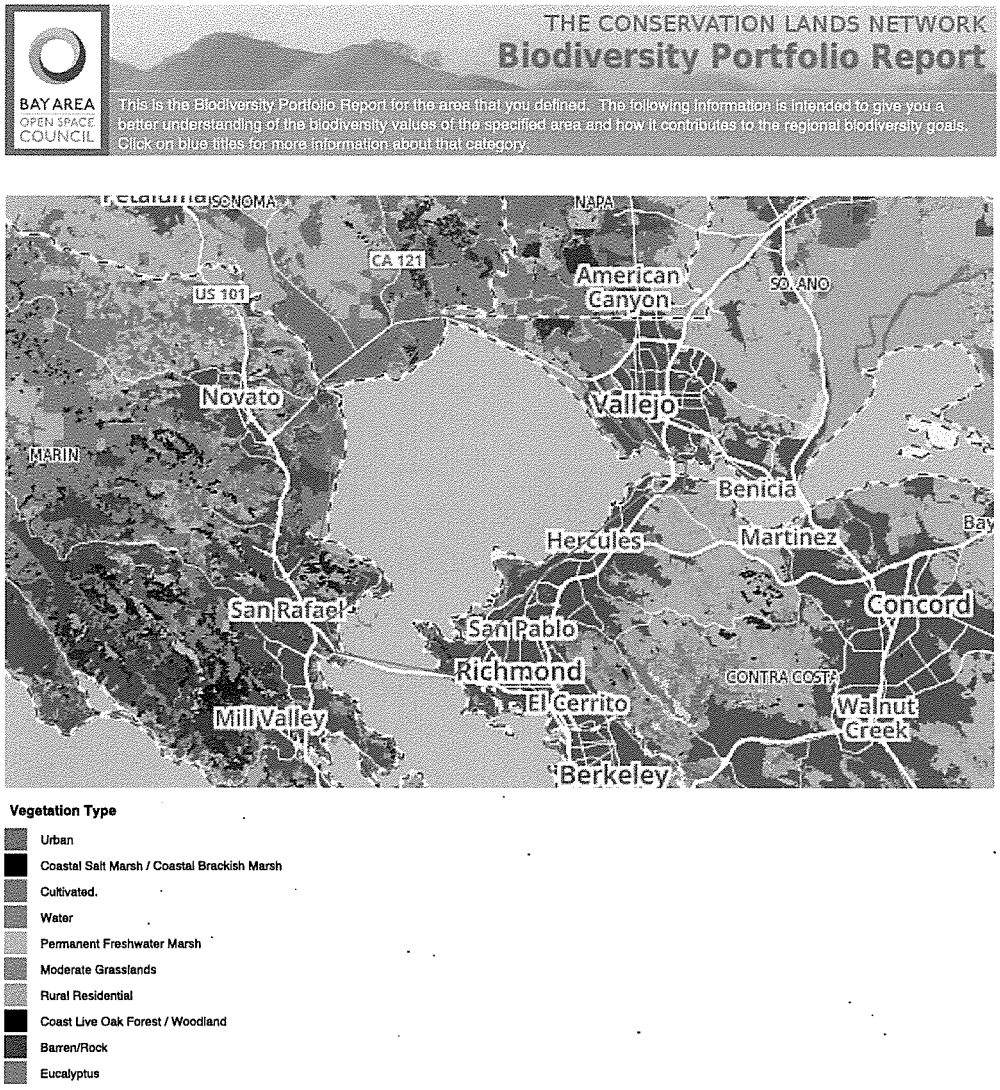

Figure 1. Vegetation types in the Project region.

Avian Collision Hazard

One hundred million to 1 billion birds are killed annually by daytime window collisions at low-level structures in the U.S. alone.[49] The visual system of birds is simply not capable of perceiving glass as a physical obstacle, or in distinguishing the illusion of habitat from what really is habitat.[50] Whereas the extent of the threat remains unknown, the presence of dead and injured birds at solar facilities operating (or under construction)

[49] Evans Ogden LJ. 2002. Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collision of Migratory Birds. Special Report for the Fatal Light Awareness Program (FLAP). Available at: http://www.flap.org/.

[50] Klem D Jr. 2009. Preventing Bird-Window Collisions. The Wilson Journal of Ornithology 121(2):314–321.

in California demonstrates that solar arrays present a collision hazard to birds.[51] At PV facilities, birds appear to mistake the broad reflective surfaces of the solar arrays for water, trees, and other attractive habitat.[52] When this occurs, the birds become susceptible to mortality by: (a) colliding with the solar arrays; or (b) becoming stranded (often injured) on a substrate from which they cannot take flight, thereby becoming susceptible to predation and starvation.[53]

There is also recent evidence that PV solar panels produce polarized light pollution that attracts insects, which in turn attract insect-eating birds.[54] Those birds then become susceptible to injury or death because they cannot distinguish insects on a PV panel that reflects attractive habitat from insects that really are on (or in) attractive habitat. Dead and injured insectivores then attract avian predators and scavengers, which too become susceptible to collision with the PV panels and other project features. As Kagan et al. (2014) reported, this creates an entire food chain vulnerable to injury and death.[55]

A recent study completed by the National Fish and Wildlife Forensics Laboratory (2014) reported: "solar facilities appear to represent "equal-opportunity" hazards for the bird species that encounter them.[56] Although solar facilities kill all types of birds, monitoring reports have documented an unexpectedly high proportion of waterbird deaths at recently constructed solar project sites, including those that use PV solar panels.[57] This phenomenon appears to be due to waterbirds mistaking the PV arrays for a lake (or other water body). A letter from the United States Fish and Wildlife Service ("USFWS") confirms that this "lake effect" is a growing concern for all types of solar projects:

> "Incidental fatalities are increasingly being documented and reported at a range of solar projects. . . All [solar] technology types appear to present a hazard to water-associated bird species from the lake effect, based on the species composition of avian mortalities documented at ISEGS, Genesis (solar trough), and Desert Sunlight (photovoltaic) projects. The magnitude of this lake effect remains unclear, but may be location specific and may be correlated with migratory flyways or the availability of other habitat for migratory stopovers."[58]

The Project site is located along the Pacific Flyway. It is approximately one mile from San Francisco Bay ("SF Bay") and immediately adjacent to several water features (i.e., ponds and marshes). SF Bay is recognized as a Western Hemisphere Shorebird Reserve

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[51] Kagan RA, TC Viner, PW Trail, EO Espinoza. 2014. Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis. National Fish and Wildlife Forensics Laboratory. 28 pp.

[52] *Ibid.*

[53] *Ibid.*

[54] *Ibid.*

[55] *Ibid.*

[56] *Ibid.*

[57] *See* <http://www.kcet.org/news/rewire/solar/water-birds-turning-up-dead-at-solar-projects-in-desert.html>.

[58] Letter from Kennon Corey, U.S. Fish and Wildlife Service, to Christine Stora, California Energy Commission dated August 7, 2014 (emphasis added). A copy of this letter is attached hereto.

Network Site of Hemispheric Importance for shorebirds—the highest possible ranking.[59] It is one of the most important wetland sites along the Pacific coast for waterbirds, hosting millions of wintering and breeding shorebirds, waterfowl, and other birds annually.[60] Additionally, tidal marsh and upland habitat support large populations of landbirds around the SF Bay.[61] Due to the Project's location in relation to SF Bay and other aquatic habitat, there is a heightened risk that birds will mistake the Project's solar arrays for water, resulting in bird strikes and entrapment.

The USFWS concluded in its analysis of another solar facility that, given the large sizes of existing and proposed PV facilities, and the lack of opportunity for effective adaptive management measures and other design modifications sufficient to avoid take of birds, PV facilities could have significant effects on migratory birds.[62] I concur with this conclusion.

The Project poses an especially significant risk to the federally endangered Ridgway's rail (*Rallus obsoletus obsoletus*; formerly California clapper rail). To date, solar PV facilities have killed two federally endangered Yuma rails (*R. o. yumanensis*; formerly Yuma clapper rail), a related subspecies, and several soras and Virginia rails.[63] Collectively, the data indicate PV facilities pose a mortality risk to all rail species.[64]

The DEIR does not disclose or analyze the potential for the Project to kill and injure birds due to the "lake effect" and other factors discussed above. As a result, the DEIR must be revised and recirculated to inform the public and decision makers of the potential risks associated with constructing a PV power plant in an area that is heavily populated by birds, including numerous species that are listed as Threatened or Endangered.

MITIGATION ISSUES

Compliance with Richmond's General Plan

Richmond's General Plan states: "[a]t a minimum, require mitigation of impacts to sensitive species ensuring that a project does not contribute to the decline of the affected species populations in the region. Identify mitigations in coordination with the U.S. Fish and Wildlife service, the California Department of Fish and Game [now CDFW] and

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[59] *See* <http://www.whsrn.org/site-profile/san-francisco-bay>.

[60] Cormier R, M Pitkin. 2008. Pocket Guide to Birds of San Francisco Bay. PRBO Conservation Science and California Partners in Flight. p. 5. Available at: <http://www.pointblue.org/uploads/assets/education/SFBayBirdPocketGuide4webPDFreduced.pdf>. *See also* Pitkin M, J Wood (Editors). 2011. The State of the Birds, San Francisco Bay. PRBO Conservation Science and the San Francisco Bay Joint Venture. Available at: <http://data.prbo.org/sfstateofthebirds/>.

[61] *Ibid.*

[62] U.S. Fish and Wildlife Service. 2014 Aug 4. Comments on the Draft Environmental Impact Report (EIR 529) for the Blythe Mesa Solar Project (CUP 2685), Riverside County, California.

[63] *Ibid.*

[64] *Ibid.*

other regulatory agencies."[65] The DEIR lacks any evidence that MCE has coordinated with the USFWS and CDFW to formulate appropriate mitigation. To the contrary, discrepancies between the mitigation measures proposed in the DEIR and those promulgated by the USFWS and CDFW (including survey guidelines) suggest a lack of coordination with the resource agencies. For example, MCE's surveys did not adhere to the USFWS and CDFW survey protocols for rare plants, burrowing owls, and Ridgway's rail; the DEIR does not incorporate mitigation for potentially significant impacts due to avian collisions with solar arrays; the DEIR does not require consultation for potentially significant impacts to listed species; and the burrowing owl mitigation proposed in the DEIR does not adhere to CDFW mitigation guidelines (discussed further below).

Nesting Birds

Most nesting bird species are protected by the Migratory Bird Treaty Act, and in some cases the State and federal government. The DEIR indicates MCE will conduct pre-construction surveys for nesting birds within 500 feet of proposed disturbance areas.[66] The DEIR, however, does not establish minimum standards for the survey effort, including the need to adhere to scientific standards for nest site detection.

Nest finding is labor intensive and can be extremely difficult due to the tendency of many species to construct well-concealed or camouflaged nests.[67] As a result, most studies that involve locating bird nests employ a variety of search techniques. These include flushing an adult from the nest, watching parental behavior (e.g., carrying nest material or food), and systematically searching nesting substrates.[68] In addition, breeding birds are known to be most active and detectable early in the morning, and there is a strong positive correlation between survey effort and abundance of nests detected.

Several of the bird species that have the potential to nest within 500 feet of the Project site are extremely difficult to detect. For example, the Ridgway's rail is a cryptic species that is extremely difficult to detect.[69] Rail nests are even more difficult to detect because they are located within tidal marsh habitat and are concealed by vegetation that has been pulled together to form a canopy over the nest site.[70] As a result, a single pre-

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[65] DEIR, p. 4.1-19.

[66] *Ibid*, p. 4.1-24.

[67] DeSante DF, GR Geupel. 1987. Landbird productivity in central coastal California: the relationship to annual rainfall and a reproductive failure in 1986. Condor. 89:636-653.

[68] Martin TE, GR Geupel. 1993. Nest-Monitoring Plots: Methods for Locating Nests and Monitoring Success. J. Field Ornithol. 64(4):507-519.

[69] Bui TVD, J Takekawa, CT Overton, ER Schultz, J Hull, ML Casazza. 2015. Movements of Radio-Marked California Ridgway's Rails During Monitoring Surveys: Implications for Population Monitoring. Journal of Fish and Wildlife Management 6(1):227-237. *See also* Liu L, N Nur, L Salas, J Wood, J McBroom, J Evens, G Block. 2011. Effects of survey timing and environmental factors on California Clapper Rail detection rates. Available at: <http://www.prbo.org/cms/docs/wetlands/Appendix1_LiuSOE2011.pdf>.

[70] U.S. Fish and Wildlife Service. 2013. Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Vol I, pp. 105 and 106.

construction survey is insufficient to avoid impacts to rails and many of the other species listed in the DEIR. Indeed, detection of rails requires specialized techniques (e.g., call playback) implemented across multiple weeks.[71] The USFWS's survey protocol for Ridgway's rails requires two passive surveys, followed by two active surveys, with surveys spaced at least two weeks apart between January 15 and mid-April.[72]

Consequently, any mitigation incorporated into the EIR needs to specify the techniques that should be applied to nest surveys, the expected level of effort (i.e., hours per unit area), the search area, the time of day surveys will be permitted, and the techniques that should be used to minimize human-induced disturbance.

Burrowing Owl

Burrowing owls have the potential to occur on and adjacent to the Project site. MCE's proposed mitigation for Project impacts to burrowing owls includes a pre-construction survey, establishment of buffer zones around active burrows, and the exclusion of owls from their burrows during the non-breeding season (which in itself is a potentially significant impact).

Pre-construction survey-

The DEIR requires MCE to conduct a pre-construction clearance survey for burrowing owls within 14 days prior to construction and ground disturbance activities.[73] This condition is not consistent with CDFW guidelines, which recommend an initial pre-construction survey within the 14 days prior to ground disturbance, followed by a subsequent survey within 24 hours prior to ground disturbance.[74] As CDFW's Staff Report acknowledges, "burrowing owls may re-colonize a site after only a few days."[75] As a result, a single pre-construction survey up to 14 days in advance of construction is insufficient to avoid and minimize take of burrowing owls.

Furthermore, CDFW's Staff Report makes it clear that the "take avoidance" (i.e., pre-construction) surveys for burrowing owls are not a substitute for the four surveys required to assess Project impacts and formulate appropriate mitigation. As a result, MCE must conduct the protocol surveys described by CDFW, and the results of those

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[71] Liu L, N Nur, L Salas, J Wood, J McBroom, J Evens, G Block. 2011. Effects of survey timing and environmental factors on California Clapper Rail detection rates. Available at: <http://www.prbo.org/cms/docs/wetlands/Appendix1_LiuSOE2011.pdf>. *See also* U.S. Fish and Wildlife Service. 2015. California Clapper Rail Survey Protocol. Available at: <http://www.fws.gov/sfbaydelta/documents/June_2015__Final_CCR_protocol.pdf>.

[72] U.S. Fish and Wildlife Service. 2015. California Clapper Rail Survey Protocol. Available at: <http://www.fws.gov/sfbaydelta/documents/June_2015__Final_CCR_protocol.pdf>.

[73] DEIR, p. 4.1-25.

[74] California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843>, pp. 29-30.

[75] *Ibid*, p. 30.

surveys need to be released in a revised CEQA document.[76]

Buffers-

The DEIR requires a 50-meter buffer around burrows occupied by burrowing owls during the non-breeding season and a 100-meter buffer around burrows occupied during the breeding season.[77] The proposed buffer distances are not consistent with CDFW standards, and thus they are not sufficient to protect burrowing owls. CDFW's Staff Report indicates that indirect impacts and appropriate mitigation should be determined through site-specific analyses that incorporate the wide variation in natal area, home range, foraging area, and other factors influencing burrowing owls and burrowing owl population persistence in a particular area.[78] However, CDFW's Staff Report indicates that activities involving a "low" level of disturbance should incorporate a buffer of 50 meters during the non-breeding season and 200 meters during the breeding season, but that those buffers should be extended to 500 meters for activities that involve a "high" level of disturbance.[79] Pile-driving, grading, and other activities associated with construction of a solar energy facility qualify as a "high" level of disturbance; therefore, a 500-meter buffer is warranted.

Habitat compensation-

The DEIR does not require MCE to provide compensatory mitigation for Project impacts to burrowing owls and their foraging habitat, even if owls are detected during pre-construction surveys. CDFW's Staff Report states:

> "the current scientific literature supports the conclusion that mitigation for permanent habitat loss necessitates replacement with an equivalent or greater habitat area for breeding, foraging, wintering, dispersal, presence of burrows, burrow surrogates, presence of fossorial mammal dens, well drained soils, and abundant and available prey within close proximity to the burrow."[80]

I concur with the CDFW, especially given the perilous status of the species in the Project region and the ongoing decline of the species throughout most of the state.[81]

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[76] *Ibid*, Appendix D.

[77] DEIR, p. 4.1-25.

[78] California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843>. p. 12.

[79] *Ibid*, p. 9.

[80] *Ibid*, p. 8.

[81] *Ibid. See also* Townsend SE, C Lenihan. 2003. Burrowing Owl Status in the Greater San Francisco Bay Area. Proceedings of the California Burrowing Owl Syposium. Bird Populations Monographs No. 1:60-70. Available at: <http://www.calenv.com/California_Environmental_Services/Publications_files/Townsend%20and%20Lenihan_Burrowing%20Owl.pdf>. *See also* Wilkerson RL and RB Siegel. 2010. Assessing changes in the distribution and abundance of burrowing owls in California, 1993-2007. Bird Populations 10: 1-36.

Avian Collisions

Substantial evidence shows that impacts from polarized-light pollution are potentially significant and must be mitigated. Consequently, MCE must analyze the avian collision hazard as a potentially significant impact, and it must provide adequate mitigation.

In May 2014 the USFWS sent a letter to solar developers in California and Nevada, stating: "recent information collected at solar facilities by Service personnel indicates that wildlife, particularly avian species, can be negatively affected by solar energy development."[82] The letter warned that unmitigated solar projects could result in unpermitted "take" of species protected under the Endangered Species Act and the Migratory Bird Treaty Act. Klem (2009) and Kagan et al. (2014) discussed several techniques (e.g., UV-reflective or solid, contrasting bands spaced no further than 28 cm from each other on arrays) that enable birds to avoid collisions with windows, and presumably solar panels.[83] The techniques described by Klem (2009) and Kagan et al. (2014) are feasible, and they should be incorporated as mitigation. MCE should also be required to implement a monitoring, reporting, and adaptive management plan during Project construction and during at least the first three years of operation.[84] The plan should be approved by the USFWS prior to implementation, and the public should have the opportunity to review the subsequent monitoring reports.

Because the Project site is located in close proximity to a relatively dense population of Ridgway's rails[85] it is likely to cause incidental take during its 30-year (or longer) lifespan. As a result, the EIR should incorporate a provision that requires MCE to apply for an incidental take permit from the USFWS.

Special-Status Mammals

The DEIR does not contain any measures to avoid, minimize, and mitigate impacts to the special-status mammal species that could be affected by the Project. Feasible mitigation includes clearance surveys (i.e., trapping), installation of a barrier fence, biological monitoring during construction, and the acquisition of compensatory mitigation. In addition, because the Project could affect the salt-marsh harvest mouse, MCE should be

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[82] Available at: <http://www.fws.gov/cno/images/Solar%20Letter%20template.pdf>.

[83] Klem D Jr. 2009. Preventing Bird-Window Collisions. The Wilson Journal of Ornithology 121(2):314–321. *See also* Kagan RA, TC Viner, PW Trail, EO Espinoza. 2014. Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis. National Fish and Wildlife Forensics Laboratory. 28 pp.

[84] U.S. Fish and Wildlife Service, Pacific Southwest Region. 2010 Sep. Region 8 Interim Guidelines for the Development of a Project-Specific Avian and Bat Protection Plan for Solar Energy Plants and Related Transmission Facilities. p. 10.

[85] Wood J, M Elrod. 2014. 2014 Annual Report to U.S. Fish and Wildlife Service: California Ridgway's Rail (*Rallus obsoletus obsoletus*). Point Blue Conservation Science. Available at: <http://www.pointblue.org/uploads/assets/admin/2014RIRAsurveyreport_FINAL.pdf>

required to consult with the USFWS and CDFW to determine measures needed to comply with the federal Endangered Species Act, California Endangered Species Act, and Section 4700 of the Fish and Game Code.

Weed Management

It is well established that construction and other ground disturbance activities promote the establishment and/or spread of non-native plants (i.e., weeds), both on and off-site. The introduction and spread of non-native plants as a result of the Project has the potential to result in numerous adverse environmental effects. For example, non-native plants can displace native (and perhaps sensitive) plant species, and they can degrade wildlife habitat by eliminating food sources, cover, and breeding sites. Incredibly, the DEIR does not disclose, analyze, or provide mitigation for these potentially significant impacts. As a result, potentially significant impacts due to the establishment and/or spread of non-native plants remain unmitigated.

CONCLUSION

As a result of the issues identified in this letter, it is my professional opinion that the DEIR does not accurately portray existing conditions pertaining to sensitive biological resources, and that it does not disclose all potentially significant Project impacts to those resources. Furthermore, it is my professional opinion that the DEIR does not provide the mitigation necessary to reduce impacts to sensitive biological resources to a less-than-significant level.

Sincerely,

Scott Cashen, M.S.
Senior Biologist

Scott Cashen, M.S.

Senior Biologist / Forest Ecologist

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Scott Cashen has 20 years of professional experience in natural resources management. During that time he has worked as a field biologist, forester, environmental consultant, and instructor of Wildlife Management. Mr. Cashen currently operates an independent consulting business that focuses on CEQA/NEPA compliance issues, endangered species, scientific field studies, and other topics that require a high level of scientific expertise.

Mr. Cashen has knowledge and experience with many taxa, biological resource issues, and environmental regulations. This knowledge and experience has made him a highly sought after biological resources expert. To date, he has been retained as a biological resources expert for over 40 projects. Mr. Cashen's role in this capacity has encompassed all stages of the environmental review process, from initial document review through litigation support and expert witness testimony.

Mr. Cashen is a recognized expert on the environmental impacts of renewable energy development. He has been involved in the environmental review process for 28 renewable energy projects, and he has been a biological resources expert for more of California's solar energy projects than any other private consultant. In 2010, Mr. Cashen testified on 5 of the Department of the Interior's "Top 6 Fast-tracked Solar Projects" and his testimony influenced the outcome of each of these projects.

Mr. Cashen is a versatile scientist capable of addressing numerous aspects of natural resource management simultaneously. Because of Mr. Cashen's expertise in both forestry and biology, Calfire had him prepare the biological resource assessments for all of its fuels treatment projects in Riverside and San Diego Counties following the 2003 Cedar Fire. Mr. Cashen has led field studies on several special-status species, including plants, fish, reptiles, amphibians, birds, and mammals. Mr. Cashen has been the technical editor of several resource management documents, and his strong scientific writing skills have enabled him to secure grant funding for several clients.

AREAS OF EXPERTISE

- CEQA, NEPA, and Endangered Species Act compliance issues
- Comprehensive biological resource assessments
- Endangered species management
- Renewable energy
- Forest fuels reduction and timber harvesting
- Scientific field studies, grant writing and technical editing

EDUCATION

M.S. Wildlife and Fisheries Science - The Pennsylvania State University (1998)
B.S. Resource Management - The University of California, Berkeley (1992)

PROFESSIONAL EXPERIENCE

Litigation Support / Expert Witness

As a biological resources expert, Mr. Cashen reviews CEQA/NEPA documents and provides his client(s) with an assessment of biological resource issues. He then prepares written comments on the scientific and legal adequacy of the project's environmental documents (e.g., EIR). For projects requiring California Energy Commission (CEC) approval, Mr. Cashen has submitted written testimony (opening and rebuttal) in conjunction with oral testimony before the CEC.

Mr. Cashen can lead field studies to generate evidence for legal testimony, and he can incorporate testimony from his deep network of species-specific experts. Mr. Cashen's clients have included law firms, non-profit organizations, and citizen groups.

REPRESENTATIVE EXPERIENCE

Solar Energy Facilities

- Abengoa Mojave Solar Project
- Avenal Energy Power Plant
- Beacon Solar Energy Project
- Blythe Solar Power Project
- Calico Solar Project
- Calipatria Solar Farm II
- Carrizo Energy Solar Farm
- Catalina Renewable Energy Project
- Fink Road Solar Farm
- Genesis Solar Energy Project
- Heber Solar Energy Facility
- Imperial Valley Solar Project
- Ivanpah Solar Electric Generating
- Maricopa Sun Solar Complex
- Mt. Signal and Calexico Solar
- San Joaquin Solar I & II
- Solar Gen II Projects
- SR Solis Oro Loma
- Vestal Solar Facilities
- Victorville 2 Power Project

Geothermal Energy Facilities

- East Brawley Geothermal
- Mammoth Pacific 1 Replacement
- Western GeoPower Plant and

Wind Energy Facilities

- Catalina Renewable Energy Project
- Ocotillo Express Wind Energy
- San Diego County Wind Ordinance
- Tres Vaqueros Repowering Project
- Vasco Winds Relicensing Project

Biomass Facilities

- Tracy Green Energy Project

Development Projects

- Alves Ranch
- Aviano
- Chula Vista Bayfront Master Plan
- Columbus Salame
- Concord Naval Weapons Station
- Faria Annexation
- Live Oak Master Plan
- Napa Pipe
- Roddy Ranch
- Rollingwood
- Sprint-Nextel Tower

Project Management

Mr. Cashen has managed several large-scale wildlife, forestry, and natural resource management projects. Many of these projects have required hiring and training field crews, coordinating with other professionals, and communicating with project stakeholders. Mr. Cashen's experience in study design, data collection, and scientific writing make him an effective project manager, and his background in several different natural resource disciplines enable him to address the many facets of contemporary land management in a cost-effective manner.

REPRESENTATIVE EXPERIENCE

Wildlife Studies

- Peninsular Bighorn Sheep Resource Use and Behavior Study: (*CA State Parks*)
- "KV" Spotted Owl and Northern Goshawk Inventory: (*USFS, Plumas NF*)
- Amphibian Inventory Project: (*USFS, Plumas NF*)
- San Mateo Creek Steelhead Restoration Project: (*Trout Unlimited and CA Coastal Conservancy, Orange County*)
- Delta Meadows State Park Special-status Species Inventory: (*CA State Parks, Locke*)

Natural Resources Management

- Mather Lake Resource Management Study and Plan – (*Sacramento County*)
- Placer County Vernal Pool Study – (*Placer County*)
- Weidemann Ranch Mitigation Project – (*Toll Brothers, Inc., San Ramon*)
- Ion Communities Biological Resource Assessments – (*Ion Communities, Riverside and San Bernardino Counties*)
- Del Rio Hills Biological Resource Assessment – (*The Wyro Company, Rio Vista*)

Forestry

- Forest Health Improvement Projects – (*CalFire, SD and Riverside Counties*)
- San Diego Bark Beetle Tree Removal Project – (*SDG&E, San Diego Co.*)
- San Diego Bark Beetle Tree Removal Project – (*San Diego County/NRCS*)
- Hillslope Monitoring Project – (*CalFire, throughout California*)

Biological Resources

Mr. Cashen has a diverse background with biological resources. He has conducted comprehensive biological resource assessments, habitat evaluations, species inventories, and scientific peer review. Mr. Cashen has led investigations on several special-status species, including ones focusing on the foothill yellow-legged frog, mountain yellow-legged frog, desert tortoise, steelhead, burrowing owl, California spotted owl, northern goshawk, willow flycatcher, Peninsular bighorn sheep, red panda, and forest carnivores.

REPRESENTATIVE EXPERIENCE

Avian

- Study design and Lead Investigator - Delta Meadows State Park Special-Status Species Inventory *(CA State Parks: Locke)*
- Study design and lead bird surveyor - Placer County Vernal Pool Study *(Placer County: throughout Placer County)*
- Surveyor - Willow flycatcher habitat mapping *(USFS: Plumas NF)*
- Independent surveyor - Tolay Creek, Cullinan Ranch, and Guadacanal Village restoration projects *(Ducks Unlimited/USGS: San Pablo Bay)*
- Study design and Lead Investigator - Bird use of restored wetlands research *(Pennsylvania Game Commission: throughout Pennsylvania)*
- Study design and surveyor - Baseline inventory of bird species at a 400-acre site in Napa County *(HCV Associates: Napa)*
- Surveyor - Baseline inventory of bird abundance following diesel spill *(LFR Levine-Fricke: Suisun Bay)*
- Study design and lead bird surveyor - Green Valley Creek Riparian Restoration Site *(City of Fairfield: Fairfield, CA)*
- Surveyor - Burrowing owl relocation and monitoring *(US Navy: Dixon, CA)*
- Surveyor - Pre-construction raptor and burrowing owl surveys *(various clients and locations)*
- Surveyor - Backcountry bird inventory *(National Park Service: Eagle, Alaska)*
- Lead surveyor - Tidal salt marsh bird surveys (*Point Reyes Bird Observatory: throughout Bay Area*)
- Surveyor – Pre-construction surveys for nesting birds (*various clients and locations)*

Amphibian

- Crew Leader - Red-legged frog, foothill yellow-legged frog, and mountain yellow-legged frog surveys *(USFS: Plumas NF)*

- Surveyor - Foothill yellow-legged frog surveys *(PG&E: North Fork Feather River)*
- Surveyor - Mountain yellow-legged frog surveys *(El Dorado Irrigation District: Desolation Wilderness)*
- Crew Leader - Bullfrog eradication *(Trout Unlimited: Cleveland NF)*

Fish and Aquatic Resources

- Surveyor - Hardhead minnow and other fish surveys *(USFS: Plumas NF)*
- Surveyor - Weber Creek aquatic habitat mapping (*El Dorado Irrigation District: Placerville, CA*)
- Surveyor - Green Valley Creek aquatic habitat mapping *(City of Fairfield: Fairfield, CA)*
- GPS Specialist - Salmonid spawning habitat mapping *(CDFG: Sacramento River)*
- Surveyor - Fish composition and abundance study (*PG&E: Upper North Fork Feather River and Lake Almanor*)
- Crew Leader - Surveys of steelhead abundance and habitat use *(CA Coastal Conservancy: Gualala River estuary)*
- Crew Leader - Exotic species identification and eradication *(Trout Unlimited: Cleveland NF)*

Mammals

- Principal Investigator – Peninsular bighorn sheep resource use and behavior study (*California State Parks: Freeman Properties*)
- Scientific Advisor –Study on red panda occupancy and abundance in eastern Nepal *(The Red Panda Network: CA and Nepal)*
- Surveyor - Forest carnivore surveys *(University of CA: Tahoe NF)*
- Surveyor - Relocation and monitoring of salt marsh harvest mice and other small mammals *(US Navy: Skagg's Island, CA)*
- Surveyor – Surveys for Monterey dusky-footed woodrat. Relocation of woodrat houses (*Touré Associates: Prunedale*)

Natural Resource Investigations / Multiple Species Studies

- Scientific Review Team Member – Member of the science review team assessing the effectiveness of the US Forest Service's implementation of the Herger-Feinstein Quincy Library Group Act.
- Lead Consultant - Baseline biological resource assessments and habitat mapping for CDF management units *(CDF: San Diego, San Bernardino, and Riverside Counties)*

- Biological Resources Expert – Peer review of CEQA/NEPA documents (*Adams Broadwell Joseph & Cardoza: California)*
- Lead Consultant - Pre- and post-harvest biological resource assessments of tree removal sites *(SDG&E: San Diego County)*
- Crew Leader - T&E species habitat evaluations for Biological Assessment in support of a steelhead restoration plan *(Trout Unlimited: Cleveland NF)*
- Lead Investigator - Resource Management Study and Plan for Mather Lake Regional Park *(County of Sacramento: Sacramento, CA)*
- Lead Investigator - Biological Resources Assessment for 1,070-acre Alfaro Ranch property *(Yuba County, CA)*
- Lead Investigator - Wildlife Strike Hazard Management Plan *(HCV Associates: Napa)*
- Lead Investigator - Del Rio Hills Biological Resource Assessment *(The Wyro Company: Rio Vista, CA)*
- Lead Investigator – Ion Communities project sites (*Ion Communities: Riverside and San Bernardino Counties*)
- Surveyor – Tahoe Pilot Project: Validation of California's Wildlife Habitat Relationships (CWHR) Model *(University of California: Tahoe NF)*

Forestry

Mr. Cashen has five years of experience working as a consulting forester on projects throughout California. Mr. Cashen has consulted with landowners and timber operators on forest management practices; and he has worked on a variety of forestry tasks including selective tree marking, forest inventory, harvest layout, erosion control, and supervision of logging operations. Mr. Cashen's experience with many different natural resources enable him to provide a holistic approach to forest management, rather than just management of timber resources.

REPRESENTATIVE EXPERIENCE

- Lead Consultant - CalFire fuels treatment projects *(SD and Riverside Counties)*
- Lead Consultant and supervisor of harvest activities – San Diego Gas and Electric Bark Beetle Tree Removal Project *(San Diego)*
- Crew Leader - Hillslope Monitoring Program *(CalFire: throughout California)*
- Consulting Forester – Forest inventories and timber harvest projects *(various clients throughout California)*

Grant Writing and Technical Editing

Mr. Cashen has prepared and submitted over 50 proposals and grant applications. Many of the projects listed herein were acquired through proposals he wrote. Mr. Cashen's clients and colleagues have recognized his strong scientific writing skills and ability to generate technically superior proposal packages. Consequently, he routinely prepares funding applications and conducts technical editing for various clients.

PERMITS

U.S. Fish and Wildlife Service Section 10(a)(1)(A) Recovery Permit for the Peninsular bighorn sheep

CA Department of Fish and Game Scientific Collecting Permit

PROFESSIONAL ORGANIZATIONS / ASSOCIATIONS

The Wildlife Society (Conservation Affairs Committee member)

Cal Alumni Foresters

Mt. Diablo Audubon Society

OTHER AFFILIATIONS

Scientific Advisor and Grant Writer – *The Red Panda Network*

Scientific Advisor – *Mt. Diablo Audubon Society*

Grant Writer – *American Conservation Experience*

Scientific Advisor and Land Committee Member – *Save Mt. Diablo*

TEACHING EXPERIENCE

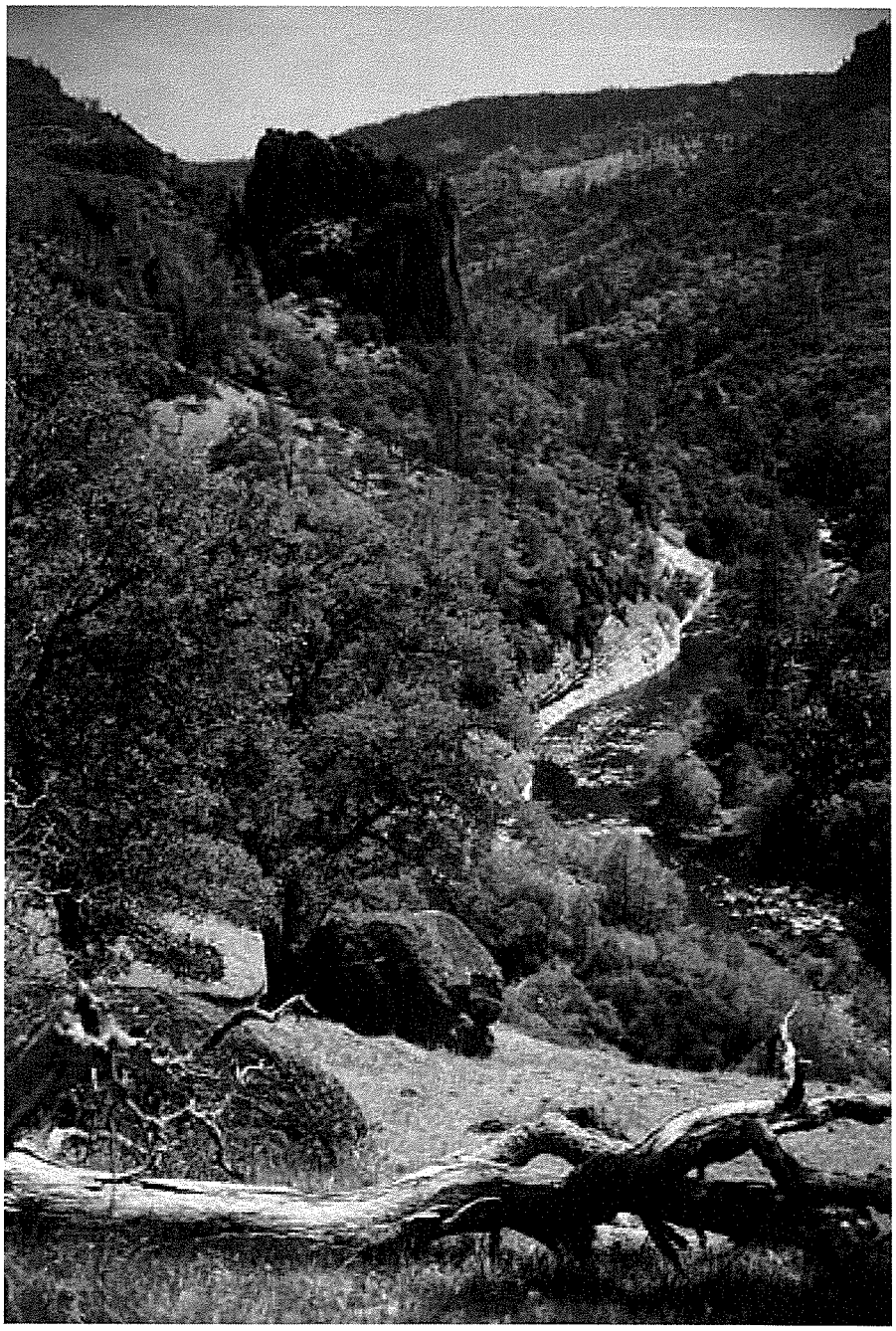
Instructor: Wildlife Management - The Pennsylvania State University, 1998

Teaching Assistant: Ornithology - The Pennsylvania State University, 1996-1997

THE CALIFORNIA NATURAL DIVERSITY DATABASE: A NATURAL HERITAGE PROGRAM FOR RARE SPECIES AND VEGETATION

by Roxanne Bittman

The California Natural Diversity Database (CNDDB), now over 20 years old, is a highly valuable repository of rare plant information maintained by the Habitat Conservation Division of the California Department of Fish and Game (CDFG). The primary function of CNDDB is to gather and disseminate data on the status and locations of rare and endangered plants, animals, and vegetation types. The goal of the program is to help conserve California's biological diversity by providing government agencies, the private sector, and conservation groups with information to promote better-informed land-use decisions and improved resource management. The California Native Plant Society (CNPS), through its many chapters and members—which conduct surveys of native rare plant populations throughout the year—is a substantial contributor to the database. CNPS's collaboration with CDFG helps to keep the database current so its data can be used to inform policy decisions that may impact native plant habitat.



Ishi Wilderness, northern Sierra Nevada. CNDDB updated all of the sensitive taxa in the entire Sierra bioregion in support of the Sierra Framework planning effort. Photograph by M. Hoshovsky.

PART OF A CONSERVATION NETWORK

CNDDB is a rich source of highly accurate, quality-checked data on the locations and status of rare and endangered plants, animals, and natural communities (collectively known as "*elements*") in California. CNDDB was originally conceived and developed by The Nature Conservancy (TNC)

ACRONYMS

CDFG	California Department of Fish and Game
CNDDB	California Natural Diversity Database
GIS	Geographic Information System
TNC	The Nature Conservancy
WCB	Wildlife Conservation Board

science staff in 1979. The science branch of TNC is now part of a new organization called NatureServe. CNDDB is part of a nationwide network of natural heritage programs across the United States, Canada, and Latin America which collaborate with NatureServe.

The function of NatureServe is to manage and distribute information critical to the conservation of the world's biological diversity. It provides regional data sets (that cross state lines) to federal agencies, and promotes the mission of conservation nationwide through products, services, decision support tools, publications, and the website NatureServe Explorer (*www.natureserve.org/explorer*). NatureServe recently published the book *Precious Heritage* (Stein et al. 2000), which discussed the status and trends of the biological diversity of the United States. This volume represented a successful test as to whether heritage data from across all 50 states could be compiled and analyzed to offer a broad scale picture for the entire nation.

North Coast semaphore grass (*Pleuropogon hooverianus*) is a rare plant from Marin, Mendocino, and Sonoma counties. CNDDB recently worked with the local CNPS chapters and the DFG Habitat Conservation Planning Branch to update all known records of this plant in support of a petition to uplist the species from Rare to Endangered under CESA. Photograph by P. But.

NATIONWIDE DATA COMPATABILITY

One of the strengths of the natural heritage network and of the individual programs that comprise it, such as CNDDB, is that all programs use similar tools and virtually the same methodology to enter and analyze the data on rare species and vegetation types. They use the same element codes, element ranking system, and mapping conventions, as well as very similar data entry forms. (*Element ranking* includes the use of Global (G) and State (S) ranks to reflect an element's relative rarity and endangerment status.)

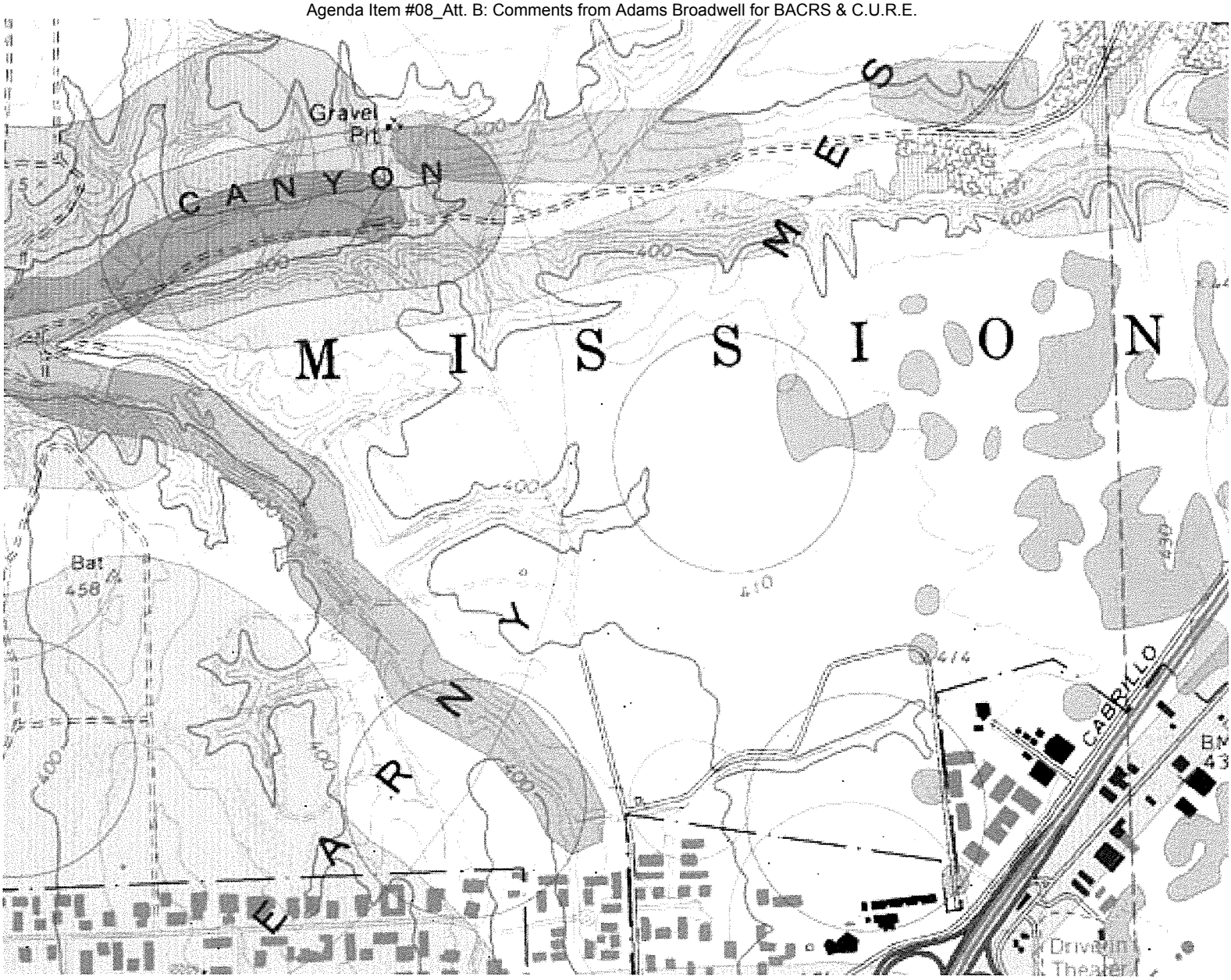
For consistency, all scientific names are fully cross-referenced in a central database. Data are mapped as precisely as they are received by all participating heritage programs. For example, if we receive a label from an herbarium specimen with imprecise location data, we map it as a larger, non-specific circle (of varying sizes). If we receive a field survey form (see p. 63) with a map precisely locating the extent of a population, we map the population precisely. Plant populations within one-quarter mile of each other are considered part of one occurrence.

Each occurrence is input by one biologist and quality controlled by another to maximize accuracy. This methodology, with minor variations, is consistent throughout the network. The nationwide data compatibility makes it possible for NatureServe to do cross-state analyses and to produce multistate products, such as *Precious Heritage.*

USES LATEST TECHNOLOGY

As part of the nationwide network of heritage programs, CNDDB enjoys a special position. The California program is not only well-established, with over 40,000 location records in its database, but it was the first in the country to integrate its program with the use of a Geographic Information System (GIS). GIS makes it possible to map, store, retrieve, and analyze geographic data on a computer.

This migration to new technology initially cost the program valuable data entry time, since the conversion to a digital mapping system was time-consuming and contributed to the accumulation of an unprocessed data backlog. However, the use of GIS allows this and other heritage programs to do analyses that would never be possible with paper maps or more traditional databases alone. In addition, the California program takes great care to fully reference each occurrence in its database. Every mapped location has a full bibliography associated with it and the



CNDDB digitizes each occurrence into a GIS layer, with some mapped as non-specific circles and others as very precise polygon features. This example shows a portion of the USGS La Jolla 7.5' quadrangle in San Diego County. The multiple polygons on the right represent a mixture of several very rare vernal pool plants, while the long polygon to the left represents southern riparian scrub, a rare vegetation community. Map by CNDDB.

references are logically filed within the CNDDB office. Thus, the documentation for each location is readily accessible.

A POSITIVE SIGHTING DATABASE

It is very important to understand that CNDDB only records actual sightings of rare species and natural communities. If an area is surveyed for a species and it is *not* found, this is not recorded, unless the species was known previously to be present on that site. This means that no inference can be made regarding lands that have never been surveyed. It is never appropriate to state that an area contains no rare taxa simply because a search of CNDDB was made and nothing resulted from the query. Large tracts of land in the state have never been surveyed for rare plants and animals and retain the potential to support rare elements; this fact needs to be clearly stated in all environmental documents. Put simply, a lack of records in CNDDB does not mean that no rare plants or animals occur in a given area.

DATABASE USES AND FORMATS

Clients of CNDDB include federal and state agencies, county and local governments, private consulting firms, environmental groups, land protection entities, and academic researchers. We provide data to thousands of clients each year

and this user base is growing. Their activities and needs vary greatly, including environmental document preparation or review, land protection and management activities, state and federal listing processes, plant status review, and research.

CNDDB provides the data in a variety of formats to accommodate user needs, including our personal computer application *Rarefind*, GIS layers, hardcopy maps and overlays, and reports and descriptive information from our extensive element files.

To support clients' diverse needs CNDDB provides a variety of levels of detail. Some may only need the US Geological Survey 7.5-minute topographic quadrangle level of accuracy for mapped information, while others require exact detail at a precise scale. Some users primarily need location information, with minimal text information, whereas many must have more detailed information to support difficult conservation decisions.

It is therefore critical that CNDDB attempt to collect the highest possible quality data on both population location and distribution, population and habitat condition, threats, land use, and other information related to occurrence rank. (Occurrence ranks range from Excellent, Good, Fair, Poor, Unknown, or None—the latter for extirpated occurrences—and reflect the quality of both the population's health and the associated habitat at a particular site.) Without this level of detail, conservation groups such as The Nature Conservancy, the state Wildlife Conservation Board (WCB), various land trust agencies, and others would have inadequate information with which to make critical land protection decisions.

RECENT CHANGES AND IMPROVEMENTS

What are areas for improvement at CNDDB? Concerns expressed in the past include the charge that CNDDB is too expensive, that data entry is too slow, that there is a large backlog of unprocessed infor-

Jepson Prairie, Solano County. Recently, largely through efforts of the Solano Land Trust, several hundred acres were purchased by WCB as an addition to the larger Jepson Prairie protected area. Documentation by CNDDB of the diversity of rare species on site helped justify the permanent protection of this important natural area. Photograph by O. Pollak.

mation, that the data are too inaccessible, and that there is not an online field survey form which can be submitted via the internet.

CNDDB costs approximately $500,000 per year to run. This pays for 10 permanent and temporary staff, three of which work on plants, along with hardware and software maintenance and materials. This level of staffing is far lower than the per-species staffing levels common in the heritage network. The enabling legislation (California Fish and Game Code § 1932) for CNDDB required that some cost recovery system be in place to offset program costs.

For many years, CNDDB charged private industry clients $2500 per year for a data subscription (and $1250 per year for not-for-profit clients). Although this fee system provided needed income that helped run the program, it was also a disincentive for small companies, local agencies, many county planning agencies, and others unable or unwilling to afford the cost. Additionally, the legitimate complaint was made that users were expected to contribute data to the system and yet were expected to pay to retrieve their own data as an end product. Although there is some validity to this criticism, it is also true that CNDDB makes the data substantially more useful and usable, and is not just a simple compendium of observations.

Recent changes have allowed CNDDB to greatly reduce its charge for subscriptions to $300 per year for new subscribers and $200 per year for renewals. This new pricing structure is the same for both for-profit and not-for-profit users and should make the products available to just about anyone. Some groups maintain memoranda of understanding with CNDDB that provide for data exchange arrangements allowing for free subscriptions. Two examples are the US Forest Service and CNPS. University researchers often qualify for this type of arrangement as well.

Adobe lily (*Fritillaria pluriflora*). WCB succeeded in negotiating a conservation easement for the wildflower-rich Bear Valley in Colusa County, a popular spring botanizing spot. This area has one of the largest known populations of adobe lily, a rare plant from the North Coast Ranges tracked for many years by CNDDB. Photograph by J. Game.

Improvements in technology have recently made possible some exciting changes to CNDDB. CNDDB now has full digital topographic coverage for the state as well as other useful background coverages. (GIS *background coverages* are geographic data sets or overlays containing features such as roads, towns, soil types, watersheds, or rivers that can be can be used for reference during data entry.) The resulting increase in speed of data entry and quality control has led to a steady decline of our backlog of unprocessed data over the last year.

We are also beginning to accept digital data sets with companion tabular data, and we are developing expedited ways of handling this increased data flow in an automated fashion. Currently, digital datasets require more processing time than paper field survey forms, but we expect this to change. A *Windows* version of *Rarefind* is due for release in fall 2002, and will replace the existing DOS version.

As always, data currently housed in CNDDB files that have not yet been entered into the computerized database are available for review by interested parties. This includes updates to existing occurrences, as well as files on wholly unprocessed plants, which are mostly comprised of CNPS List 3 and 4 species. There are also some as yet unprocessed List 1B and 2 taxa which were newly added to the latest edition of the CNPS *Inventory of Rare and Endangered Plants of California* (CNPS 2001).

In addition to improvements outlined above, CNDDB anticipates the development of an online field survey form with point and

polygon mapping capability. Currently, data contributors can fill out an online field form from our website. However, they cannot save or submit it over the Internet since online digital mapping is not yet perfected. Contributors should provide precise location information with their survey forms.

APPROPRIATE USE OF SENSITIVE DATA

The question as to how much sensitive locational data should be freely available to the public has been debated since heritage programs first began compiling such data. All heritage programs contacted in a recent survey indicated that their policy on data security was either parallel to that of CNDDB or was stricter. CNDDB screens each client to ascertain what they need the data for in order to tailor the product to their needs.

CNDDB and other heritage programs retain the right to refuse release of the most detailed information under certain circumstances. This stems from the concern that there is still not widespread understanding of the importance of rare species among the general public. Population loss or degradation by deliberate destruction of habitat is a problem, as is over-collection of certain classes of sensitive plants such as bulbs, orchids, insectivorous plants, and succulents. This list has grown to include plants used in commercial ventures to make craft products containing wood, lichen, branches, leaves, fruit, and the like. These plant materials come from a variety of species, both common and rare.

There is a large amount of information on the basic ecology and aesthetic value of rare plants that could be displayed on the Internet. We also either currently provide or intend to provide online lists of rare plants with their status and location to the county or 7.5-minute quadrangle level. CNPS currently makes this information available on their website (*www.cnps.org*). However, we do not advocate putting up the most precise location information for sensitive species (which includes all species on CNPS Lists 1-4).

Notwithstanding the approach described above, CNDDB is committed to providing widespread access to the data it collects and analyzes. As stated, more general information will be provided on the CNDDB website, through publications such as the upcoming *Atlas of the Biodiversity of California* (in prep 2002), and through links to other sites such as Calflora (*www.calflora.org*) and the CNPS website. Access to CNDDB data is also planned for the future via online, password-protected methods.

HOW TO CONTACT CNDDB

To learn more about our program, visit our website (*www.dfg.ca.gov/whdab*). Lists of rare, threatened, and endangered plants are found here, as well as the online field survey form, information on the appropriate way to survey for plants, and more. There is also equivalent information for rare animal taxa and natural community types. A section titled Data Products contains an online order form and product support information, along with commonly used links. To contact CNDDB directly, use the email addresses listed on the CNDDB website under Staff.

HIGHLIGHTS OF CNDDB

- Contains over 40,000 records on rare plants, animals, and natural communities, including nearly 20,000 records on rare plants alone, covering over 1000 taxa.
- Subscriptions cost $300 per year, and $200 to renew, with free six-month updates.
- Our website (*www.dfg.ca.gov/whdab*) contains an online field survey form for submitting new data, with a link to an online mapping tool for use with coordinate information such as UTM and latitude/longitude.
- For more information, contact CNDDB using the email addresses listed on the website under Staff.

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Staff Report on Burrowing Owl Mitigation

State of California

Natural Resources Agency

Department of Fish and Game

March 7, 2012[1]

[1] This document replaces the Department of Fish and Game 1995 Staff Report On Burrowing Owl Mitigation.

TABLE OF CONTENTS

INTRODUCTION AND PURPOSE

Maintaining California's rich biological diversity is dependent on the conservation of species and their habitats. The California Department of Fish and Game (Department) has designated certain species as "species of special concern" when their population viability and survival is adversely affected by risk factors such as precipitous declines or other vulnerability factors (Shuford and Gardali 2008). Preliminary analyses of regional patterns for breeding populations of burrowing owls (*Athene cunicularia*) have detected declines both locally in their central and southern coastal breeding areas, and statewide where the species has experienced modest breeding range retraction (Gervais et al. 2008). In California, threat factors affecting burrowing owl populations include habitat loss, degradation and modification, and eradication of ground squirrels resulting in a loss of suitable burrows required by burrowing owls for nesting, protection from predators, and shelter (See Appendix A).

The Department recognized the need for a comprehensive conservation and mitigation strategy for burrowing owls, and in 1995 directed staff to prepare a report describing mitigation and survey recommendations. This report, "1995 Staff Report on Burrowing Owl Mitigation," (Staff Report) (CDFG 1995), contained Department-recommended burrowing owl and burrow survey techniques and mitigation measures intended to offset the loss of habitat and slow or reverse further decline of this species. Notwithstanding these measures, over the past 15+ years, burrowing owls have continued to decline in portions of their range (DeSante et al. 2007, Wilkerson and Siegel, 2010). The Department has determined that reversing declining population and range trends for burrowing owls will require implementation of more effective conservation actions, and evaluating the efficacy of the Department's existing recommended avoidance, minimization and mitigation approaches for burrowing owls.

The Department has identified three main actions that together will facilitate a more viable, coordinated, and concerted approach to conservation and mitigation for burrowing owls in California. These include:

1. Incorporating burrowing owl comprehensive conservation strategies into landscape-based planning efforts such as Natural Community Conservation Plans (NCCPs) and multi-species Habitat Conservation Plans (HCPs) that specifically address burrowing owls.
2. Developing and implementing a statewide conservation strategy (Burkett and Johnson, 2007) and local or regional conservation strategies for burrowing owls, including the development and implementation of a statewide burrowing owl survey and monitoring plan.
3. Developing more rigorous burrowing owl survey methods, working to improve the adequacy of impacts assessments; developing clear and effective avoidance and minimization measures; and developing mitigation measures to ensure impacts to the species are effectively addressed at the project, local, and/or regional level (the focus of this document).

This Report sets forth the Department's recommendations for implementing the third approach identified above by revising the 1995 Staff Report, drawing from the most relevant and current knowledge and expertise, and incorporating the best scientific information

available pertaining to the species. It is designed to provide a compilation of the best available science for Department staff, biologists, planners, land managers, California Environmental Quality Act (CEQA) lead agencies, and the public to consider when assessing impacts of projects or other activities on burrowing owls.

This revised Staff Report takes into account the California Burrowing Owl Consortium's Survey Protocol and Mitigation Guidelines (CBOC 1993, 1997) and supersedes the survey, avoidance, minimization and mitigation recommendations in the 1995 Staff Report. Based on experiences gained from implementing the 1995 Staff Report, the Department believes revising that report is warranted. This document also includes general conservation goals and principles for developing mitigation measures for burrowing owls.

DEPARTMENT ROLE AND LEGAL AUTHORITIES

The mission of the Department is to manage California's diverse fish, wildlife and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. The Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitats necessary to maintain biologically sustainable populations of those species (Fish and Game Code (FGC) §1802). The Department, as trustee agency pursuant to CEQA (See CEQA Guidelines, §15386), has jurisdiction by law over natural resources, including fish and wildlife, affected by a project, as that term is defined in Section 21065 of the Public Resources Code. The Department exercises this authority by reviewing and commenting on environmental documents and making recommendations to avoid, minimize, and mitigate potential negative impacts to those resources held in trust for the people of California.

Field surveys designed to detect the presence of a particular species, habitat element, or natural community are one of the tools that can assist biologists in determining whether a species or habitat may be significantly impacted by land use changes or disturbance. The Department reviews field survey data as well as site-specific and regional information to evaluate whether a project's impacts may be significant. This document compiles the best available science for conducting habitat assessments and surveys, and includes considerations for developing measures to avoid impacts or mitigate unavoidable impacts.

CEQA

CEQA requires public agencies in California to analyze and disclose potential environmental impacts associated with a project that the agency will carry out, fund, or approve. Any potentially significant impact must be mitigated to the extent feasible. Project-specific CEQA mitigation is important for burrowing owls because most populations exist on privately owned parcels that, when proposed for development or other types of modification, may be subject to the environmental review requirements of CEQA.

Take

Take of individual burrowing owls and their nests is defined by FGC section 86, and prohibited by sections 3503, 3503.5 and 3513. Take is defined in FGC Section 86 as "hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill."

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States and Canada, Japan, Mexico, and Russia for the protection of migratory birds, including the burrowing owl (50 C.F.R. § 10). The MBTA protects migratory bird nests from possession, sale, purchase, barter, transport, import and export, and collection. The other prohibitions of the MBTA - capture, pursue, hunt, and kill - are inapplicable to nests. The regulatory definition of take, as defined in Title 50 C.F.R. part 10.12, means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to hunt, shoot, wound, kill, trap, capture, or collect. Only the verb "collect" applies to nests. It is illegal to collect, possess, and by any means transfer possession of any migratory bird nest. The MBTA prohibits the destruction of a nest when it contains birds or eggs, and no possession shall occur during the destruction (see Fish and Wildlife Service, Migratory Bird Permit Memorandum, April 15, 2003). Certain exceptions to this prohibition are included in 50 C.F.R. section 21. Pursuant to Fish & Game Code section 3513, the Department enforces the Migratory Bird Treaty Act consistent with rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act.

Regional Conservation Plans

Regional multiple species conservation plans offer long-term assurances for conservation of covered species at a landscape scale, in exchange for biologically appropriate levels of incidental take and/or habitat loss as defined in the approved plan. California's NCCP Act (FGC §2800 et seq.) governs such plans at the state level, and was designed to conserve species, natural communities, ecosystems, and ecological processes across a jurisdiction or a collection of jurisdictions. Complementary federal HCPs are governed by the Endangered Species Act (7 U.S.C. § 136, 16 U.S.C.§ 1531 et seq.) (ESA). Regional conservation plans (and certain other landscape-level conservation and management plans), may provide conservation for unlisted as well as listed species. Because the geographic scope of NCCPs and HCPs may span many hundreds of thousands of acres, these planning tools have the potential to play a significant role in conservation of burrowing owls, and grasslands and other habitats.

Fish and Game Commission Policies

There are a number of Fish and Game Commission policies (see FGC §2008) that can be applied to burrowing owl conservation. These include policies on: Raptors, Cooperation, Endangered and Threatened Species, Land Use Planning, Management and Utilization of Fish and Wildlife on Federal Lands, Management and Utilization of Fish and Wildlife on Private Lands, and Research.

GUIDING PRINCIPLES FOR CONSERVATION

Unless otherwise provided in a statewide, local, or regional conservation strategy, surveying and evaluating impacts to burrowing owls, as well as developing and implementing avoidance, minimization, and mitigation and conservation measures incorporate the following principles. These principles are a summary of Department staff expert opinion and were used to guide the preparation of this document.

1. Use the Precautionary Principle (Noss et al.1997), by which the alternative of increased conservation is deliberately chosen in order to buffer against incomplete knowledge of burrowing owl ecology and uncertainty about the consequences to burrowing owls of potential impacts, including those that are cumulative.
2. Employ basic conservation biology tenets and population-level approaches when determining what constitutes appropriate avoidance, minimization, and mitigation for impacts. Include mitigation effectiveness monitoring and reporting, and use an adaptive management loop to modify measures based on results.
3. Protect and conserve owls in wild, semi-natural, and agricultural habitats (conserve is defined at FGC §1802).
4. Protect and conserve natural nest burrows (or burrow surrogates) previously used by burrowing owls and sufficient foraging habitat and protect auxiliary "satellite" burrows that contribute to burrowing owl survivorship and natural behavior of owls.

CONSERVATION GOALS FOR THE BURROWING OWL IN CALIFORNIA

It is Department staff expert opinion that the following goals guide and contribute to the short and long-term conservation of burrowing owls in California:

1. Maintain size and distribution of extant burrowing owl populations (allowing for natural population fluctuations).
2. Increase geographic distribution of burrowing owls into formerly occupied historical range where burrowing owl habitat still exists, or where it can be created or enhanced, and where the reason for its local disappearance is no longer of concern.
3. Increase size of existing populations where possible and appropriate (for example, considering basic ecological principles such as carrying capacity, predator-prey relationships, and inter-specific relationships with other species at risk).
4. Protect and restore self-sustaining ecosystems or natural communities which can support burrowing owls at a landscape scale, and which will require minimal long-term management.
5. Minimize or prevent unnatural causes of burrowing owl population declines (e.g., nest burrow destruction, chemical control of rodent hosts and prey).
6. Augment/restore natural dynamics of burrowing owl populations including movement and genetic exchange among populations, such that the species does not require future listing and protection under the California Endangered Species Act (CESA) and/or the federal Endangered Species Act (ESA).
7. Engage stakeholders, including ranchers; farmers; military; tribes; local, state, and federal agencies; non-governmental organizations; and scientific research and education communities involved in burrowing owl protection and habitat management.

ACTIVITIES WITH THE POTENTIAL TO TAKE OR IMPACT BURROWING OWLS

The following activities are examples of activities that have the potential to take burrowing owls, their nests or eggs, or destroy or degrade burrowing owl habitat: grading, disking, cultivation, earthmoving, burrow blockage, heavy equipment compacting and crushing burrow tunnels, levee maintenance, flooding, burning and mowing (if burrows are impacted), and operating wind turbine collisions (collectively hereafter referred to as "projects" or "activities"

whether carried out pursuant to CEQA or not). In addition, the following activities may have impacts to burrowing owl populations: eradication of host burrowers; changes in vegetation management (i.e. grazing); use of pesticides and rodenticides; destruction, conversion or degradation of nesting, foraging, over-wintering or other habitats; destruction of natural burrows and burrow surrogates; and disturbance which may result in harassment of owls at occupied burrows.

PROJECT IMPACT EVALUATIONS

The following three progressive steps are effective in evaluating whether projects will result in impacts to burrowing owls. The information gained from these steps will inform any subsequent avoidance, minimization and mitigation measures. The steps for project impact evaluations are: 1) habitat assessment, 2) surveys, and 3) impact assessment. Habitat assessments are conducted to evaluate the likelihood that a site supports burrowing owl. Burrowing owl surveys provide information needed to determine the potential effects of proposed projects and activities on burrowing owls, and to avoid take in accordance with FGC sections 86, 3503, and 3503.5. Impact assessments evaluate the extent to which burrowing owls and their habitat may be impacted, directly or indirectly, on and within a reasonable distance of a proposed CEQA project activity or non-CEQA project. These three site evaluation steps are discussed in detail below.

Biologist Qualifications

The current scientific literature indicates that only individuals meeting the following minimum qualifications should perform burrowing owl habitat assessments, surveys, and impact assessments:

1. Familiarity with the species and its local ecology;
2. Experience conducting habitat assessments and non-breeding and breeding season surveys, or experience with these surveys conducted under the direction of an experienced surveyor;
3. Familiarity with the appropriate state and federal statutes related to burrowing owls, scientific research, and conservation;
4. Experience with analyzing impacts of development on burrowing owls and their habitat.

Habitat Assessment Data Collection and Reporting

A habitat assessment is the first step in the evaluation process and will assist investigators in determining whether or not occupancy surveys are needed. Refer to Appendix B for a definition of burrowing owl habitat. Compile the detailed information described in Appendix C when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report.

Surveys

Burrowing owl surveys are the second step of the evaluation process and the best available scientific literature recommends that they be conducted whenever burrowing owl habitat or sign (see Appendix B) is encountered on or adjacent to (within 150 meters) a project site

(Thomsen 1971, Martin 1973). Occupancy of burrowing owl habitat is confirmed at a site when at least one burrowing owl, or its sign at or near a burrow entrance, is observed within the last three years (Rich 1984). Burrowing owls are more detectable during the breeding season with detection probabilities being highest during the nestling stage (Conway et al. 2008). In California, the burrowing owl breeding season extends from 1 February to 31 August (Haug et al. 1993, Thompsen 1971) with some variances by geographic location and climatic conditions. Several researchers suggest three or more survey visits during daylight hours (Haug and Diduik 1993, CBOC 1997, Conway and Simon 2003) and recommend each visit occur at least three weeks apart during the peak of the breeding season, commonly accepted in California as between 15 April and 15 July (CBOC 1997). Conway and Simon (2003) and Conway et al. (2008) recommended conducting surveys during the day when most burrowing owls in a local area are in the laying and incubation period (so as not to miss early breeding attempts), during the nesting period, and in the late nestling period when most owls are spending time above ground.

Non-breeding season (1 September to 31 January) surveys may provide information on burrowing owl occupancy, but do not substitute for breeding season surveys because results are typically inconclusive. Burrowing owls are more difficult to detect during the non-breeding season and their seasonal residency status is difficult to ascertain. Burrowing owls detected during non-breeding season surveys may be year-round residents, young from the previous breeding season, pre-breeding territorial adults, winter residents, dispersing juveniles, migrants, transients or new colonizers. In addition, the numbers of owls and their pattern of distribution may differ during winter and breeding seasons. However, on rare occasions, non-breeding season surveys may be warranted (i.e., if the site is believed to be a wintering site only based on negative breeding season results). Refer to Appendix D for information on breeding season and non-breeding season survey methodologies.

Survey Reports

Adequate information about burrowing owls present in and adjacent to an area that will be disturbed by a project or activity will enable the Department, reviewing agencies and the public to effectively assess potential impacts and will guide the development of avoidance, minimization, and mitigation measures. The survey report includes but is not limited to a description of the proposed project or proposed activity, including the proposed project start and end dates, as well as a description of disturbances or other activities occurring on-site or nearby. Refer to Appendix D for details included in a survey report.

Impact Assessment

The third step in the evaluation process is the impact assessment. When surveys confirm occupied burrowing owl habitat in or adjoining the project area, there are a number of ways to assess a project's potential significant impacts to burrowing owls and their habitat. Richardson and Miller (1997) recommended monitoring raptor behavior prior to developing management recommendations and buffers to determine the extent to which individuals have been sensitized to human disturbance. Monitoring results will also provide detail necessary for developing site-specific measures. Postovit and Postovit (1987) recommended an analytical approach to mitigation planning: define the problem (impact), set goals (to guide mitigation development), evaluate and select mitigation methods, and monitor the results.

Define the problem. The impact assessment evaluates all factors that could affect burrowing owls. Postovit and Postovit (1987) recommend evaluating the following in assessing impacts to raptors and planning mitigation: type and extent of disturbance, duration and timing of disturbance, visibility of disturbance, sensitivity and ability to habituate, and influence of environmental factors. They suggest identifying and addressing all potential direct and indirect impacts to burrowing owls, regardless of whether or not the impacts will occur during the breeding season. Several examples are given for each impact category below; however, examples are not intended to be used exclusively.

Type and extent of the disturbance. The impact assessment describes the nature (source) and extent (scale) of potential project impacts on occupied, satellite and unoccupied burrows including acreage to be lost (temporary or permanent), fragmentation/edge being created, increased distance to other nesting and foraging habitat, and habitat degradation. Discuss any project activities that impact either breeding and/or non-breeding habitat which could affect owl home range size and spatial configuration, negatively affect onsite and offsite burrowing owl presence, increase energetic costs, lower reproductive success, increase vulnerability to predation, and/or decrease the chance of procuring a mate.

Duration and timing of the impact. The impact assessment describes the amount of time the burrowing owl habitat will be unavailable to burrowing owls (temporary or permanent) on the site and the effect of that loss on essential behaviors or life history requirements of burrowing owls, the overlap of project activities with breeding and/or non-breeding seasons (timing of nesting and/or non-breeding activities may vary with latitude and climatic conditions, which should be considered with the timeline of the project or activity), and any variance of the project activities in intensity, scale and proximity relative to burrowing owl occurrences.

Visibility and sensitivity. Some individual burrowing owls or pairs are more sensitive than others to specific stimuli and may habituate to ongoing visual or audible disturbance. Site-specific monitoring may provide clues to the burrowing owl's sensitivities. This type of assessment addresses the sensitivity of burrowing owls within their nesting area to humans on foot, and vehicular traffic. Other variables are whether the site is primarily in a rural versus urban setting, and whether any prior disturbance (e.g., human development or recreation) is known at the site.

Environmental factors. The impact assessment discusses any environmental factors that could be influenced or changed by the proposed activities including nest site availability, predators, prey availability, burrowing mammal presence and abundance, and threats from other extrinsic factors such as human disturbance, urban interface, feral animals, invasive species, disease or pesticides.

Significance of impacts. The impact assessment evaluates the potential loss of nesting burrows, satellite burrows, foraging habitat, dispersal and migration habitat, wintering habitat, and habitat linkages, including habitat supporting prey and host burrowers and other essential habitat attributes. This assessment determines if impacts to the species will result in significant impacts to the species locally, regionally and range-wide per CEQA Guidelines §15382 and Appendix G. The significance of the impact to habitat depends on the extent of habitat disturbed and length of time the habitat is unavailable (for example: minor – several days, medium – several weeks to months, high - breeding season affecting juvenile survival,

or over winter affecting adult survival).

Cumulative effects. The cumulative effects assessment evaluates two consequences: 1) the project's proportional share of reasonably foreseeable impacts on burrowing owls and habitat caused by the project or in combination with other projects and local influences having impacts on burrowing owls and habitat, and 2) the effects on the regional owl population resulting from the project's impacts to burrowing owls and habitat.

Mitigation goals. Establishing goals will assist in planning mitigation and selecting measures that function at a desired level. Goals also provide a standard by which to measure mitigation success. Unless specifically provided for through other FGC Sections or through specific regulations, take, possession or destruction of individual burrowing owls, their nests and eggs is prohibited under FGC sections 3503, 3503.5 and 3513. Therefore, a required goal for all project activities is to avoid take of burrowing owls. Under CEQA, goals would consist of measures that would avoid, minimize and mitigate impacts to a less than significant level. For individual projects, mitigation must be roughly proportional to the level of impacts, including cumulative impacts, in accordance with the provisions of CEQA (CEQA Guidelines, §§ 15126.4(a)(4)(B), 15064, 15065, and 16355). In order for mitigation measures to be effective, they must be specific, enforceable, and feasible actions that will improve environmental conditions. As set forth in more detail in Appendix A, the current scientific literature supports the conclusion that mitigation for permanent habitat loss necessitates replacement with an equivalent or greater habitat area for breeding, foraging, wintering, dispersal, presence of burrows, burrow surrogates, presence of fossorial mammal dens, well drained soils, and abundant and available prey within close proximity to the burrow.

MITIGATION METHODS

The current scientific literature indicates that any site-specific avoidance or mitigation measures developed should incorporate the best practices presented below or other practices confirmed by experts and the Department. The Department is available to assist in the development of site-specific avoidance and mitigation measures.

Avoiding. A primary goal is to design and implement projects to seasonally and spatially avoid negative impacts and disturbances that could result in take of burrowing owls, nests, or eggs. Other avoidance measures may include but not be limited to:

- Avoid disturbing occupied burrows during the nesting period, from 1 February through 31 August.
- Avoid impacting burrows occupied during the non-breeding season by migratory or non-migratory resident burrowing owls.
- Avoid direct destruction of burrows through chaining (dragging a heavy chain over an area to remove shrubs), disking, cultivation, and urban, industrial, or agricultural development.
- Develop and implement a worker awareness program to increase the on-site worker's recognition of and commitment to burrowing owl protection.
- Place visible markers near burrows to ensure that farm equipment and other machinery does not collapse burrows.
- Do not fumigate, use treated bait or other means of poisoning nuisance animals in areas where burrowing owls are known or suspected to occur (e.g., sites observed with nesting

owls, designated use areas).
- Restrict the use of treated grain to poison mammals to the months of January and February.

Take avoidance (pre-construction) surveys. Take avoidance surveys are intended to detect the presence of burrowing owls on a project site at a fixed period in time and inform necessary take avoidance actions. Take avoidance surveys may detect changes in owl presence such as colonizing owls that have recently moved onto the site, migrating owls, resident burrowing owls changing burrow use, or young of the year that are still present and have not dispersed. Refer to Appendix D for take avoidance survey methodology.

Site surveillance. Burrowing owls may attempt to colonize or re-colonize an area that will be impacted; thus, the current scientific literature indicates a need for ongoing surveillance at the project site during project activities is recommended. The surveillance frequency/effort should be sufficient to detect burrowing owls if they return. Subsequent to their new occupancy or return to the site, take avoidance measures should assure with a high degree of certainty that take of owls will not occur.

Minimizing. If burrowing owls and their habitat can be protected in place on or adjacent to a project site, the use of buffer zones, visual screens or other measures while project activities are occurring can minimize disturbance impacts. Conduct site-specific monitoring to inform development of buffers (see Visibility and sensitivity above). The following general guidelines for implementing buffers should be adjusted to address site-specific conditions using the impact assessment approach described above. The CEQA lead agency and/or project proponent is encouraged to consult with the Department and other burrowing owl experts for assistance in developing site-specific buffer zones and visual screens.

Buffers. Holroyd et al. (2001) identified a need to standardize management and disturbance mitigation guidelines. For instance, guidelines for mitigating impacts by petroleum industries on burrowing owls and other prairie species (Scobie and Faminow, 2000) may be used as a template for future mitigation guidelines (Holroyd et al. 2001). Scobie and Faminow (2000) developed guidelines for activities around occupied burrowing owl nests recommending buffers around low, medium, and high disturbance activities, respectively (see below).

Recommended restricted activity dates and setback distances by level of disturbance for burrowing owls (Scobie and Faminow 2000).

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Based on existing vegetation, human development, and land uses in an area, resource managers may decide to allow human development or resource extraction closer to these area/sites than recommended above. However, if it is decided to allow activities closer than

the setback distances recommended, a broad-scale, long-term, scientifically-rigorous monitoring program ensures that burrowing owls are not detrimentally affected by alternative approaches.

Other minimization measures include eliminating actions that reduce burrowing owl forage and burrowing surrogates (e.g. ground squirrel), or introduce/facilitate burrowing owl predators. Actions that could influence these factors include reducing livestock grazing rates and/or changing the timing or duration of grazing or vegetation management that could result in less suitable habitat.

Burrow exclusion and closure. Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls, or permanently exclude burrowing owls and close burrows after verifying burrows are empty by site monitoring and scoping. Exclusion in and of itself is not a take avoidance, minimization or mitigation method. Eviction of burrowing owls is a potentially significant impact under CEQA.

The long-term demographic consequences of these techniques have not been thoroughly evaluated, and the fate of evicted or excluded burrowing owls has not been systematically studied. Because burrowing owls are dependent on burrows at all times of the year for survival and/or reproduction, evicting them from nesting, roosting, and satellite burrows may lead to indirect impacts or take. Temporary or permanent closure of burrows may result in significant loss of burrows and habitat for reproduction and other life history requirements. Depending on the proximity and availability of alternate habitat, loss of access to burrows will likely result in varying levels of increased stress on burrowing owls and could depress reproduction, increase predation, increase energetic costs, and introduce risks posed by having to find and compete for available burrows. Therefore, exclusion and burrow closure are not recommended where they can be avoided. The current scientific literature indicates consideration of all possible avoidance and minimization measures before temporary or permanent exclusion and closure of burrows is implemented, in order to avoid take.

The results of a study by Trulio (1995) in California showed that burrowing owls passively displaced from their burrows were quickly attracted to adjacent artificial burrows at five of six passive relocation sites. The successful sites were all within 75 meters (m) of the destroyed burrow, a distance generally within a pair's territory. This researcher discouraged using passive relocation to artificial burrows as a mitigation measure for lost burrows without protection of adjacent foraging habitat. The study results indicated artificial burrows were used by evicted burrowing owls when they were approximately 50-100 m from the natural burrow (Thomsen 1971, Haug and Oliphant 1990). Locating artificial or natural burrows more than 100 m from the eviction burrow may greatly reduce the chances that new burrows will be used. Ideally, exclusion and burrow closure is employed only where there are adjacent natural burrows and non-impacted, sufficient habitat for burrowing owls to occupy with permanent protection mechanisms in place. Any new burrowing owl colonizing the project site after the CEQA document has been adopted may constitute changed circumstances that should be addressed in a re-circulated CEQA document.

The current scientific literature indicates that burrow exclusion should only be conducted by qualified biologists (meeting the Biologist's Qualifications above) during the non-breeding

season, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping. The literature also indicates that when temporary or permanent burrow exclusion and/or burrow closure is implemented, burrowing owls should not be excluded from burrows unless or until:

- A Burrowing Owl Exclusion Plan (see Appendix E) is developed and approved by the applicable local DFG office;
- Permanent loss of occupied burrow(s) and habitat is mitigated in accordance with the Mitigating Impacts sections below. Temporary exclusion is mitigated in accordance with the item #1 under Mitigating Impacts below.
- Site monitoring is conducted prior to, during, and after exclusion of burrowing owls from their burrows sufficient to ensure take is avoided. Conduct daily monitoring for one week to confirm young of the year have fledged if the exclusion will occur immediately after the end of the breeding season.
- Excluded burrowing owls are documented using artificial or natural burrows on an adjoining mitigation site (if able to confirm by band re-sight).

Translocation (Active relocation offsite >100 meters). At this time, there is little published information regarding the efficacy of translocating burrowing owls, and additional research is needed to determine subsequent survival and breeding success (Klute et al. 2003, Holroyd et al. 2001). Study results for translocation in Florida implied that hatching success may be decreased for populations of burrowing owls that undergo translocation (Nixon 2006). At this time, the Department is unable to authorize the capture and relocation of burrowing owls except within the context of scientific research (FGC §1002) or a NCCP conservation strategy.

Mitigating impacts. Habitat loss and degradation from rapid urbanization of farmland in the core areas of the Central and Imperial valleys is the greatest of many threats to burrowing owls in California (Shuford and Gardali, 2008). At a minimum, if burrowing owls have been documented to occupy burrows (see Definitions, Appendix B) at the project site in recent years, the current scientific literature supports the conclusion that the site should be considered occupied and mitigation should be required by the CEQA lead agency to address project-specific significant and cumulative impacts. Other site-specific and regionally significant and cumulative impacts may warrant mitigation. The current scientific literature indicates the following to be best practices. If these best practices cannot be implemented, the lead agency or lead investigator may consult with the Department to develop effective mitigation alternatives. The Department is also available to assist in the identification of suitable mitigation lands.

1. Where habitat will be temporarily disturbed, restore the disturbed area to pre-project condition including decompacting soil and revegetating. Permanent habitat protection may be warranted if there is the potential that the temporary impacts may render a nesting site (nesting burrow and satellite burrows) unsustainable or unavailable depending on the time frame, resulting in reduced survival or abandonment. For the latter potential impact, see the permanent impact measures below.
2. Mitigate for permanent impacts to nesting, occupied and satellite burrows and/or burrowing owl habitat such that the habitat acreage, number of burrows and burrowing owls impacted are replaced based on the information provided in Appendix A. Note: A

minimum habitat replacement recommendation is not provided here as it has been shown to serve as a default, replacing any site-specific analysis and discounting the wide variation in natal area, home range, foraging area, and other factors influencing burrowing owls and burrowing owl population persistence in a particular area.

3. Mitigate for permanent impacts to nesting, occupied and satellite burrows and burrowing owl habitat with (a) permanent conservation of similar vegetation communities (grassland, scrublands, desert, urban, and agriculture) to provide for burrowing owl nesting, foraging, wintering, and dispersal (i.e., during breeding and non-breeding seasons) comparable to or better than that of the impact area, and (b) sufficiently large acreage, and presence of fossorial mammals. The mitigation lands may require habitat enhancements including enhancement or expansion of burrows for breeding, shelter and dispersal opportunity, and removal or control of population stressors. If the mitigation lands are located adjacent to the impacted burrow site, ensure the nearest neighbor artificial or natural burrow clusters are at least within 210 meters (Fisher et al. 2007).
4. Permanently protect mitigation land through a conservation easement deeded to a non-profit conservation organization or public agency with a conservation mission, for the purpose of conserving burrowing owl habitat and prohibiting activities incompatible with burrowing owl use. If the project is located within the service area of a Department-approved burrowing owl conservation bank, the project proponent may purchase available burrowing owl conservation bank credits.
5. Develop and implement a mitigation land management plan to address long-term ecological sustainability and maintenance of the site for burrowing owls (see Management Plan and Artificial Burrow sections below, if applicable).
6. Fund the maintenance and management of mitigation land through the establishment of a long-term funding mechanism such as an endowment.
7. Habitat should not be altered or destroyed, and burrowing owls should not be excluded from burrows, until mitigation lands have been legally secured, are managed for the benefit of burrowing owls according to Department-approved management, monitoring and reporting plans, and the endowment or other long-term funding mechanism is in place or security is provided until these measures are completed.
8. Mitigation lands should be on, adjacent or proximate to the impact site where possible and where habitat is sufficient to support burrowing owls present.
9. Where there is insufficient habitat on, adjacent to, or near project sites where burrowing owls will be excluded, acquire mitigation lands with burrowing owl habitat away from the project site. The selection of mitigation lands should then focus on consolidating and enlarging conservation areas located outside of urban and planned growth areas, within foraging distance of other conserved lands. If mitigation lands are not available adjacent to other conserved lands, increase the mitigation land acreage requirement to ensure a selected site is of sufficient size. Offsite mitigation may not adequately offset the biological and habitat values impacted on a one to one basis. Consult with the Department when determining offsite mitigation acreages.
10. Evaluate and select suitable mitigation lands based on a comparison of the habitat attributes of the impacted and conserved lands, including but not limited to: type and structure of habitat being impacted or conserved; density of burrowing owls in impacted and conserved habitat; and significance of impacted or conserved habitat to the species range-wide. Mitigate for the highest quality burrowing owl habitat impacted first and foremost when identifying mitigation lands, even if a mitigation site is located outside of

a lead agency's jurisdictional boundary, particularly if the lead agency is a city or special district.

11. Select mitigation lands taking into account the potential human and wildlife conflicts or incompatibility, including but not limited to, human foot and vehicle traffic, and predation by cats, loose dogs and urban-adapted wildlife, and incompatible species management (i.e., snowy plover).
12. Where a burrowing owl population appears to be highly adapted to heavily altered habitats such as golf courses, airports, athletic fields, and business complexes, permanently protecting the land, augmenting the site with artificial burrows, and enhancing and maintaining those areas may enhance sustainability of the burrowing owl population onsite. Maintenance includes keeping lands grazed or mowed with weed-eaters or push mowers, free from trees and shrubs, and preventing excessive human and human-related disturbance (e.g., walking, jogging, off-road activity, dog-walking) and loose and feral pets (chasing and, presumably, preying upon owls) that make the environment uninhabitable for burrowing owls (Wesemann and Rowe 1985, Millsap and Bear 2000, Lincer and Bloom 2007). Items 4, 5 and 6 also still apply to this mitigation approach.
13. If there are no other feasible mitigation options available and a lead agency is willing to establish and oversee a Burrowing Owl Mitigation and Conservation Fund that funds on a competitive basis acquisition and permanent habitat conservation, the project proponent may participate in the lead agency's program.

Artificial burrows. Artificial burrows have been used to replace natural burrows either temporarily or long-term and their long-term success is unclear. Artificial burrows may be an effective addition to in-perpetuity habitat mitigation if they are augmenting natural burrows, the burrows are regularly maintained (i.e., no less than annual, with biennial maintenance recommended), and surrounding habitat patches are carefully maintained. There may be some circumstances, for example at airports, where squirrels will not be allowed to persist and create a dynamic burrow system, where artificial burrows may provide some support to an owl population.

Many variables may contribute to the successful use of artificial burrows by burrowing owls, including pre-existence of burrowing owls in the area, availability of food, predators, surrounding vegetation and proximity, number of natural burrows in proximity, type of materials used to build the burrow, size of the burrow and entrance, direction in which the burrow entrance is facing, slope of the entrance, number of burrow entrances per burrow, depth of the burrow, type and height of perches, and annual maintenance needs (Belthoff and King 2002, Smith et al. 2005, Barclay et al. 2011). Refer to Barclay (2008) and (2011) and to Johnson et al. 2010 (unpublished report) for guidance on installing artificial burrows including recommendations for placement, installation and maintenance.

Any long-term reliance on artificial burrows as natural burrow replacements must include semi-annual to annual cleaning and maintenance and/or replacement (Barclay et al. 2011, Smith and Conway 2005, Alexander et al. 2005) as an ongoing management practice. Alexander et al. (2005), in a study of the use of artificial burrows found that all of 20 artificial burrows needed some annual cleaning and maintenance. Burrows were either excavated by predators, blocked by soil or vegetation, or experienced substrate erosion forming a space beneath the tubing that prevented nestlings from re-entering the burrow.

Mitigation lands management plan. Develop a Mitigation Lands Management Plan for projects that require off-site or on-site mitigation habitat protection to ensure compliance with and effectiveness of identified management actions for the mitigation lands. A suggested outline and related vegetation management goals and monitoring success criteria can be found in Appendix E.

Mitigation Monitoring and Reporting

Verify the compliance with required mitigation measures, the accuracy of predictions, and ensure the effectiveness of all mitigation measures for burrowing owls by conducting follow-up monitoring, and implementing midcourse corrections, if necessary, to protect burrowing owls. Refer to CEQA Guidelines Section 15097 and the CEQA Guidelines for additional guidance on mitigation, monitoring and reporting. Monitoring is qualitatively different from site surveillance; monitoring normally has a specific purpose and its outputs and outcomes will usually allow a comparison with some baseline condition of the site before the mitigation (including avoidance and minimization) was undertaken. Ideally, monitoring should be based on the Before-After Control-Impact (BACI) principle (McDonald et al. 2000) that requires knowledge of the pre-mitigation state to provide a reference point for the state and change in state after the project and mitigation have been implemented.

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Appendix A. Burrowing Owl Natural History and Threats

Diet

Burrowing owl diet includes arthropods, small rodents, birds, amphibians, reptiles, and carrion (Haug et al. 1993).

Breeding

In California, the breeding season for the burrowing owl typically occurs between 1 February and 31 August although breeding in December has been documented (Thompson 1971, Gervais et al. 2008); breeding behavior includes nest site selection by the male, pair formation, copulation, egg laying, hatching, fledging, and post-fledging care of young by the parents. The peak of the breeding season occurs between 15 April and 15 July and is the period when most burrowing owls have active nests (eggs or young). The incubation period lasts 29 days (Coulombe 1971) and young fledge after 44 days (Haug et al. 1993). Note that the timing of nesting activities may vary with latitude and climatic conditions. Burrowing owls may change burrows several times during the breeding season, starting when nestlings are about three weeks old (Haug et al. 1993).

Dispersal

The following discussion is an excerpt from Gervais et al (2008):

> "The burrowing owl is often considered a sedentary species (e.g., Thomsen 1971). A large proportion of adults show strong fidelity to their nest site from year to year, especially where resident, as in Florida (74% for females, 83% for males; Millsap and Bear 1997). In California, nest-site fidelity rates were 32%–50% in a large grassland and 57% in an agricultural environment (Ronan 2002, Catlin 2004, Catlin et al. 2005). Differences in these rates among sites may reflect differences in nest predation rates (Catlin 2004, Catlin et al. 2005). Despite the high nest fidelity rates, dispersal distances may be considerable for both juveniles (natal dispersal) and adults (postbreeding dispersal), but this also varied with location (Catlin 2004, Rosier et al. 2006). Distances of 53 km to roughly 150 km have been observed in California for adult and natal dispersal, respectively (D. K. Rosenberg and J. A. Gervais, unpublished data), despite the difficulty in detecting movements beyond the immediate study area (Koenig et al. 1996)."

Habitat

The burrowing owl is a small, long-legged, ground-dwelling bird species, well-adapted to open, relatively flat expanses. In California, preferred habitat is generally typified by short, sparse vegetation with few shrubs, level to gentle topography and well-drained soils (Haug et al. 1993). Grassland, shrub steppe, and desert are naturally occurring habitat types used by the species. In addition, burrowing owls may occur in some agricultural areas, ruderal grassy fields, vacant lots and pastures if the vegetation structure is suitable and there are useable burrows and foraging habitat in proximity (Gervais et al 2008). Unique amongst North

American raptors, the burrowing owl requires underground burrows or other cavities for nesting during the breeding season and for roosting and cover, year round. Burrows used by the owls are usually dug by other species termed host burrowers. In California, California ground squirrel (*Spermophilus beecheyi*) and round-tailed ground squirrel (*Citellus tereticaudus*) burrows are frequently used by burrowing owls but they may use dens or holes dug by other fossorial species including badger (*Taxidea taxus*), coyote (*Canis latrans*), and fox (e.g., San Joaquin kit fox, *Vulpes macrotis mutica*; Ronan 2002). In some instances, owls have been known to excavate their own burrows (Thompson 1971, Barclay 2007). Natural rock cavities, debris piles, culverts, and pipes also are used for nesting and roosting (Rosenberg et al. 1998). Burrowing owls have been documented using artificial burrows for nesting and cover (Smith and Belthoff, 2003).

Foraging habitat. Foraging habitat is essential to burrowing owls. The following discussion is an excerpt from Gervais et al. (2008):

> "Useful as a rough guide to evaluating project impacts and appropriate mitigation for burrowing owls, adult male burrowing owls home ranges have been documented (calculated by minimum convex polygon) to comprise anywhere from 280 acres in intensively irrigated agroecosystems in Imperial Valley (Rosenberg and Haley 2004) to 450 acres in mixed agricultural lands at Lemoore Naval Air Station, CA (Gervais et al. 2003), to 600 acres in pasture in Saskatchewan, Canada (Haug and Oliphant 1990). But owl home ranges may be much larger, perhaps by an order of magnitude, in non-irrigated grasslands such as at Carrizo Plain, California (Gervais et al. 2008), based on telemetry studies and distribution of nests. Foraging occurs primarily within 600 m of their nests (within approximately 300 acres, based on a circle with a 600 m radius) during the breeding season."

Importance of burrows and adjacent habitat. Burrows and the associated surrounding habitat are essential ecological requisites for burrowing owls throughout the year and especially during the breeding season. During the non-breeding season, burrowing owls remain closely associated with burrows, as they continue to use them as refuge from predators, shelter from weather and roost sites. Resident populations will remain near the previous season's nest burrow at least some of the time (Coulombe 1971, Thomsen 1971, Botelho 1996, LaFever et al. 2008).

In a study by Lutz and Plumpton (1999) adult males and females nested in formerly used sites at similar rates (75% and 63%, respectively) (Lutz and Plumpton 1999). Burrow fidelity has been reported in some areas; however, more frequently, burrowing owls reuse traditional nesting areas without necessarily using the same burrow (Haug et al. 1993, Dechant et al. 1999). Burrow and nest sites are re-used at a higher rate if the burrowing owl has reproduced successfully during the previous year (Haug et al. 1993) and if the number of burrows isn't limiting nesting opportunity.

Burrowing owls may use "satellite" or non-nesting burrows, moving young at 10-14 days, presumably to reduce risk of predation (Desmond and Savidge 1998) and possibly to avoid nest parasites (Dechant et al. 1999). Successful nests in Nebraska had more active satellite burrows within 75 m of the nest burrow than unsuccessful nests (Desmond and Savidge

1999). Several studies have documented the number of satellite burrows used by young and adult burrowing owls during the breeding season as between one and 11 burrows with an average use of approximately five burrows (Thompsen 1984, Haug 1985, Haug and Oliphant 1990). Supporting the notion of selecting for nest sites near potential satellite burrows, Ronan (2002) found burrowing owl families would move away from a nest site if their satellite burrows were experimentally removed through blocking their entrance.

Habitat adjacent to burrows has been documented to be important to burrowing owls. Gervais et al. (2003) found that home range sizes of male burrowing owls during the nesting season were highly variable within but not between years. Their results also suggested that owls concentrate foraging efforts within 600 meters of the nest burrow, as was observed in Canada (Haug and Oliphant 1990) and southern California (Rosenberg and Haley 2004). James et al. (1997), reported habitat modification factors causing local burrowing owl declines included habitat fragmentation and loss of connectivity.

In conclusion, the best available science indicates that essential habitat for the burrowing owl in California must include suitable year-round habitat, primarily for breeding, foraging, wintering and dispersal habitat consisting of short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey within close proximity to the burrow.

Threats to Burrowing Owls in California

Habitat loss. Habitat loss, degradation, and fragmentation are the greatest threats to burrowing owls in California. According to DeSante et al. (2007), "the vast majority of burrowing owls [now] occur in the wide, flat lowland valleys and basins of the Imperial Valley and Great Central Valley [where] for the most part,...the highest rates of residential and commercial development in California are occurring." Habitat loss from the State's long history of urbanization in coastal counties has already resulted in either extirpation or drastic reduction of burrowing owl populations there (Gervais et al. 2008). Further, loss of agricultural and other open lands (such as grazed landscapes) also negatively affect owl populations. Because of their need for open habitat with low vegetation, burrowing owls are unlikely to persist in agricultural lands dominated by vineyards and orchards (Gervais et al. 2008).

Control of burrowing rodents. According to Klute et al. (2003), the elimination of burrowing rodents through control programs is a primary factor in the recent and historical decline of burrowing owl populations nationwide. In California, ground squirrel burrows are most often used by burrowing owls for nesting and cover; thus, ground squirrel control programs may affect owl numbers in local areas by eliminating a necessary resource.

Direct mortality. Burrowing owls suffer direct losses from a number of sources. Vehicle collisions are a significant source of mortality especially in the urban interface and where owls nest alongside roads (Haug et al. 1993, Gervais et al. 2008). Road and ditch maintenance, modification of water conveyance structures (Imperial Valley) and discing to control weeds in fallow fields may destroy burrows (Rosenberg and Haley 2004, Catlin and Rosenberg 2006) which may trap or crush owls. Wind turbines at Altamont Pass Wind Resource Area are known to cause direct burrowing owl mortality (Thelander et al. 2003). Exposure to

pesticides may pose a threat to the species but is poorly understood (Klute et al. 2003, Gervais et al. 2008).

Appendix B. Definitions

Some key terms that appear in this document are defined below.

Adjacent habitat means burrowing owl habitat that abuts the area where habitat and burrows will be impacted and rendered non-suitable for occupancy.

Breeding (nesting) season begins as early as 1 February and continues through 31 August (Thomsen 1971, Zarn 1974). The timing of breeding activities may vary with latitude and climatic conditions. The breeding season includes pairing, egg-laying and incubation, and nestling and fledging stages.

Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls or permanently exclude burrowing owls and excavate and close burrows after confirming burrows are empty.

Burrowing owl habitat generally includes, but is not limited to, short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey.

Burrow surrogates include culverts, piles of concrete rubble, piles of soil, burrows created along soft banks of ditches and canals, pipes, and similar structures.

Civil twilight - Morning civil twilight begins when the geometric center of the sun is 6 degrees below the horizon (civil dawn) and ends at sunrise. Evening civil twilight begins at sunset and ends when the geometric center of the sun reaches 6 degrees below the horizon (civil dusk). During this period there is enough light from the sun that artificial sources of light may not be needed to carry on outdoor activities. This concept is sometimes enshrined in laws, for example, when drivers of automobiles must turn on their headlights (called lighting-up time in the UK); when pilots may exercise the rights to fly aircraft. Civil twilight can also be described as the limit at which twilight illumination is sufficient, under clear weather conditions, for terrestrial objects to be clearly distinguished; at the beginning of morning civil twilight, or end of evening civil twilight, the horizon is clearly defined and the brightest stars are visible under clear atmospheric conditions.

Conservation for burrowing owls may include but may not be limited to protecting remaining breeding pairs or providing for population expansion, protecting and enhancing breeding and essential habitat, and amending or augmenting land use plans to stabilize populations and other specific actions to avoid the need to list the species pursuant to California or federal Endangered Species Acts.

Contiguous means connected together so as to form an uninterrupted expanse in space.

Essential habitat includes nesting, foraging, wintering, and dispersal habitat.

Foraging habitat is habitat within the estimated home range of an occupied burrow, supports suitable prey base, and allows for effective hunting.

Host burrowers include ground squirrels, badgers, foxes, coyotes, gophers etc.

Locally significant species is a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or occurring in a unique habitat type.

Non-breeding season is the period of time when nesting activity is not occurring, generally September 1 through January 31, but may vary with latitude and climatic conditions.

Occupied site or occupancy means a site that is assumed occupied if at least one burrowing owl has been observed occupying a burrow within the last three years (Rich 1984). Occupancy of suitable burrowing owl habitat may also be indicated by owl sign including its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance or perch site.

Other impacting activities may include but may not be limited to agricultural practices, vegetation management and fire control, pest management, conversion of habitat from rangeland or natural lands to more intensive agricultural uses that could result in "take". These impacting activities may not meet the definition of a project under CEQA.

Passive relocation is a technique of installing one-way doors in burrow openings to temporarily or permanently evict burrowing owls and prevent burrow re-occupation.

Peak of the breeding season is between 15 April and 15 July.

Sign includes its tracks, molted feathers, cast pellets (defined as 1-2" long brown to black regurgitated pellets consisting of non-digestible portions of the owls' diet, such as fur, bones, claws, beetle elytra, or feathers), prey remains, egg shell fragments, owl white wash, nest burrow decoration materials (e.g., paper, foil, plastic items, livestock or other animal manure, etc.), possible owl perches, or other items.

Appendix C. Habitat Assessment and Reporting Details

Habitat Assessment Data Collection and Reporting

Current scientific literature indicates that it would be most effective to gather the data in the manner described below when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report:

1. Conduct at least one visit covering the entire potential project/activity area including areas that will be directly or indirectly impacted by the project. Survey adjoining areas within 150 m (Thomsen 1971, Martin 1973), or more where direct or indirect effects could potentially extend offsite. If lawful access cannot be achieved to adjacent areas, surveys can be performed with a spotting scope or other methods.
2. Prior to the site visit, compile relevant biological information for the site and surrounding area to provide a local and regional context.
3. Check all available sources for burrowing owl occurrence information regionally prior to a field inspection. The CNDDB and BIOS (see References cited) may be consulted for known occurrences of burrowing owls. Other sources of information include, but are not limited to, the Proceedings of the California Burrowing Owl Symposium (Barclay et al. 2007), county bird atlas projects, Breeding Bird Survey records, eBIRD (http://ebird.org), Gervais et al. (2008), local reports or experts, museum records, and other site-specific relevant information.
4. Identify vegetation and habitat types potentially supporting burrowing owls in the project area and vicinity.
5. Record and report on the following information:
   a. A full description of the proposed project, including but not limited to, expected work periods, daily work schedules, equipment used, activities performed (such as drilling, construction, excavation, etc.) and whether the expected activities will vary in location or intensity over the project's timeline;
   b. A regional setting map, showing the general project location relative to major roads and other recognizable features;
   c. A detailed map (preferably a USGS topo 7.5' quad base map) of the site and proposed project, including the footprint of proposed land and/or vegetation-altering activities, base map source, identifying topography, landscape features, a north arrow, bar scale, and legend;
   d. A written description of the biological setting, including location (Section, Township, Range, baseline and meridian), acreage, topography, soils, geographic and hydrologic characteristics, land use and management history on and adjoining the site (i.e., whether it is urban, semi-urban or rural; whether there is any evidence of past or current livestock grazing, mowing, disking, or other vegetation management activities);
   e. An analysis of any relevant, historical information concerning burrowing owl use or occupancy (breeding, foraging, over-wintering) on site or in the assessment area;
   f. Vegetation type and structure (using Sawyer et al. 2009), vegetation height, habitat types and features in the surrounding area plus a reasonably sized (as supported with logical justification) assessment area; (Note: use caution in discounting habitat based on grass height as it can be a temporary condition variable by season and conditions (such as current grazing regime) or may be distributed as a mosaic).

g. The presence of burrowing owl individuals or pairs or sign (see Appendix B);
h. The presence of suitable burrows and/or burrow surrogates (>11 cm in diameter (height and width) and >150 cm in depth) (Johnson et al. 2010), regardless of a lack of any burrowing owl sign and/or burrow surrogates; and burrowing owls and/or their sign that have recently or historically (within the last 3 years) been identified on or adjacent to the site.

Appendix D. Breeding and Non-breeding Season Surveys and Reports

Current scientific literature indicates that it is most effective to conduct breeding and non-breeding season surveys and report in the manner that follows:

Breeding Season Surveys

Number of visits and timing. Conduct 4 survey visits: 1) at least one site visit between 15 February and 15 April, and 2) a minimum of three survey visits, at least three weeks apart, between 15 April and 15 July, with at least one visit after 15 June. Note: many burrowing owl migrants are still present in southwestern California during mid-March, therefore, exercise caution in assuming breeding occupancy early in the breeding season.

Survey method. Rosenberg et al. (2007) confirmed walking line transects were most effective in smaller habitat patches. Conduct surveys in all portions of the project site that were identified in the Habitat Assessment and fit the description of habitat in Appendix A. Conduct surveys by walking straight-line transects spaced 7 m to 20 m apart, adjusting for vegetation height and density (Rosenberg et al. 2007). At the start of each transect and, at least, every 100 m, scan the entire visible project area for burrowing owls using binoculars. During walking surveys, record all potential burrows used by burrowing owls as determined by the presence of one or more burrowing owls, pellets, prey remains, whitewash, or decoration. Some burrowing owls may be detected by their calls, so observers should also listen for burrowing owls while conducting the survey.

Care should be taken to minimize disturbance near occupied burrows during all seasons and not to "flush" burrowing owls especially if predators are present to reduce any potential for needless energy expenditure or burrowing owl mortality. Burrowing owls may flush if approached by pedestrians within 50 m (Conway et al. 2003). If raptors or other predators are present that may suppress burrowing owl activity, return at another time or later date for a follow-up survey.

Check all burrowing owls detected for bands and/or color bands and report band combinations to the Bird Banding Laboratory (BBL). Some site-specific variations to survey methods discussed below may be developed in coordination with species experts and Department staff.

Weather conditions. Poor weather may affect the surveyor's ability to detect burrowing owls, therefore, avoid conducting surveys when wind speed is >20 km/hr, and there is precipitation or dense fog. Surveys have greater detection probability if conducted when ambient temperatures are >20° C, <12 km/hr winds, and cloud cover is <75% (Conway et al. 2008).

Time of day. Daily timing of surveys varies according to the literature, latitude, and survey method. However, surveys between morning civil twilight and 10:00 AM and two hours before sunset until evening civil twilight provide the highest detection probabilities (Barclay pers. comm. 2012, Conway et al. 2008).

Alternate methods. If the project site is large enough to warrant an alternate method, consult current literature for generally accepted survey methods and consult with the Department on the proposed survey approach.

Additional breeding season site visits. Additional breeding season site visits may be necessary, especially if non-breeding season exclusion methods are contemplated. Detailed information, such as approximate home ranges of each individual or of family units, as well as foraging areas as related to the proposed project, will be important to document for evaluating impacts, planning avoidance measure implementation and for mitigation measure performance monitoring.

Adverse conditions may prevent investigators from determining presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owls in any given year. Any such conditions should be identified and discussed in the survey report. Visits to the site in more than one year may increase the likelihood of detection. Also, visits to adjacent known occupied habitat may help determine appropriate survey timing.

Given the high site fidelity shown by burrowing owls (see Appendix A, Importance of burrows), conducting surveys over several years may be necessary when project activities are ongoing, occur annually, or start and stop seasonally. (See Negative surveys).

Non-breeding Season Surveys

If conducting non-breeding season surveys, follow the methods described above for breeding season surveys, but conduct at least four (4) visits, spread evenly, throughout the non-breeding season. Burrowing owl experts and local Department staff are available to assist with interpreting results.

Negative Surveys

Adverse conditions may prevent investigators from documenting presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owl in any given year. Discuss such conditions in the Survey Report. Visits to the site in more than one year increase the likelihood of detection and failure to locate burrowing owls during one field season does not constitute evidence that the site is no longer occupied, particularly if adverse conditions influenced the survey results. Visits to other nearby known occupied sites can affirm whether the survey timing is appropriate.

Take Avoidance Surveys

Field experience from 1995 to present supports the conclusion that it would be effective to complete an initial take avoidance survey no less than 14 days prior to initiating ground disturbance activities using the recommended methods described in the Detection Surveys section above. Implementation of avoidance and minimization measures would be triggered by positive owl presence on the site where project activities will occur. The development of avoidance and minimization approaches would be informed by monitoring the burrowing owls.

Burrowing owls may re-colonize a site after only a few days. Time lapses between project activities trigger subsequent take avoidance surveys including but not limited to a final survey conducted within 24 hours prior to ground disturbance.

Survey Reports

Report on the survey methods used and results including the information described in the Summary Report and include the reports within the CEQA documentation:

1. Date, start and end time of surveys including weather conditions (ambient temperature, wind speed, percent cloud cover, precipitation and visibility);
2. Name(s) of surveyor(s) and qualifications;
3. A discussion of how the timing of the survey affected the comprehensiveness and detection probability;
4. A description of survey methods used including transect spacing, point count dispersal and duration, and any calls used;
5. A description and justification of the area surveyed relative to the project area;
6. A description that includes: number of owls or nesting pairs at each location (by nestlings, juveniles, adults, and those of an unknown age), number of burrows being used by owls, and burrowing owl sign at burrows. Include a description of individual markers, such as bands (numbers and colors), transmitters, or unique natural identifying features. If any owls are banded, request documentation from the BBL and bander to report on the details regarding the known history of the banded burrowing owl(s) (age, sex, origins, whether it was previously relocated) and provide with the report if available;
7. A description of the behavior of burrowing owls during the surveys, including feeding, resting, courtship, alarm, territorial defense, and those indicative of parents or juveniles;
8. A list of possible burrowing owl predators present and documentation of any evidence of predation of owls;
9. A detailed map (1:24,000 or closer to show details) showing locations of all burrowing owls, potential burrows, occupied burrows, areas of concentrated burrows, and burrowing owl sign. Locations documented by use of global positioning system (GPS) coordinates must include the datum in which they were collected. The map should include a title, north arrow, bar scale and legend;
10. Signed field forms, photos, etc., as appendices to the field survey report;
11. Recent color photographs of the proposed project or activity site; and
12. Original CNDDB Field Survey Forms should be sent directly to the Department's CNDDB office, and copies should be included in the environmental document as an appendix. (http://www.dfg.ca.gov/bdb/html/cnddb.html).

Appendix E. Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans

Whereas the Department does not recommend exclusion and burrow closure, current scientific literature and experience from 1995 to present, indicate that the following example components for burrowing owl artificial burrow and exclusion plans, combined with consultation with the Department to further develop these plans, would be effective.

Artificial Burrow Location

If a burrow is confirmed occupied on-site, artificial burrow locations should be appropriately located and their use should be documented taking into consideration:

1. A brief description of the project and project site pre-construction;
2. The mitigation measures that will be implemented;
3. Potential conflicting site uses or encumbrances;
4. A comparison of the occupied burrow site(s) and the artificial burrow site(s) (e.g., vegetation, habitat types, fossorial species use in the area, and other features);
5. Artificial burrow(s) proximity to the project activities, roads and drainages;
6. Artificial burrow(s) proximity to other burrows and entrance exposure;
7. Photographs of the site of the occupied burrow(s) and the artificial burrows;
8. Map of the project area that identifies the burrow(s) to be excluded as well as the proposed sites for the artificial burrows;
9. A brief description of the artificial burrow design;
10. Description of the monitoring that will take place during and after project implementation including information that will be provided in a monitoring report.
11. A description of the frequency and type of burrow maintenance.

Exclusion Plan

An Exclusion Plan addresses the following including but not limited to:

1. Confirm by site surveillance that the burrow(s) is empty of burrowing owls and other species preceding burrow scoping;
2. Type of scope and appropriate timing of scoping to avoid impacts;
3. Occupancy factors to look for and what will guide determination of vacancy and excavation timing (one-way doors should be left in place 48 hours to ensure burrowing owls have left the burrow before excavation, visited twice daily and monitored for evidence that owls are inside and can't escape i.e., look for sign immediately inside the door).
4. How the burrow(s) will be excavated. Excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow);
5. Removal of other potential owl burrow surrogates or refugia on site;
6. Photographing the excavation and closure of the burrow to demonstrate success and sufficiency;

7. Monitoring of the site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take;
8. How the impacted site will continually be made inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until development is complete.

Appendix F. Mitigation Management Plan and Vegetation Management Goals

Mitigation Management Plan

A mitigation site management plan will help ensure the appropriate implementation and maintenance for the mitigation site and persistence of the burrowing owls on the site. For an example to review, refer to Rosenberg et al. (2009). The current scientific literature and field experience from 1995 to present indicate that an effective management plan includes the following:

1. Mitigation objectives;
2. Site selection factors (including a comparison of the attributes of the impacted and conserved lands) and baseline assessment;
3. Enhancement of the conserved lands (enhancement of reproductive capacity, enhancement of breeding areas and dispersal opportunities, and removal or control of population stressors);
4. Site protection method and prohibited uses;
5. Site manager roles and responsibilities;
6. Habitat management goals and objectives:
    a. Vegetation management goals,
        i. Vegetation management tools:
            1. Grazing
            2. Mowing
            3. Burning
            4. Other
    b. Management of ground squirrels and other fossorial mammals,
    c. Semi-annual and annual artificial burrow cleaning and maintenance,
    d. Non-natives control – weeds and wildlife,
    e. Trash removal;
7. Financial assurances:
    a. Property analysis record or other financial analysis to determine long-term management funding,
    b. Funding schedule;
8. Performance standards and success criteria;
9. Monitoring, surveys and adaptive management;
10. Maps;
11. Annual reports.

Vegetation Management Goals

- Manage vegetation height and density (especially in immediate proximity to burrows). Suitable vegetation structure varies across sites and vegetation types, but should generally be at the average effective vegetation height of 4.7 cm (Green and Anthony 1989) and <13 cm average effective vegetation height (MacCracken et al. 1985*a)*.
- Employ experimental prescribed fires (controlled, at a small scale) to manage vegetation structure;

- Vegetation reduction or ground disturbance timing, extent, and configuration should avoid take. While local ordinances may require fire prevention through vegetation management, activities like disking, mowing, and grading during the breeding season can result in take of burrowing owls and collapse of burrows, causing nest destruction. Consult the take avoidance surveys section above for pre-management avoidance survey recommendations;
- Promote natural prey distribution and abundance, especially in proximity to occupied burrows; and
- Promote self-sustaining populations of host burrowers by limiting or prohibiting lethal rodent control measures and by ensuring food availability for host burrowers through vegetation management.

Refer to Rosenberg et al. (2009) for a good discussion of managing grasslands for burrowing owls.

Mitigation Site Success Criteria

In order to evaluate the success of mitigation and management strategies for burrowing owls, monitoring is required that is specific to the burrowing owl management plan. Given limited resources, Barclay et al. (2011) suggests managers focus on accurately estimating annual adult owl populations rather than devoting time to estimating reproduction, which shows high annual variation and is difficult to accurately estimate. Therefore, the key objective will be to determine accurately the number of adult burrowing owls and pairs, and if the numbers are maintained. A frequency of 5-10 years for surveys to estimate population size may suffice if there are no changes in the management of the nesting and foraging habitat of the owls.

Effective monitoring and evaluation of off-site and on-site mitigation management success for burrowing owls includes (Barclay, pers. comm.):

- Site tenacity;
- Number of adult owls present and reproducing;
- Colonization by burrowing owls from elsewhere (by band re-sight);
- Evidence and causes of mortality;
- Changes in distribution; and
- Trends in stressors.

ATTACHMENT B

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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September 12, 2015

Rachael Koss
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Subject: Comments on the Richmond Solar PV Project

Dear Ms. Koss:

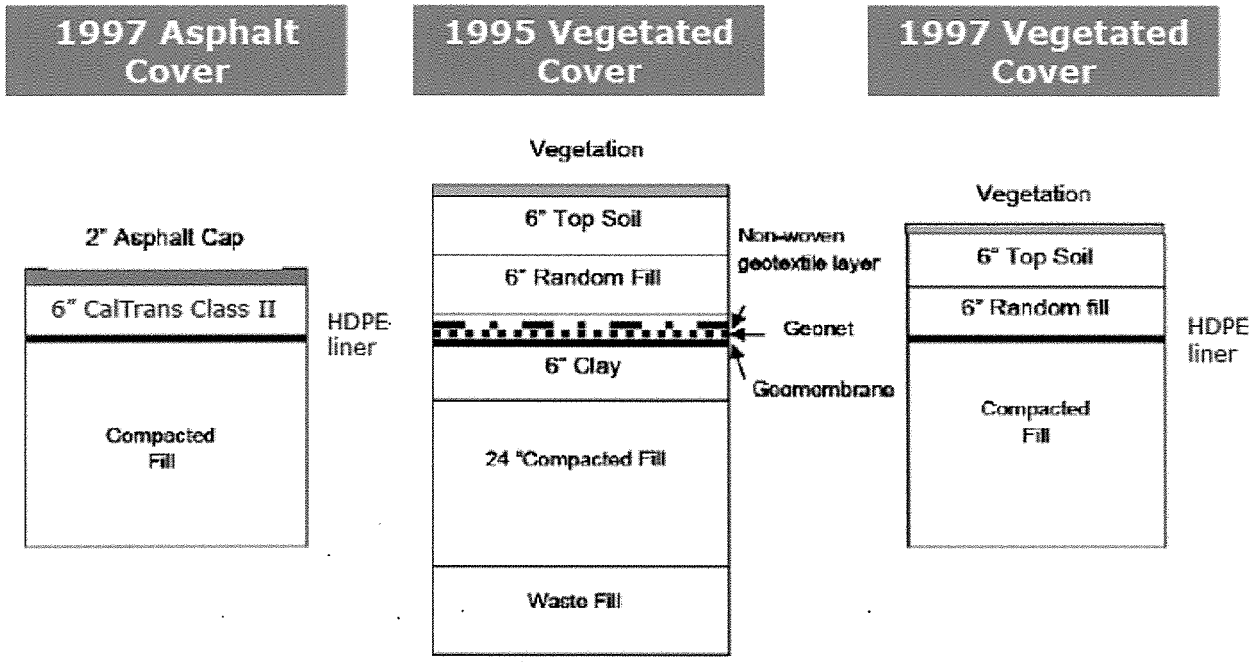
I have reviewed the August 2015 Draft Environmental Impact Report (DEIR) for the Richmond Solar PV Project, a proposed 10.5 megawatt (MW) solar photovoltaic project to be constructed on 60 acres of the Richmond Chevron Refinery, in Richmond, California. The Project will cover 40 acres of a capped landfill and 20 acres of a filled fertilizer evaporation pond with solar arrays. The project would be a combination of non-penetrating ballasted fixed tilt arrays installed on the capped landfill, and pole-mounted single axis tracking arrays installed on the filled fertilizer evaporation pond. The DEIR acknowledges that "residual chemicals or heavy metals may be present in these areas" and that "construction workers could be exposed to these chemicals should ground-disturbing activities occur during grading and construction" (p. 4.2-9).

The DEIR fails to adequately evaluate potentially significant impacts to water quality and public health from installation of solar arrays on both the capped landfill and on the fertilizer evaporation pond. Placement of solar panels on the landfill cap may lead to differential settlement which could compromise the integrity of the cap. Accelerated erosion of the landfill cap may also result from the placement of the PV panel arrays. In addition, the act of driving piles into the filled fertilizer evaporation pond may create pathways for infiltrating water, potentially mobilizing contamination. Workers may also be exposed to chemicals in the subsurface via inhalation of dust and in handling construction equipment. These potentially significant impacts must be adequately evaluated and mitigated in a revised DEIR.

Differential Settlement Potential at Landfill 15 Cap

The DEIR fails to disclose that placement of the solar panels at Landfill 15 may cause differential settlement which could compromise the integrity of the cap. The cap, which was constructed from 1995 to 1997, was completed in three configurations as shown below[1]:

[1] ARCADIS, 2012. Landfill 15 Solar Array Installation – Engineering and Regulator Evaluation



As shown, as little as 8 inches of material and a maximum of 12 inches of material overlie a high-density 40 milimeter polyethylene liner or a geomembrane. The cap was created to promote evapotranspiration of precipitation and to isolate underlying wastes from infiltrating water.

The infiltration of water through a landfill cap will increase the generation of landfill leachate, potentially mobilizing contamination that could move offsite in groundwater. The underlying landfill wastes include sludges (separator, paint, and water treatment), oily soil and dredge spoils, resins, catalyst fines, lime, and sulfur.[2] Chemical components of these compounds, which may include volatile organic compounds, semi-volatile organic compounds, heavy metals, and petroleum hydrocarbons may dissolve into groundwater and become mobile. If mobilized, the contaminated groundwater may move toward and enter the adjacent San Pablo Bay, a water body that is listed as impaired by the San Francisco Bay Regional Water Quality Control Board under the Clean Water Act, Section 303(d) for pesticides, dioxins and furans, and mercury.[3]

A brief description of the potential for landfill settlement is provided in Appendix B to the DEIR. Appendix B states that an "updated settlement evaluation will be necessary considering the increased loading due to placement of backfill and solar arrays on site" (Appendix B, p. 5). A brief Powerpoint report[4] that was the basis for this conclusion found:

Presentation as referenced in the DEIR, p. 7-1

[2] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CCwQFjACahUKEwjxsr-Y0N3HAhWCi5IKHXmSAX4&url=http%3A%2F%2Fwww.waterboards.ca.gov%2Fsanfranciscobay%2Fboard_decisions%2Fadopted_orders%2F2011%2FR2-2011-0036.pdf&usg=AFQjCNFXoCelncvlq6NTf1iUk40XPijWpA&bvm=bv.101800829,d.aWw&cad=rja

[3] http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/state_usepa_combined.pdf

[4] ARCADIS, 2012. Landfill 15 Solar Array Installation – Engineering and Regulator Evaluation Presentation as referenced in the DEIR, p. 7-1

- Some soft soils may be present in the waste fill – differential settlement could affect the liner.
- Post-closure amendment approval process may have to go through a public hearing process.
- Additional information needed, including:
    - Quantity and spacing (panel dimensions)
    - Loads and Footprint dimensions
    - Utility Connections (location, ground support – poles conduits, flexibility, etc.).

The recommendations in Appendix B to the DEIR and in the underlying report, as itemized above, have not been addressed. No "updated settlement evaluation" is referenced or included in the DEIR. The potential for soft soils and the requirements for permitting with the Department of Toxics Substances Control have not been disclosed or analyzed. No information on the ability of the liner to handle the load (weight) of the solar panels, including the significant weight of their ballasted footings, is included in the DEIR.

The potential for differential settlement of a landfill cap is a serious consideration, one that needs a measured evaluation. The construction of a utility scale solar project on a closed landfill was rejected as an alternative at other locations due to concerns for differential settlement. For example, the 2011 DEIR for the McHenry Solar Farm found that a landfill being considered for construction "would not be suitable for a utility-scale solar project due to differential settling of the landfill and construction restrictions on the landfill cap."[5]

DEIR mitigation measure HAZ-1(a) requires the applicant to provide to the City, prior to issuance of building permits, parameters "to assure that the solar project would not reduce the effectiveness of the remediation measures currently implemented in the solar site area." This measure defers evaluation and mitigation of the Project's potentially significant impact from settlement of the landfill cap until after Project approval. A revised DEIR must be prepared that evaluates impacts and provides mitigation for settlement of the landfill cap from the placement of the ballasted solar array, as recommended by Chevron's consultants. The evaluation should consider the potential to encounter soft soils during construction and the loads of the construction equipment and solar panel infrastructure on the cap. The utility corridors and any supports should be included in drawings and cross sections to show any penetration of the cap.

In addition to an evaluation of the settlement potential, the DEIR must include mitigation measures to ensure that differential settlement that would affect the integrity of the landfill cap does not occur. A revised DEIR should include a mitigation measure that would require an accurate survey, to be conducted once per year, to measure any settlement that is occurring. The mitigation measure should also require a thorough visual inspection of the landfill cap, once per year, to ensure settlement has not caused a breach of the cap that would allow for percolation of runoff in the area of the array.

[5] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CB8QFjAAahUKEwjdxYWJv97HAhVCUJIKHTvBA6w&url=http%3A%2F%2Fwww.stancounty.com%2Fplanning%2Fpl%2Fagenda%2F2011%2F09-15-11%2FDEIR.pdf&usg=AFQjCNG3LzBHZ5igdCGhJ9uGTmCnN8jVeg

Increased Runoff may Cause Erosion of Cap

The Chevron report referenced in Appendix B found that "new relatively impervious surfaces [such as solar panels] will cause an increased rate of runoff discharge during storm events."[6] According to the DEIR (p. 4.3-10):

> The project is not anticipated to substantially affect runoff since the proposed project includes minimal changes in existing natural landforms, ongoing vegetation maintenance efforts during construction and operation, and limited areas of compaction.

The conclusion fails to consider that just 12 inches of soil (including 6 inches of "random fill" – see above figure) overlie an impermeable or relatively impermeable plastic membrane in areas of the Landfill 15 cap. Given the uncertain engineering properties of "top soil" and "random fill" and shallowness of these materials, this conclusion is unsupported. The infiltration capacity of these materials must be identified, including measurements of porosity and permeability. Without this information, there is no support for the DEIR's conclusion.

The DEIR also states (p. 4.3-10):

> Although modules are not anticipated to increase the rate of runoff, it is anticipated that the "drip line" effect of the modules, where surface runoff in direct response to precipitation events would be concentrated along the lowest edge of PV module installations, could cause localized increases in erosion.

The DEIR fails to address how "localized increases in erosion" might impact a soil/random fill layer 12 inches thick and the stability of the underlying 40 millimeter thick plastic membrane.

Mitigation measure HAZ-1(a) only provides for the evaluation of impacts on Landfill 15 remedial measures "prior to issuance of building permits, by the City of Richmond "and/or the Regional Water Quality Control Board." Under this proposed mitigation measure, the potential for erosion of the cap will not be disclosed. A Project-specific study must be conducted and included in a revised DEIR that evaluates whether any increases in runoff can be accommodated by the thin layer of soil/random fill underlying some areas of the solar panels, without an increase in erosion. Erosion of the soils would limit the growth of vegetation on the cap, therefore limiting the potential for evapotranspiration. Erosion of cap soils could also directly expose the plastic membrane to sunlight, causing UV-degradation and the potential for leakage. An increase in leakage would cause greater infiltration, generating additional leachate which may lead to migration of leachate-related contaminants via groundwater offsite. The DEIR fails to analyze or mitigate this potentially significant impact to water quality.

Pile Driving on Former Fertilizer Pond may Cause or Contribute to Contamination

The construction of the pole mounted solar array in the area of the Former Fertilizer Pond has the potential to mobilize contaminants and to expose workers to contamination. Contaminants known to

[6] ARCADIS, 2012. Landfill 15 Solar Array Installation – Engineering and Regulator Evaluation Presentation as referenced in the DEIR, p. 7-1

exist at the Former Fertilizer Pond include arsenic, beryllium, cadmium, and cobalt (DEIR, p. 4.2-2). These compounds are toxic to human health and aquatic organisms.

- Ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer.[7] Arsenic is bioconcentrated by aquatic organisms.[8]
- The U.S. EPA has determined that beryllium is a probable human carcinogen.[9]
- The Department of Health and Human Services has determined that cadmium and cadmium compounds are known human carcinogens.[10] Cadmium is known to be toxic to aquatic organisms.[11]
- The International Agency for Research on Cancer has determined that cobalt and cobalt compounds are possibly carcinogenic to humans.[12]

No cover, liner, or cap exists at this site. The DEIR states that the fertilizer ponds were filled and compacted with clean fill and asphalt base (p. 4.2-2); however, the statement is unsupported since there are no details about the cover of the ponds in the DEIR and no additional documents about the cover are referenced in the DEIR. There is also no mention of a cover in any of the DTSC or RWQCB documents related to the Project site.

The DEIR asserts (p. 4.2-9):

> Although installation of the tracking arrays on the FFPP portion of the project site would involve ground disturbance to a depth of six feet, nine inches – as this area contains clean, compacted fill – the likelihood that construction workers or operational staff could be exposed to residual chemicals in on-site soils is minor. In addition, pole-mounting would involve pile-driving or a similar technique that would minimize the area of soil disturbance.

However, because the actual depth of the "clean, compacted fill" is not disclosed in the DEIR, this statement is unsupported. There is no evidence to support the statement that the piles driven to a depth of six feet, nine inches would not contact contaminants.

The act of driving piles into a layer of material of unknown thickness and unknown permeability may create conduits through which water may infiltrate and move down to contact underlying contaminants. The underlying contaminants may be mobilized in this process to move with groundwater offsite and eventually toward San Pablo Bay, which is listed by the San Francisco Bay Regional Water Quality Control Board as an impaired water body. The DEIR fails to analyze or mitigate this potentially significant impact to water quality.

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[7] http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=19&tid=3

[8] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=12&ved=0CB8QFjABOApqFQoTCIWohZrm8ccCFcyLDQodP4IF0w&url=https%3A%2F%2Fclu-in.org%2Fdownload%2Fcontaminantfocus%2Farsenic%2Feisler_CHR_12_Arsenic.pdf&usg=AFQjCNHb_HtC8LGz8o-emb4Bt5MRaUMF1A&bvm=bv.102537793,d.eXY&cad=rja

[9] http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=184&tid=33

[10] http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=47&tid=15

[11] http://water.epa.gov/scitech/swguidance/standards/upload/2001_04_13_criteria_cadmium_cad2001upd.pdf

[12] http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=372&tid=64

A revised DEIR must be prepared that includes an engineering evaluation of the material that covers the Former Fertilizer Ponds. The evaluation should include measurements of the thicknesses and permeability of the material and an evaluation of the integrity of the material as a barrier to infiltration. The evaluation should also determine the potential for the pile-driven, pole mounted supports to act as hydraulic conduits that would preferentially move infiltration downward into soil, possibly mobilizing underlying contaminants.

The revised DEIR should also evaluate potential construction worker health and safety implications of the potential to drive piles into underlying contaminants. The DEIR should include provisions to protect worker safety from those contaminants – including arsenic, beryllium, cadmium, and cobalt – that may be present within the depth that piles are to be driven.

Sincerely,

Matt Hagemann, P.G., C.Hg.

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Geologic and Hydrogeologic Characterization
Industrial Stormwater Compliance
Investigation and Remediation Strategies
Litigation Support and Testifying Expert
CEQA Review

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

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Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

Landfill 15 Solar Array Installation - Engineering and Regulatory Evaluation

ARCADIS-US
Richmond, CA

Objectives and Baseline Assumptions

Objective:

- Provide initial evaluation of the requirements to install the proposed solar energy installation on Landfill 15 by optimizing suitable footprint acreage
  - Constructability constraints
  - Regulatory constraints

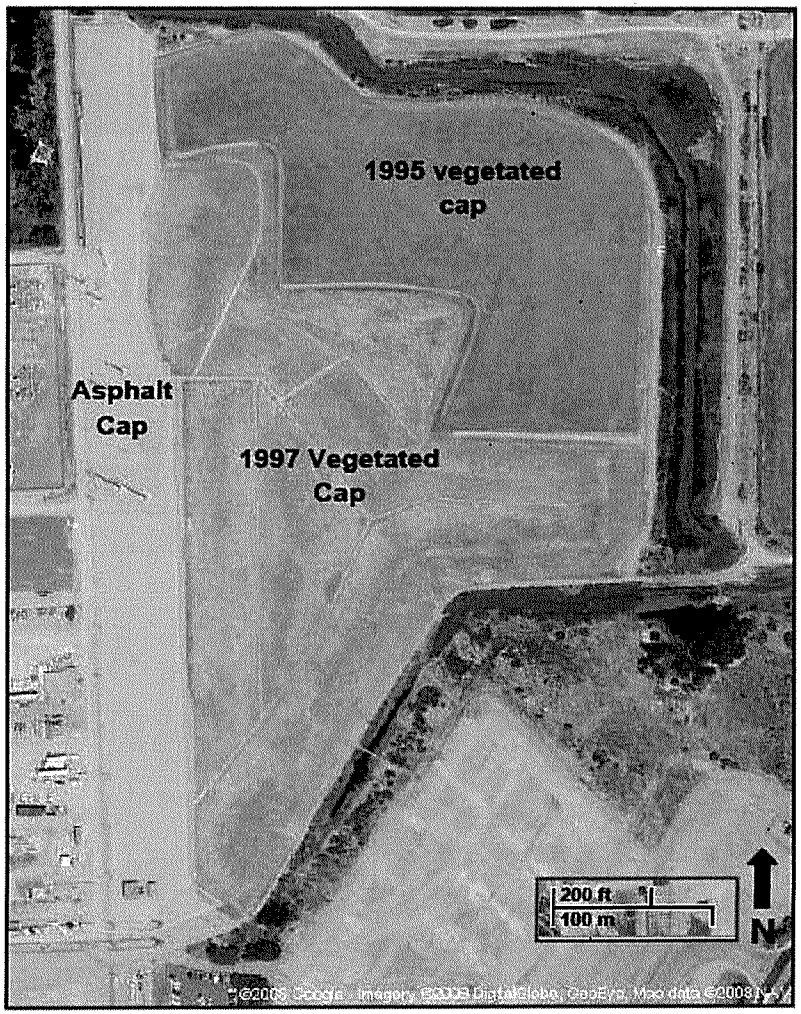
Baseline Assumptions

- Optimal grades for solar installation ≤ 4%
- Slab-on grade array foundations
- Constructed with typical low-ground pressure equipment

Landfill 15 Background

- 41 acre site located just east of the Richmond Refinery
- Operated as an evaporation pond and a landfill from early 1960's to 1987
- Fill material consists mostly of:
  - oily and acid sludge
  - sulfur wastes
  - hydrocarbon-contaminated soil
  - other non-hazardous fill material from the refinery and Pollard Landfill

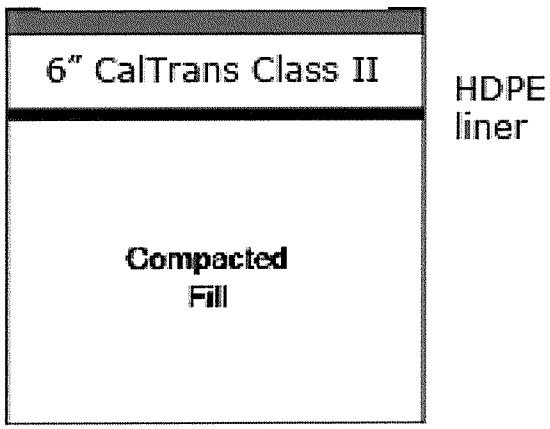
Site Closure History



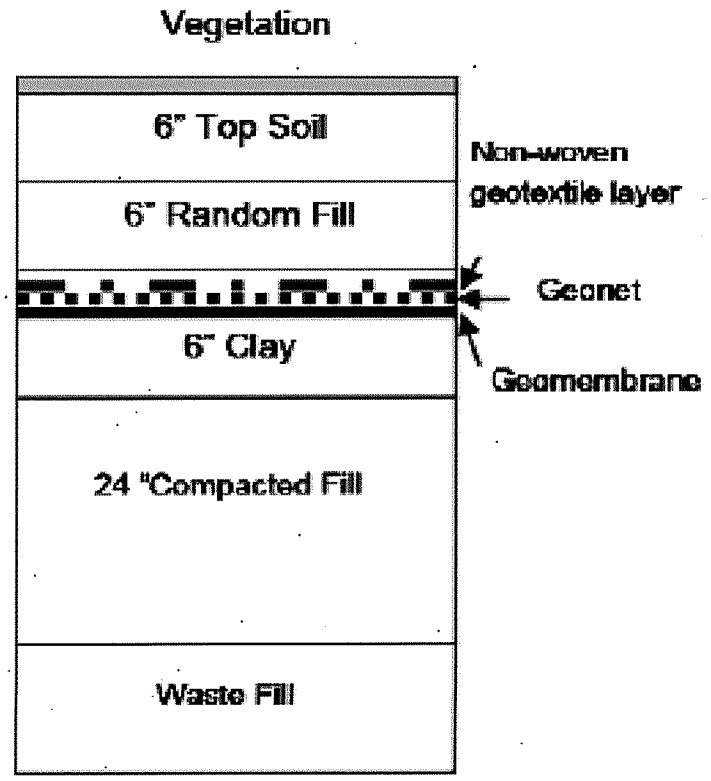
- 2 generations and 3 configurations
  - 1995 – NE activated waste management portion closed and capped with a vegetated cover.
  - 1997 – remainder of site closed with an asphalt or vegetated cover.
  - Groundwater protection, methane venting, and stormwater control systems were installed.

Cover Design Cross Sections

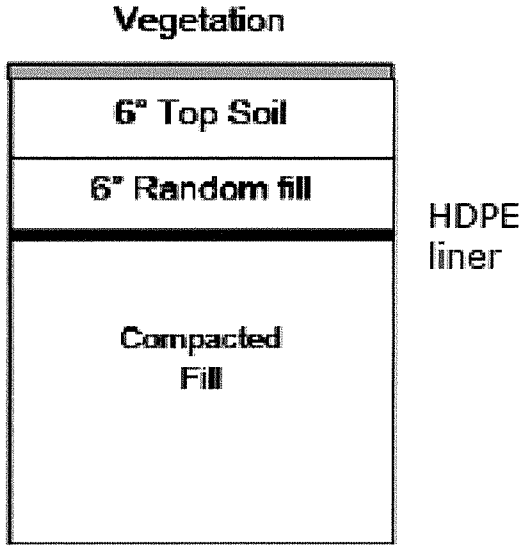
1997 Asphalt Cover



1995 Vegetated Cover



1997 Vegetated Cover



Vertical Settlement Summary

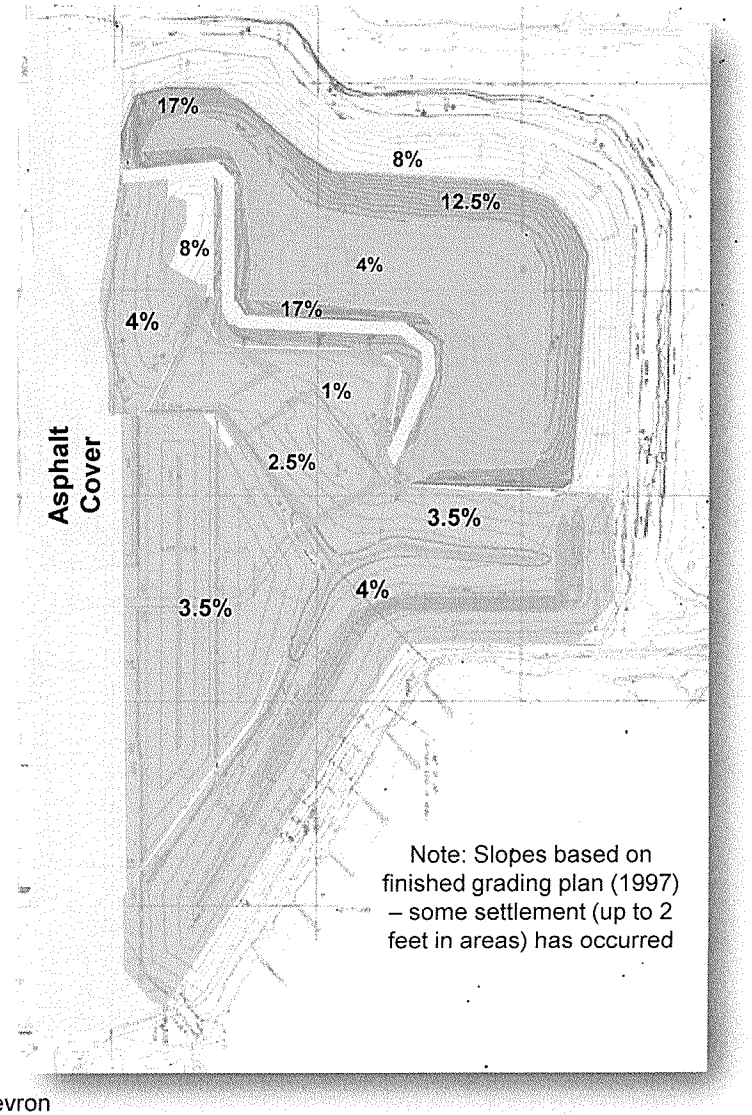
- Basis of Design lifetime settlement estimate (pre-construction) – 3.2 ft[1]
- Total observed settlement (1997-2010) – Average of 1.03 ft (1.76 ft max)[1]
- Average settlement per year (1997-2010) – 0.07 ft[1]
- 2011 Average Settlement – 0.03 ft

Evaluation

- Historically there has been a slight decrease in rate of settlement.
- Primary consolidation is not likely complete as this point.
- If additional loads are relatively small compared to the current load, additional differential settlement likely will be relatively small

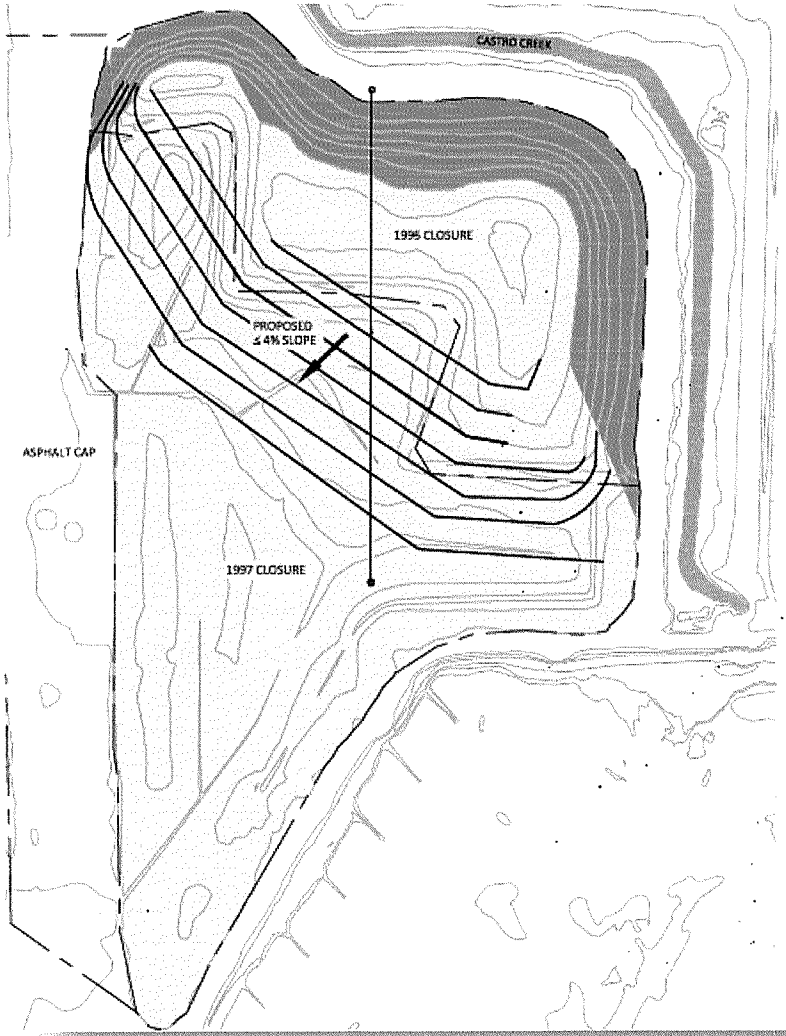
[1] - *SAIC, 2011.* 2010 *Annual Inspection and Monitoring Report – Landfill 15 Closure Site. January*

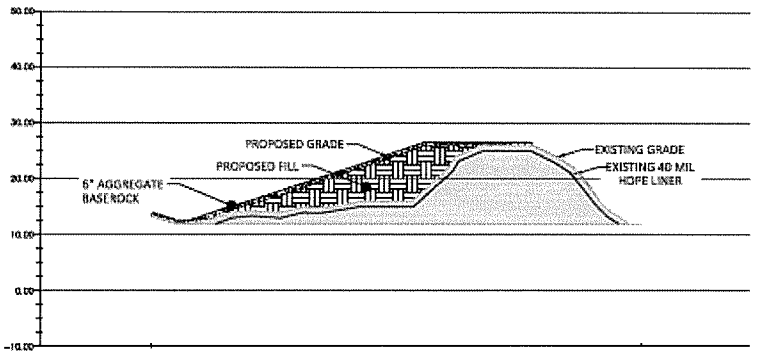
Current Site Slope Configuration



- In vegetated sections, finished grading slopes range from 1% to 17% (6:1).
- **Blue areas** represent current slope grades of ≤ 4% (preferred grade for solar array installation).

Redesigned Site Layout





PROFILE - SOUTH TO NORTH

23.1 ACRES OF USEABLE AREA FOR SOLAR PROJECT
WITH AGGREGATE BASEROCK (SLOPES ≤ 4%)

4.2 ACRES OF NON-USEABLE AREA WITH EXISTING
VEGETATION COVER (SLOPES > 4%)

VOLUMES OF IMPORT
55,000 CYD ACCEPTABLE SOIL
1,350 TONS AGGREGATE BASEROCK

DESIGN ASSUMPTIONS
1. MAINTAIN MINIMUM 1-FOOT OF COVER OVER EXISTING LINER.
2. PLACE 6" AGGREGATE BASEROCK COVER OVER PROPOSED FILL OR EXISTING CAP.
3. IN V-DITCHES COVERED BY PROPOSED FILL PLACE PERFORATED PIPE AND DRAIN ROCK.

DRAFT
NOT FOR CONSTRUCTION

Site Redesign Evaluation

- Approximately 55,000 CYD clean backfill necessary to provide adequate slope and optimize available area for solar installations.
- Base-rock finish layer placed on sloped area – base-rock will reduce the potential for erosion and minimize O&M costs.
- Backfilled v-ditches to be re-engineered with perforated pipe and drainage rock.
- Site acreage availability evaluation:

	Area (acres)	
	≤ 4% slope	≥ 4% slope
Current Site Design	17.6	9.7
Proposed Regraded Design	23.1	4.2

- Redesigned site increases available acreage for solar arrays by 5.5 acres.

Site Redesign Evaluation (cont.)

- Estimated cost of implementing redesign project ~ $800,000

LANDFILL 15 CONCEPTUAL GRADING DESIGN

DESCRIPTION	PRICE	QUANTITY	UNIT	AMOUNT	TOTAL
Pipe	$ 29	2,500	LF	$ 72,000	
Aggregate baserock	$ 29	1,350	TON	$ 38,880	
Soil	$ 12	55,000	CY	$ 660,000	
Total					**$ 770,880**

- Site Redesign Cost Assumptions:
  - Clean backfill soil obtained from adjacent Chevron site.
  - Solar array foundations anticipated to be placed on graded surface. Estimate does not include costs related to preparing the site for the solar array foundations or utility connections.

Site Redesign Surface Conditions

Drainage and Erosion

- New relatively impervious surfaces will cause an increased rate of runoff discharge during storm events.
- Site redesign involves covering over segments of v-ditch.

Discussion

- Existing storm water features (drainage capacity) will need to be evaluated and modified if necessary.
- V-ditches covered by backfilled will need to be modified to remain functioning to provide infiltration drainage.

Regulatory Evaluation: Title 22 and 27 – Post Closure Land Use

Construction shall maintain the integrity of the final cover, drainage and erosion control systems, and monitoring and control systems.

- Structures and utilities constructed to mitigate effects of differential settlement. Utility connections shall be designed with flexible connections and utility collars.
- Utilities shall not be installed in or below any low permeability layer of final cover.
- If pilings are installed in or through the low permeability layer of final cover, then the low permeability layer must be replaced or repaired.
- An additional soil layer may be required to be placed on the final cover prior to construction to protect the integrity and function of the various layers of the final cover.

- The post-closure amendment approval process may have to go through a public hearing process. The approximate timeline for approval of the amendment would be 180 days after receipt of the amendment by the DTSC. Rough estimate for a post-closure permit amendment is approximately $50,000.
- Based on evaluation assumptions, regulatory re-permitting should be feasible.

Project Assumptions Summary

- Slopes of ≤4% grade are adequate for installation of solar arrays.
- An updated settlement evaluation will be necessary considering the increased loading due to placement of backfill and solar arrays on site.
- Some soft soils may be present in the waste fill – differential settlement could affect the liner. Soft spots can be identified by inspection of footings immediately after construction and as part of the annual inspection.
- Permit modification necessary due to grading and drainage alteration. Will need to demonstrate through more detailed evaluation that the liner will not be impacted by project activities.
- Increased rate of stormwater discharge is allowed under NPDES Permit R2-2011-0049.
- Each engineering consideration will require detailed evaluation once design (grading and solar arrays) is selected.
- DTSC Permit modification would involve either a Class 2 or 3 modification.

Solar Panel Specification Considerations – Additional Information Required for Refined Evaluation

Solar Array Information

- Quantity and spacing (panel dimensions)
- Loads and Footprint dimensions
- Utility Connections (location, ground support – poles conduits, flexibility, etc.)

Solar Array Mounting

- Footing materials, embedment, settlement tolerance
- Orientation (angle, direction, height from ground)
- Mounting technique/design – rotation capabilities

Site Information & Construction Feasibility

- Access/Material transport
- Additional Subbase material
- Slope constraints

Conclusions

- Landfill 15 is a viable site for the installation of solar arrays.
- Backfilling and regrading of the current site will increase the total acreage available for the installation of the solar arrays by 5.5 acres (23.1 total acres available).
- Further engineering evaluations will be required once project designs (grading and solar array specifications) are selected.
- Alteration of the landfill run-off control and final cover system will require a permit modification.
- Total estimate cost for the engineering redesign, re-permitting, and implementing the redesign is approximately $850,000.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2011-0036

UPDATED WASTE DISCHARGE REQUIREMENTS AND RESCISSION OF ORDER NO. 00-043 FOR:

CHEVRON PRODUCTS COMPANY
CHEVRON RICHMOND REFINERY
841 CHEVRON WAY
RICHMOND, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Regional Water Board, finds that:

OWNERSHIP AND LOCATION

1. Chevron Products Company, a subsidiary of Chevron USA, Inc., (hereinafter called Chevron or the Discharger) owns and operates the Chevron Richmond Refinery (hereinafter called the refinery). The refinery was built in 1902 and produces a broad range of fuels, lubricants, asphalt and petrochemicals. The 2,900-acre refinery is located along the southern shore of San Pablo Bay in Contra Costa County (Figure 1). The City of Richmond lies to the east of the refinery. To the east and within one mile from the refinery are industrial, residential, and commercial land uses. Certain wastes generated from the refinery's processes have historically been deposited in Waste Management Units within the refinery, prompting the need for these Waste Discharge Requirements (WDRs).

PURPOSE OF ORDER UPDATE

2. This Order rescinds outdated WDRs and updates the requirements for continued maintenance and monitoring of the inactive and closed Waste Management Units, along with the requirements for the Waste Management Unit corrective action and water quality monitoring programs.

REGULATORY HISTORY

3. Prior to this Order, the Regional Water Board regulated the Waste Management Units and the refinery-wide investigations and corrective actions under Order No. 00-043. The refinery-wide investigation and corrective action activities not associated with the Waste Management Units will be addressed under separate Site Cleanup Requirements Order (SCRs).

   Other Orders previously adopted, but now rescinded, for the refinery are:

93-109	Waste Discharge Requirements
93-016	Site Cleanup Requirements for the S.P. Hill Tank Field
92-092	Site Cleanup Requirements for the Alkane Sector
92-010	Waste Discharge Requirements for Landfill 15
91-098	Cease and Desist Order for Pollard Pond and the Hydropits
90-146	Site Cleanup Requirements for Plant l/Additives Plant
89-175	Waste Discharge Requirements
89-011	Cease and Desist Order for the Pollard Pond
88-044	Waste Discharge Requirements
83-13	Waste Discharge Requirements
81-55	Waste Discharge Requirements

4. The Regional Water Board adopted Order No. R2-2006-0035 (NPDES No. CA0005134) on June 14, 2006. This permit regulates the discharge of effluent from the Discharger's wastewater treatment system, and the discharges of all stormwater associated with industrial activity from the refinery to San Pablo and San Francisco bays.

5. Effective July 18, 1997, many provisions of the California Code of Regulations (CCR) for non-hazardous waste were moved from Division 3, Chapter 15 into Title 27, Division 2 (Title 27). Where applicable, the new regulatory citations have been incorporated in this Order.

FACILITY DESCRIPTION AND HISTORY

Hydrogeologic Setting

6. The refinery and its tankfields are located on the peninsula of the Potrero-San Pablo Ridge, which is composed of the steeply dipping Franciscan Complex. The refining of the petroleum products generally occurs on the bay fill areas northeast of the ridge. The southwest side of the ridge consists of steep topography where the Franciscan Complex has been terraced for the placement of aboveground petroleum storage tanks.

7. Past fluctuations in sea level created a complex sedimentary sequence of interfingered estuarine and alluvial fan deposits overlying the Franciscan Complex bedrock. The uppermost deposits are artificially placed bay fill, ranging from approximately 3 feet to approximately 30 feet in depth. The fill materials overlie bay muds, which consist of silt and silty clay with abundant plant matter or peat. The bay muds overlap onto the Franciscan bedrock and thicken bayward.

8. Three hydrogeologic zones have been identified within the top 150 feet of sediments. in the flat lying areas of the refinery, the A-Zone, the C-Zone, and the B-Zone, in order of increasing depth.

   a. The A-Zone is the first water bearing zone and consists of artificial fill and the naturally occurring peat rich, bay mud. The water table elevation for this zone is within two to ten feet of the ground surface and generally discharges to the Bay.

   b. The C-Zone is an 80 to 90-foot-thick water bearing zone of interfingered alluvial and estuarine sediments. These sediments generally have low hydraulic conductivity, but sandy, more permeable units occur as channels and lenses. The sand units have not been shown to be contiguous across the site, but do appear to be hydraulically connected. However, based on several years of chemical data there is no indication that the C-Zone groundwater has been significantly impacted. Chevron has concluded that the bay mud has been an effective hydraulic barrier between the A- and C-Zones and has prevented the migration of contaminants in groundwater from the A-Zone to the C-Zone. These results and

conclusions were presented to the Regional Water Board in two reports titled C-Zone Investigation - Phase 1 and Phase 2, dated February 8 and December 20, 1991, respectively, and continue to be supported by groundwater monitoring data collected pursuant to the refinery-wide Self-Monitoring Program.

c. The B-Zone is a relatively permeable unit at approximately 100 feet below the ground surface. It ranges from 5 to 15 feet thick and contains potable water, but has limited production capacity. The B-Zone occurs under artesian conditions and appears to be hydraulically separate from the overlying zones.

9. As shown in Figure 2, the refinery lies in four geomorphic/geologic settings referred to locally as the "Alluvial," "Flats," "Ridge," and "Transition" Zones.

a. The **Alluvial Zone** is defined as the broad area of alluvial fan deposits, derived from the Berkeley Hills, east of the refinery. This zone represents flatland areas in which bay mud was not deposited. The upper portion of the alluvial fan deposit is typically clayey with low permeability.

b. The **Flats Zone** comprises the flatland marsh area bounded by San Pablo Bay to the north and extending south along the northeast side of Potrero-San Pablo Ridge. For the purpose of the refinery's investigations, the inland Flats Zone/Alluvial Zone boundary has been defined to be the 5-foot bay mud isopach (line of equal thickness). Thus, the Flats Zone is typically underlain by at least five feet of bay mud except where removed by excavation or erosion, in local areas of non-deposition, or where displaced by differential settlement of overlying fill.

c. The **Ridge Zone** consists primarily of colluvium (slope wash) overlying deformed Franciscan Complex rocks exposed along Potrero-San Pablo Ridge. The boundary of the Ridge Zone is defined as those areas of Potrero-San Pablo Ridge above the 50-foot elevation contour.

d. The **Transition Zone** is defined as the area that separates the Flats Zone from the Ridge Zones. As described above, the Flats-Transition boundary is defined as the 5-foot bay mud isopach and the Ridge-Transition boundary is defined as the 50-foot elevation contour.

Castro/Plant 1 sectors are referred to collectively as the Groundwater Protection Systems (GPS) (see Figure 4). The GPS establishes and maintains a contiguous capture zone which prevents migration of potentially contaminated A-Zone groundwater past the GPS alignment. The slurry walls were installed where thick and/or highly permeable intervals of A-Zone fill soils are encountered. A low permeability bay mud "floor" inhibits transport of A-Zone contaminants to the underlying C-Zone in the "Flats Zone" of the Refinery (see Figure 13).

14. Approximately 24,700 feet of extraction trench, 18,535 feet of barrier wall, over 200 groundwater extraction sumps, and one groundwater treatment plant have been installed. The extracted groundwater is routed to the refinery's wastewater treatment system and discharged in accordance with existing NPDES permit requirements. The GPS extraction trenches and barrier wall are illustrated in Figure 13.

15. The Regional Water Board has determined that the GPS comprised of the slurry walls and extraction trenches at the Alkane, North Yard, Effluent, Landfarms/Landfill, Reclamation, Pollard, and Castro/Plant 1 sectors is a satisfactory corrective action measure for the containment and removal of contaminated groundwater along the perimeter of the refinery. The corrective action at the Alkane, North Yard, Effluent, Landfarms/Landfill, and the Reclamation sectors are addressed by this Order. Activities associated with the Castro/Plant 1 Additives, Pollard, Bayside North, Bayside South and Interior C Zone sectors will be addressed in separate SCRs. There is a single groundwater monitoring program for all sectors which is contained in both these WDRs and the SCRs.

Waste Management Units

The following is a summary of actions taken at previously-identified Waste Management Units pursuant to previous Regional Water Board orders organized by the refinery sectors subject to this Order.

Landfarms/Landfill Sector

16. Perimeter Groundwater Barrier and Soil cover: A GPS barrier wall and/or extraction trench is at the downgradient edge and largely surrounds this sector, consisting of Landfill 15 and the landfarms (described below, see Figures 8 and 12). The monitoring program (as described in the attached monitoring program) monitors both the performance of the GPS (A-Zone corrective action monitoring) as well as C-Zone wells (corrective action monitoring and detection monitoring for Landfarms No. 2-5) for the monitoring parameters (MP) and Constituents of Concern (COC) noted in the monitoring program. Chevron is responsible for inspection and maintenance of the soil cover and stormwater conveyances for the Landfill 15 and Landfarm soil covers.

17. Landfill 15: Landfill 15 is a 41-acre former tidal marsh area converted for waste disposal use (Figure 8) containing about 270,000 cubic yards of waste. The site was used from the early 1960's to 1987 as an evaporation pond and as a landfill for a

variety of wastes including sludges (separator, paint, and water treatment), oily soil and dredge spoils, resins, catalyst fines, lime, and sulfur. Approximately 13 acres of Landfill 15 were reactivated in 1992 for disposal of treated non-hazardous acidic sludge and dredged bay mud generated from the closure of Pollard Pond. The portion of the landfill that accepted the Pollard Pond closure waste was closed by placement of a multi-layer low-permeability cap. The remaining 28 inactive acres that ceased receiving waste material prior to 1987 were capped in 1996 and 1997. No further closure activities are required.

18. Old Drum Storage Area: This is a 180 ft. by 90 ft. area used for storing up to 2448 drums until 1984. The unit was closed in 1986 and is covered with a concrete cap with stormwater diversion away from the site.

19. Landfarms: Between the 1970's and 1987, Chevron conducted landfarming operations at five locations to promote biodegradation of oily soils. Landfarm No. 1 is 13.5 acres and is located in the North Yard sector. Landfarms No. 2-5 are 8, 3.5,3 and 1 acres, respectively. The landfarms were built by placing clean fill over existing waste which contained slop oil solids, leaded tank bottoms, separator sludge and other wastes. The landfarms were used to biologically treat 30,000 tons per year of non-leaded tank bottom sludge, oil water mixtures and other sludges and contaminated soil. The landfarms have not received waste since 1987. A Final Closure Plan for the landfarms was approved in 1998, and closure was completed the following year, which consisted of importing fill, grading, installation of a vegetative cap and shallow groundwater extraction trenches.

20. Landfill under Landfarms Numbers 2 and 3: The unit held about 80,000 cubic yards of refinery waste, completely within the bounds of both Landfarms No. 2 and No. 3. Landfilling was finished about 1977, with the landfarming beginning in about 1980.

North Yard Sector

21. Perimeter Groundwater Barrier: A GPS barrier wall and extraction trench is at the downgradient edge of Landfarm No. 1 and the North Yard, located in this sector (see Figure 12). The monitoring program (as described in the attached monitoring program) monitors both the performance of the GPS (A-Zone corrective action) as well as C-Zone wells (corrective action monitoring and detection monitoring at Landfarm No. 1) for the MP and COC also noted in the monitoring program. The aboveground tanks in this area also are subject to the inspection and monitoring programs described below.

22. Tetraethyl Lead Site (TEL): This was a 300 cubic yard impoundment formerly used for tank bottom sludges containing TEL. The wastes were removed in 1980. The soil was removed and disposed of as hazardous waste, and, in the early 1980's, Landfarm No. 1 was expanded over the site. Landfarm No. 1 was subsequently closed as noted in Finding 19.

10. Chevron has subdivided the refinery into ten geographic sectors (see Figure 3). Each sector has unique hydrogeology and varying degrees of environmental concern. The sectors are as follows:

    - Landfarms/Landfill 15
    - Castro/Plant 1 Additives
    - North Yard
    - Bayside Sector – North
    - Bayside Sector - South
    - Alkane Sector
    - Effluent
    - Reclamation
    - Pollard
    - Interior "C" Zone or Main Yard

11. Sector boundaries are generally defined by a physiographic boundary separating adjacent sectors, or by the refinery property line. The upgradient sector boundaries for the Alkane, North Yard, and Main Yard sectors correspond to an inferred groundwater drainage divide, which is generally coincident with topographic drainage divides along San Pablo Ridge. The upgradient sector boundaries for the Landfarms/Landfills, Castro, and Reclamation sectors are generally coincident with the refinery property line. The Bayside North and Bayside South sectors include all Chevron properties on the southwestern side of San Pablo Ridge and adjacent to San Francisco Bay. With the exception of the Bayside North and Bayside South sectors (which are on the west side of the San Pablo Ridge), all sites described in this Order are largely contained by the groundwater protection systems, which are described below.

Corrective Action

12. All sectors have impacted soil and/or groundwater from historic releases and corrective action steps have been implemented. Some of the sectors contain Waste Management Units that are either in the Title 27 Corrective Action Monitoring Program or part of the refinery effluent system; these include the Alkane, Reclamation, North Yard, Effluent, and Landfarms/Landfill sectors. Corrective action occurring at sectors comprised of only impacted soil and/or groundwater from historic releases and not associated with Waste Management Units will be addressed by the SCRs presently under development; these include the Pollard, Castro/Plant 1 Additives, Bayside North, Bayside South and Interior C Zone sectors.

13. Chevron has implemented corrective actions to intercept contaminated groundwater at various locations and thus to prevent migration to San Pablo Bay. The corrective actions include systems comprised of varying combinations of slurry walls, extraction trenches and/or extraction wells for hydraulic control at different locations within the refinery. The systems comprised of slurry walls and/or extraction trenches at the Alkane, North Yard, Effluent, Landfarms/Landfill, Reclamation, Pollard, and the

23. Big Wheels Site: This was an 80 cubic yard impoundment for holding slop oil emulsion prior to landfarming. In 1980 it was clean closed, with the wastes and contaminated soil being placed in the landfarms, which were closed as noted above.

24. Landfill Under Isomax and Landfarm No. 1: This holds about 400,000 cubic yards of waste, such as slop oil solids, separator sludge, leaded tank bottoms. Final closure for the landfarms was achieved as noted above.

25. Oil Water Separators 1, 1A, 2, 2A, 13, 15, and Coalescing plate interceptor: The separators have been used to skim off oil, which is returned to product tankage. Solids settle and the effluent is routed to the Bioreactor. The sludge is a listed hazardous waste and formerly was landfarmed, but now is disposed of offsite or is recycled as a supplemental fuel. Separators 1, 2, 15 and CPI were cleaned and backfilled with clean fill.

26. No. 1 Oxidation Pond: There is petroleum hydrocarbon-contaminated soil in the No. 1 Oxidation pond. The 116-acre pond was built in 1959 and was formerly part of the refinery's effluent treatment system until the late 1980's. It is divided into five basins known as passes. Pass 1 was clean closed in 1990 and is now used for stormwater storage. Passes 2-5 contain oily sediment. In 2008, Regional Water Board staff approved a final closure plan that proposed the placing of sediments dredged from Castro Cove and other non-hazardous refinery soil within the pond, then stabilizing this material with cement and fly ash to support a final Title 27 closure cap. The Final Closure Plan was slightly modified in 2009 and again in 2010. This work is expected to be completed during 2011.

27. Lake Rushing and Majka Ditch: These transported stormwater to the No. 2A separator. 300 cubic yards of contaminated soil were removed from the ditch in 1987.

28. Poleyard Tankfield: There are 32 aboveground petroleum storage tanks, with 24 in service with a total volume of 2 million barrels. Most of these tanks have leak detection bottoms. There are a total of six impound basins including Lake Rushing, Lake Schramm (see below) and four others.

29. Lake Schramm: This was formerly an unlined surface impoundment used for disposal of leaded tank bottoms. 1300 cubic yards of leaded tank bottoms were removed in 1981, and the Lake is now lined and used to contain stormwater runoff.

Alkane Sector

30. Perimeter Groundwater Barrier: A GPS barrier wall and extraction trench is at the downgradient edge of the Alkane Sector (see Figure 7). The monitoring program (as described in the attached monitoring program) monitors both the performance of the A- and C-Zone corrective actions noted in the monitoring program. Chevron is

31. Sulfur Recovery Unit Settling Basin: This 3590-gallon basin receives low pH solutions from the sulfur recovery unit, with the supernatant being routed to the wastewater treatment plant.

32. Mud Sump: This unit formerly stored mud and solids that settled at the bottom of the No.13 Separator, but has now been cleaned and backfilled with clean soil.

33. Hydropits: The Hydrolyzing Pits (Hydropits) were three small unlined surface impoundments located on the shore of San Pablo Bay in the Alkane Sector (Figure 7) that historically received wastewater from the refinery's Alkane Plant until 1986. The most significant constituents of this waste stream were neutralized hydrofluoric acid and small amounts of oil containing benzene. Chevron submitted a closure report in 1992. The Hydropits Closure Unit includes a multi-layer cap and the Alkane GPS along the northeastern perimeter of the Hydropits adjacent to Castro Cove. The unit no longer contains liquid hazardous waste and, as such, meets the cease discharge requirements of the Toxic Pits Cleanup Act. No further closure activities are necessary or required for the Hydropits.

34. Schaeffer Slough: This ditch carried the effluent from the Hydropits to the No. 13 Separator for eventual discharge to the wastewater treatment system. The slough has now been closed.

35. No. 13 Separator: This oil/water separator has a volume of 960,000 gallons. In concert with the Mud Sump, it treated oily process water, with the supernatant being routed to the wastewater treatment system.

36. Alkane Plant: There are shallow groundwater plumes containing benzene, fluoride, and free-phase petroleum hydrocarbons originating from the Alkane Plant area (Figure 7). This contamination necessitated source area remediation consisting of free product recovery and groundwater extraction and treatment in addition to implementation of the refinery-wide GPS. In 2001, Chevron started operating eight extraction wells designed to recover floating liquid hydrocarbons and contaminated groundwater in the Alkane Plant plume source area upgradient of the Hydropits Closure Unit and the Alkane Sector GPS. These extraction wells make up the Alkane Plant Groundwater Recovery System. Groundwater and liquid hydrocarbons recovered by the extraction wells are routed to the refinery's wastewater treatment system and is discharged in accordance with existing NPDES permit requirements.

37. Pond 13A: This pond was used to store fluoride salts originating from the Hydroloyzing Pits. It had a capacity of about 28,000 cubic yards and was clean closed in 1992.

38. No. 7 sump: This sump formerly collected stormwater runoff, but is now out of service and is backfilled.

39. Alkane Tankfield: Historically, there were 40 tanks in this tankfield. Currently, no tanks are in active service in this tankfield.

Effluent Sector

40. Perimeter Groundwater Barrier: A GPS barrier wall extends along the 250-foot channel (described below, see Figure 10). The monitoring program (as described in the attached monitoring program) includes A- and C-Zone wells for the evaluation of the performance of the GPS (corrective action).

41. Bioreactor: The Bioreactor was excavated to about -40 feet Mean Sea Level in the early 1900's to be used as a turning basin for ships. Now this 30-acre pond conducts the refinery's secondary wastewater treatment by means of 1100 aerators and a series of baffles.

42. No. 2 Oxidation Pond: This 90-acre pond was historically used for final polishing of NPDES-regulated treated wastewater prior to its discharge to the Bay. The pond was converted to an Experimental Water Enhancement Wetland (Wetland), which is downstream of the biological treatment settling basins (Bioreactor). The treated water from the Wetland and Bioreactor are combined and routed through granular activated carbon, and is discharged in a deep water diffuser, which is the Refinery's NPDES' Point of Compliance under the NPDES permit referenced in Finding 4.

43. 250-foot channel: The 250-foot channel was excavated to about -40 feet MSL in the early 1900's to be used as a shipping channel for the refinery until the 1950's. The channel was then dammed and used as part of the wastewater treatment system until 1987, and now serves to store stormwater and treated process water.

    In 2002, Chevron proposed and implemented interim corrective actions for the channel. These included installation of a High Density Polyethylene barrier, fencing, bank steepening, vegetation control and removal of perching objects used by birds. Chevron also continues collection and removal of oil, and vegetation management and wildlife surveys. Lastly, Chevron conducts water elevation monitoring to assure that there is neither a vertical or lateral gradient allowing for release of contaminated water to either groundwater or the Bay. Ongoing monitoring indicates limited wildlife exposure, that A-Zone groundwater flow is fully contained by the GPS, and that there is largely an upward flow into the channel for the C-Zone water.

44. 50/100 foot channel: This channel conveyed wastewater to the bioreactor. Sampling showed the wastes to be non-hazardous. The channel has been cleaned and converted for use in conveying non-contaminated stormwater to the Bay after sampling.

45. Pond 11: This site received oily waste and paint sludge from the Drum Reconditioning Plant. The site was clean-closed in 1979.

46. Pond 14: This 4,300-cubic yard pond also received waste from the Drum Recondition Plant until 1979. In 1980, all wastes and some underlying soil were removed.

Reclamation Sector

47. Perimeter Groundwater Barrier: A GPS barrier wall and extraction trench largely surrounds the sector's units listed below (see Figure 11). The monitoring program (as described in the attached monitoring program) monitors the performance of the GPS corrective action. Chevron is responsible for inspection and maintenance of the soil cover and stormwater conveyances for the Gertrude Street and Parr-Richmond units.

48. Reclamation Yard Site: Chevron bought this site in 1958, which had been the former City of Richmond municipal landfill since 1947 and has a capacity of about 187,500 cubic yards. No waste disposal occurred following Chevron's purchase of the site.

49. Parr-Richmond Site: Chevron bought this site in 1954, which had been used for municipal landfilling and junkyard storage since 1930. A final cover was built over it in 1997.

50. Gertude Street Site: This 3-acre site was purchased by Chevron and then leased to an outside party that used it for auto dismantling and drum reconditioning between 1961 and 1983. The drums were removed in 1983. In 1987, the site was graded and, in 1997, a final cover was installed along with a groundwater extraction trench.

Seismicity

51. Earthquakes posing a threat to the refinery could occur along the Hayward, San Andreas and Calaveras faults. The maximum ground surface acceleration, calculated for soft to medium clay and silt sites, is expected to be 0.35g for an event originating from a Richter Magnitude 6.4 Maximum Probable Earthquake (MPE) at the Hayward fault about 3.7 km east of the site, 0.35g for an event originating from a Richter Magnitude 7.75 MPE at the San Andreas fault located about 24 km west, and 0.35g for an event originating from a Richter Magnitude 6.6 MPE at the Calaveras fault. In an effort to prepare for such an incident, Chevron routinely and systematically reviews all process facilities for potential hazards, including a seismic review of appropriate structures. In accordance with federal, State and local requirements, Chevron also maintains a facility emergency response plan and tsunami contingency plan for the Richmond Long Wharf.

Aboveground Petroleum Storage Tanks

52. Aboveground petroleum storage tanks are required to comply with the requirements of Chapter 6.67 Section 25270 of the Health and Safety Code. In part, the regulations require installation and utilization of a leak detection system for each regulated tank that has the potential to impact groundwater or surface waters. The refinery operates approximately 160 aboveground petroleum storage tanks with a total storage capacity of approximately 600 million gallons. The majority of these tanks now have leak detection bottoms (LDBs), as Chevron has installed LDBs on all new tanks constructed at the refinery and retrofitted old tanks with LDBs if they are kept in service after their steel bottoms need to be replaced.

53. Aboveground petroleum storage tank facilities are also required to have secondary spill containment for the capture of sudden releases from an aboveground petroleum tank. The refinery utilizes several different types of soil berms, spill collection basins and channels located in the tank fields for containment and diversion of petroleum hydrocarbon releases. The primary regulation governing this activity is Code of Federal Regulations 112.7 Spill Prevention Control and Countermeasure Plans (SPCC). The SPCC is designed to prevent spills at petroleum facilities to the maximum extent practicable and mitigate a spill if it occurs.

MONITORING PROGRAMS

54. To record the compliance of the waste management units and surface impoundments described above, Chevron is required to implement the attached monitoring program described in these WDRs. The monitoring program requires groundwater level and chemical monitoring for inorganic and organic MPs and COCs (both terms are further defined in Specification 5, below) along a point of compliance (POC - also defined in Specification 5, below and generally coincident with the GPS where present). The MPs and COCs are typically metals, semivolatile organic compounds, and volatile organic compounds.

55. In the Landfarm areas, the A-Zone monitoring helps demonstrate that the GPS is maintaining a hydraulic barrier and by evaluating the effectiveness of the GPS as a Corrective Action Monitoring Program. The C-Zone monitoring helps verify that water quality below the bay mud at the POC of the landfarms has not been degraded and is considered to be a Detection Monitoring Program. Outside of the Landfarm area, the A-Zone monitoring likewise helps validate the GPS performance as a Corrective Action Monitoring Program, but C-Zone monitoring is considered to be corrective action monitoring.

56. Pursuant to a plan approved by the Regional Water Board in 2002, Chevron performs a statistical evaluation and trend analysis of groundwater well monitoring results, to establish concentration trends and note the overall effectiveness of the remedial actions at the refinery.

57. Chevron also reports on groundwater elevations, flow patterns and velocities, hydrocarbon thicknesses and recovery, and closure unit monitoring, inspection and maintenance activities as part of their monitoring program.

BASIN PLAN

58. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Regional Water Board and approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law and the U.S. EPA, where required.

BENEFICIAL USES

59. Shallow groundwater beneath the "Flats Zone", which comprises the flatland marsh area bounded by the San Pablo Bay to the north and extending south along the northeast side of the Potrero-San Pablo Ridge, has Total Dissolved Solids (TDS) levels that are significantly higher than the 3000 mg/l (5000 µS/cm electrical conductivity) level which the Regional Water Board (Resolution No. 89-39) set as a maximum for a municipal or domestic water supply in its Sources of Drinking Water Policy. There is no historical, existing or planned use of groundwater as a source of drinking water in either the shallow (A- and C-Zones) or deeper (B-Zone) aquifers in this part of the refinery.

    Groundwater beneath the "Ridge Zone," which is bounded on the south by San Francisco Bay and extends northwest up to the top of the Potrero-San Pablo Ridge (Bayside sectors), is primarily contained in fractured bedrock of the Franciscan Complex. Based on hydraulic conductivity data collected during hydrogeologic investigations of the tankfields in the Bayside North and Bayside South sectors, it is unlikely that a single well could produce an average sustained yield of 200 gallons per day for drinking water supply purposes (State Water Board Resolution No. 88-63, exemption criterion 1(c), and Regional Water Board Resolution No. 89-39). There is no historical, existing or planned use of unconfined groundwater as a source of drinking water in this part of the refinery.

    There is the potential, however, for groundwater on either side of the Potrero-San Pablo Ridge to discharge into San Francisco and San Pablo bays at the shoreline groundwater/surface water interface. Therefore, the surface water beneficial uses named in the Basin Plan for these bodies of water are applicable to groundwater in POC monitoring wells near the shoreline interface.

60. The existing and potential beneficial uses of groundwater underlying the site that is not contained in bedrock and is greater than 100 feet below ground surface are:

a. Industrial process and service supply
b. Agricultural water supply
c. Municipal and domestic supply (however, due to the proximity of the Bay, groundwater at the site contains elevated TDS levels, which render the groundwater nonpotable)

61. The existing and potential beneficial uses of San Francisco and San Pablo bays are:

a. Ocean, commercial, and sport fishing
b. Shellfish harvesting
c. Estuarine habitat
d. Fish migration
e. Preservation of rare and endangered species
f. Fish spawning
g. Wildlife habitat
h. Water contact recreation
i. Non-contact water recreation
j. Industrial service supply
k. Industrial process supply
l. Navigation

CALIFORNIA ENVIRONMENTAL QUALITY ACT

62. This action is an Order to enforce the laws and regulations administered by the Regional Water Board. This action is categorically exempt from the provisions of the California Environmental Quality Act pursuant to Section 15308, Title 14, CCR.

NOTICE AND MEETING

63. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to amend the WDRs, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

64. The Regional Water Board, at a public meeting, heard and considered all comments pertaining to this amendment of WDRs.

IT IS HEREBY ORDERED pursuant to the authority in Section 13263 of California Water Code (CWC), Title 27, Division 2, Subdivision 1 of the California Code of Regulations (27CCR), and Chapter 15, Division 3, Title 23 of the CCR (Chapter 15) that the Discharger, its agents, successors, and assigns shall meet the applicable provisions contained in 27CCR, Chapter 15, and Division 7 CWC, and shall comply with the following:

PROHIBITIONS

1. Migration of pollutants through subsurface transport to waters of the State outside of the GPS is prohibited.

2. There shall be no discharge of wastes to surface waters except as permitted under the National Pollutant Discharge Elimination System.

3. The treatment, discharge or storage of materials that may impact the beneficial uses of groundwater or surface water shall not be allowed to create a condition of pollution or nuisance as defined in sections 13050 (l) and (m) of the CWC, nor degrade the quality of waters of the State or of the United States.

4. The creation of any new Waste Management Unit (WMU) is prohibited without prior Regional Water Board staff written concurrence.

5. The relocation of wastes is prohibited without prior Regional Water Board staff written concurrence.

6. The relocation of wastes to or from WMUs shall not create a condition of pollution or nuisance as defined in CWC sections 13050 (l) and (m). Any relocated waste shall not be placed in or allowed to contact ponded water from any source whatsoever. Wastes shall not be relocated to any location where they can be discharged into waters of the State or of the United States.

7. Excavation within or reconfiguration of any existing WMU is prohibited without prior concurrence of Regional Water Board staff. Minor excavation or reconfiguration activities such as for installation of signs or minor landscaping, or for minor routine maintenance and repair do not require prior staff concurrence.

8. Waste shall not be exposed at the surface of any WMU.

9. Disking of WMU covers is prohibited without prior Regional Water Board staff written concurrence. Alternate methods of controlling vegetative growth, which do not affect the integrity of the WMU cap, are preferred.

10. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not contact or percolate through wastes during the life of the site.

11. The discharge of hazardous waste at the facility is prohibited. For the purpose of this Order, the term "hazardous waste" is as defined in Section 20164 of Title 27.

12. The discharge of leachate or wastewater (including from surface impoundments, process waters, and runoff from the plant operations areas) that: 1) have the potential to cause corrosion or decay, or otherwise reduce or impair the integrity of the

containment structures; 2) if mixed or commingled with other wastes in the unit, could produce a violent reaction including heat, pressure, fire, explosion, or the production of toxic by-products; 3) require a higher level of containment than provided by the unit; 4) are "restricted hazardous wastes", or 5) impair the integrity of the containment structures, are prohibited per Section 20200(2)(b) of Title 27.

13. Activities associated with subsurface investigations and cleanup that will cause significant adverse migration of pollutants are prohibited.

14. There shall be no discharges to a surface impoundment, and any residual liquids and sludge shall be removed expeditiously if it is determined the surface impoundment is leaking or there is a failure which causes a threat to water quality.

15. Wastes shall not be disposed in any position where they may migrate from the disposal site to adjacent geologic materials, waters of the State or of the United States during disposal operations, closure, and during the post-closure maintenance period, per Section 20310(a) of Title 27.

16. The Discharger shall not cause the following conditions to exist in waters of the State at any place outside of the GPS:

    a. Surface Waters
        i. Floating, suspended, or deposited macroscopic particulate matter or foam;
        ii. Bottom deposits or aquatic growth;
        iii. Adversely altered temperature, turbidity, or apparent color beyond natural background levels;
        iv. Visible, floating, suspended or deposited oil or other products of petroleum origin; or
        v. Toxic or other deleterious substances to be present in concentrations or quantities that may cause deleterious effects on aquatic biota, wildlife or waterfowl, or that render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.

    b. Groundwater
        i. Further degradation of groundwater quality and/or substantial worsening of existing groundwater impacts; and
        ii. Subsurface migration of pollutants associated with Chevron's operations to waters of the State is prohibited.

SPECIFICATIONS

Reporting Specifications

1. All technical reports submitted pursuant to this Order shall be prepared under the supervision of and signed by a California registered civil engineer, registered geologist, and/or certified engineering geologist.

2. The Discharger shall implement a Detection Monitoring Program (DMP) for the C-Zone groundwater at the Landfarm area, pursuant to CCR Title 27 Section 20420. The Self-Monitoring Program (SMP) attached to this Order is intended to constitute the DMP for the refinery.

3. The Discharger shall also continue the Corrective Action Monitoring Program for the A-Zone groundwater, and the C-Zone groundwater outside of the landfarms, pursuant to CCR Title 27 Section 20430. The program shall be designed to determine if the corrective action measures, such as the operation of the GPS, are functioning and demonstrate compliance with the corrective action program goals. The SMP attached to this Order is intended to constitute the Corrective Action Monitoring Program for the refinery.

4. At any time, the Discharger may file a written request (including supporting documentation) with the Regional Water Board's Executive Officer, proposing modifications to the attached SMP. If the proposed modifications are acceptable, the Executive Officer may issue a letter of approval that incorporates the proposed revisions into the SMP.

Title 27 Compliance Specifications

5. Title 27 requires the Regional Water Board to establish a Water Quality Protection Standard (WQPS) in a WDR order for each WMU covered by that order. The WQPS for the refinery shall include the following:

   (a) Constituents of Concern (COC): Section 20395 of Title 27 defines COCs as "all waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit." COCs for the refinery include the monitoring parameters identified in the SMP attached to this Order, or any future amendment thereof, and all Appendix II parameters in the federal Subtitle D regulations.

   (b) Monitoring Parameters (MP): MPs, a subset of the COCs, are typically the most mobile and commonly detected COCs in groundwater at a site and are measured on a more frequent basis than the entire list of COCs. The MPs for the refinery shall include, at a minimum, all constituents identified as such in the SMP attached to this Order, or any future amendments thereof. The Discharger may propose modification to the MPs as additional data become available concerning site-specific source characteristics and natural background water quality. However, modifications shall only be made upon written concurrence from the Executive Officer.

   (c) Maximum Allowable Concentration Limits(MACLs): MACLs have been established for each COC listed in Tables 2 and 4 of the SMP. Concentration limits for all COCs detected at the specified monitoring wells are typically established using the background data set pursuant to CCR Title 27 Section

20400. However, use of background data is inappropriate due to the number of releases over the many years of refinery operations, as it may be technologically and/or economically infeasible to cleanup all petroleum refining-related constituents in the groundwater to background concentrations (non-detect for synthetic organics). The MACLs were thus developed to protect the beneficial uses of shallow groundwater beneath the refinery. The applicable beneficial uses with the most stringent water quality objectives are related to shallow groundwater discharge to surface waters of San Francisco Bay and include uses involving the health of aquatic organism receptors in the Bay and humans who consume aquatic organisms from the Bay.

(d) Point of Compliance: Title 27 defines the Point of Compliance (POC) as the "vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit." The appropriate POC for the refinery, based on the areal extent of groundwater impacts and the large number of WMUs involved, is the GPS extraction trench/barrier wall system, which maintains a hydraulic capture zone to protect sensitive ecological receptors in the Bay and wetlands adjacent to the refinery. The GPS/POC boundary was established under the following guidelines: 1) at the downgradient perimeters of individual WMUs that require corrective action but are non-contiguous with other A-Zone areas under corrective action (e.g., Pollard Pond, Parr-Richmond site); 2) at the furthest downgradient boundary common to a group of WMUs and/or areas under corrective action (e.g., Landfarms 2-5, Plant 1/Additives Plant); or, 3) at the refinery shoreline boundary where A-Zone groundwater contamination not associated with specific WMUs is present.

(e) Monitoring Points: Title 27 defines Monitoring Points as "a well, device, or location specified in the waste discharge requirements at which monitoring is conducted and at which the water quality protection standard applies." Monitoring Points for compliance with the refinery-wide corrective action and detection monitoring program are identified in the SMP. These monitoring points generally consist of shallow groundwater monitoring wells located downgradient of the GPS extraction well capture zone. Because refinery operations predate collection of groundwater chemistry data, background water quality monitoring locations do not exist at this site; therefore, intra-well statistical comparisons will be used for evaluating trends in concentrations of COCs detected in groundwater monitoring wells. Concentrations of petroleum hydrocarbon-related COCs reported above MACLs are expected to exhibit decreasing trends over time as the GPS continues to operate and natural biodegradation processes take place.

6. The refinery site shall be protected from any washout or erosion of wastes or covering material and from inundation that could occur during a 100 year flood event. Final cover systems for WMUs shall be graded and maintained to promote lateral runoff and prevent ponding and infiltration of water.

7. The Discharger shall notify the Regional Water Board immediately of any failure that threatens the integrity of any containment and/or control facilities, structures, or devices. Any such failure shall be promptly corrected after approval of the method and schedule by the Executive Officer.

8. The Discharger shall maintain the WMUs so as to prevent a statistically significant increase in water quality parameters at POCs as provided in CCR Title 27, Section 20420.

9. The Discharger shall maintain the WMUs to prevent discharges, such that the units do not constitute a pollution source.

10. The Regional Water Board considers the Discharger to have continuing responsibility for correcting any problems that arise in the future as a result of waste discharge or related operations or site use.

11. The Discharger shall comply with all applicable provisions of Title 27 that apply to the closure and post-closure of WMUs and the design and maintenance of surface impoundments including those that are not specifically referred to in this Order.

12. WMUs shall be closed according to a closure plan prepared according to all applicable requirements of Title 27, and approved by the Executive Officer.

Remediation Facility Specifications

13. The Discharger shall **annually demonstrate** (include results in the Annual Report) that all installed groundwater remedial systems including, but not limited to, groundwater containment, treatment, and/or extraction systems are functioning as intended and designed.

14. Containment, collection, drainage, and monitoring systems at the refinery, shall be maintained as long as contaminated waste, soil, or water is present and poses a threat to water quality.

15. The Discharger shall maintain groundwater or remediation devices or design features installed in accordance with this Order such that they continue to operate as intended without interruption, with the exception of periodic maintenance.

16. If the Executive Officer determines the existence of an imminent threat to the beneficial uses of surface or subsurface waters of the State, the Discharger may be required to install additional groundwater monitoring wells and/or undertake corrective action measures, including submittal of a site investigation report.

17. The Discharger shall install any additional groundwater and leachate monitoring devices required to fulfill the terms of any future SMP issued by the Executive Officer.

18. The Discharger shall install, maintain in good working order, and operate efficiently any facility, alarm, groundwater extraction system, or hydraulic/contaminant migration control system necessary to assure compliance with these WDRs.

19. If it is determined by the Executive Officer, based on groundwater monitoring information, that water quality impairment immediately outside the boundary of the GPS continues to degrade, the Discharger will be required to submit and implement a site specific groundwater corrective action proposal.

Monitoring Specifications

20. The Discharger shall conduct monitoring activities according to the SMP attached to this Order and as may be amended by the Executive Officer, to verify the effectiveness of groundwater remediation and containment systems and WMU closure systems.

21. All monitoring wells shall be constructed in a manner that maintains the integrity of the drill hole, prevents cross-contamination of saturated zones, and produces representative groundwater samples from discrete zones within the groundwater zone each well is intended to monitor.

22. All borings for monitoring wells shall be continuously cored. The drill holes shall be logged during drilling under the direct supervision of a registered geologist whose signature appears on the corresponding well log. Logs of monitoring wells shall be filed with the Department of Water Resources. All information used to construct the wells shall be submitted to the Regional Water Board upon completion of the wells.

23. The groundwater sampling and analysis program shall ensure that groundwater quality data are representative of the groundwater in the area that is monitored.

Surface Impoundment Specifications

24. If it is determined by the Executive Officer that any surface impoundment is degrading beneficial uses, there shall be no discharges to a surface impoundment, and residual liquids and sludges shall be removed expeditiously.

25. The impoundments will be operated such that scouring at points of discharge and by wave action at the water line will not degrade the pond containment features.

26. Pipeline discharges to surface impoundments shall be either equipped with devices, or fail-safe operating procedures, to prevent overfilling. The surface impoundments shall always maintain at least two-feet of freeboard.

27. The Discharger shall operate the surface impoundments according to a detailed operating, maintenance, and contingency plan that will include at a minimum,

procedures for routine inspection of the surface impoundments, discharge into a pond, discharge out of a pond, contingency measures if problems with the containment structures are found, and notification of agencies.

Soil Contamination and Excavated Soil Reuse

28. Chevron shall notify the Regional Water Board of any soil contamination, not previously identified in subsurface investigations, discovered during any subsurface investigation or excavation work conducted on refinery property, which may potentially adversely impact water quality. Chevron shall store, reuse, and/or dispose of non-hazardous contaminated soil according to the *Revised Soil Management Plan, Chevron Richmond Refinery, Contra Costa county, California (SAIC, 2008).*

PROVISIONS

1. Compliance: The Discharger shall comply immediately, or as prescribed by the time schedule below, with all Prohibitions, Specifications, and Provisions of this Order. All required submittals must be acceptable to the Executive Officer. Violations may result in enforcement actions, including Regional Water Board orders or court orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of these WDRs by the Regional Water Board [CWC sections 13261, 13267, 13263, 13265, 13268, 13300, 13301, 13304, 13340, and 13350].

2. Authority: All technical and monitoring reports required by this Order are requested pursuant to Section 13267 of the CWC. Failure to submit reports in accordance with schedules established by this Order or failure to submit a report of sufficient technical quality to be acceptable to the Executive Officer may subject the Discharger to enforcement action pursuant to Section 13268 of the CWC.

Reporting Requirements

3. Technical reports/plans, submitted by the Discharger, in compliance with the Prohibitions, Specifications, and Provisions of this Order, shall be submitted to the Regional Water Board on the schedule specified herein. These reports/plans shall consist of a letter report that includes the following:

   a. Identification of any obstacles that may threaten compliance with the schedule,

   b. In the event of non-compliance with any Prohibition, Specification or Provision of this Order, written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order; and

   c. In the SMP reports, an evaluation of the current groundwater monitoring system and a proposal for modifications as appropriate.

4. All application reports or information to be submitted to the Executive Officer shall be signed and certified as follows:

   a. For a corporation – by a principal executive officer or the level of vice-president or an appropriate delegate.

   b. For a partnership or sole proprietorship – by a general partner or the proprietor, respectively.

   c. For a municipality, State, federal, or other public agency – by either a principal executive officer or ranking elected official.

5. All reports submitted pursuant to this Order must be submitted as both hard copies and electronic files in PDF format. The Regional Water Board has implemented a document database that is intended to reduce the need for printed report storage space and streamline the public review process. All electronic files, whether in PDF or spreadsheet format must be submitted via email (only if the file size is under 1MB), or on CD. Email notification should be provided to Regional Water Board staff whenever a file is uploaded to Geotracker (see below).

6. The State Water Board adopted regulations requiring electronic report and data submittal to the State's GeoTracker database (Title 23, Division 3, Chapter 30, Articles 1 and 2, Sections 3890-3895 of the CCR).

   The Discharger is responsible for submitting the following via Geotracker:

   a. All chemical analytical results for soil, water, and vapor samples;

   b. The latitude and longitude of any permanent sampling point for which data is reported, accurate to within 1 meter and referenced to a minimum two reference points from the California Spatial Reference System, if available;

   c. The surveyed elevation relative to a geodetic datum of any permanent sampling point;

   d. The elevation of groundwater in any permanent monitoring well relative to the surveyed elevations;

   e. A site map or maps showing the location of all sampling points;

   f. The depth of the screened interval and the length of screened interval for any permanent monitoring well;

   g. PDF copies of boring logs; and

   h. PDF copies of all reports, workplan and other documents (the document, in its entirety [signature pages, text, figures, tables, etc.] must be saved to a single PDF file) including the signed transmittal letter and professional certification by a California Licensed Civil Engineer or a Registered Geologist.

7. Upon request, monitoring results shall also be provided electronically in Microsoft Excel® to allow for ease of review of site data, and to facilitate data computations and/or plotting that Regional Water Board staff may undertake during the review

process. Data tables submitted in electronic spreadsheet format will not be included in the case of file review and should therefore be submitted on CD and included with the hard copy of the report. Electronic tables shall include the following information:

a. Well designations;

b. Well location coordinates (latitude and longitude);

c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, screen interval elevation, and a characterization of geology of subsurface the well is located in);

d. Groundwater depths and elevations (water levels);

e. Current analytical results by constituent of concern (including detection limits for each constituent);

f. Historical analytical results (including the past five years unless otherwise requested); and

g. Measurement dates.

Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order related to surface impoundments and solid waste units, submitted by the Discharger, shall also be provided to the Contra Costa County Hazardous Materials Program.

8. Self-Monitoring Program: The Discharger shall comply with the SMP attached to this Order (Part A and Part B). The SMP is intended to constitute both a DMP and a Corrective Action Monitoring Program pursuant to Title 27, sections 20420 and 20430 and is designed to identify significant water quality impacts from the specified WMU and demonstrate compliance with the WQPS established pursuant to Title 27, Section 20390 for the WMU. The SMP may be amended as necessary at the discretion of the Executive Officer.

COMPLIANCE DATE: Immediately

9. Revision of the Self-Monitoring Program: The Discharger shall submit a plan for the revision of the monitoring locations, parameters, frequency and MACLs contained within the SMP attached to this Order (Part B).

COMPLIANCE DATE: December 15, 2011.

10. Contaminated Soil Management Plan: Chevron shall continue to implement the plan, dated August 26, 2008, for managing non-hazardous contaminated soil discovered on refinery property during subsurface investigation or excavation work. This plan includes descriptions of soil sampling, storage, and handling protocols and criteria for reusing non-hazardous contaminated soil within the refinery impacted soils.

11. Final Closure Plan for #1 Oxidation Pond Passes 2 through 5: Chevron shall continue to implement the No. 1 Oxidation Closure Plan, approved by the Regional Water

Board on April 30, 2009. The Plan proposed a final cover system for petroleum hydrocarbon contaminated soil in passes 2 through 5 of #1 Oxidation Pond. Chevron shall submit a final plan documenting the completion of this work.

COMPLIANCE DATE: December 15, 2011

12. Report of Waste Discharge: The Discharger shall submit a technical report, acceptable to the Executive Officer, describing any proposed material change in the character, location, or volume of a discharge, or in the event of a proposed change in use or development of a WMU or landfill (CWC Section 13260(c)). The technical report shall describe the project, identify key changes to the design that may impact any portion of the WMU or landfill, and specify components of the design necessary to maintain integrity of the WMU or landfill cover and prevent water quality impacts.

    COMPLIANCE DATE: 120 days prior to any material change

13. Financial Assurance: The Discharger shall submit to the Regional Water Board evidence of an irrevocable Post-closure Fund acceptable to the Executive Officer, to ensure monitoring, maintenance, and any necessary remediation actions. Every five years, for the duration of the post-closure monitoring period, the Discharger shall submit a report that includes an outline of the financial assurance mechanism and verification that the fund has been created. The fund value shall be supported by calculations, to be included with this submittal, providing cost estimates for all post-closure monitoring, maintenance, repair and replacement of WMU or landfill containment, cover, and monitoring systems.

    Additionally, cost estimates must be provided for corrective action for known or reasonable foreseeable releases that may be required for all WMUs at the facility. The fund value shall be based on the sum of these estimates. The cost estimates and funding shall be updated to reflect change to monitoring systems as they occur. The post-closure maintenance period shall extend as long as the wastes within the WMU pose a threat to water quality.

    COMPLIANCE DATE: Submitted with the 2015 Annual Report then every five years thereafter.

14. Availability: A copy of these WDRs shall be maintained by the Discharger and shall be made available by the Discharger to all employees or contractors performing work (maintenance, monitoring, repair, construction, etc.) at WMUs or groundwater containment systems. (CWC Section 13263)

15. Change in Ownership: In the event of any change in control or ownership of the facility presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Regional Water Board upon a final change in ownership. To assume operation of this Order, the succeeding owner or operator must

apply in writing to the Executive Officer requesting transfer of this Order within 30 days of the change of ownership. The request must contain the requesting entity's full legal name, mailing address, electronic address, and telephone number of the persons responsible for contact with the Regional Water Board. Failure to submit the request shall be considered a discharge without requirements, a violation of the CWC. (CWC Sections 13267 and 13263)

COMPLIANCE DATE: 30 days after a change in facility control or ownership

16. Revision: This Order is subject to Regional Water Board review and updating, as necessary, to comply with changing State or federal laws, regulations, policies, or guidelines; changes in the Basin Plan; or changes in discharge characteristics. The Regional Water Board will review this Order periodically and may revise its requirements when necessary. (CWC Section 13263).

17. Submittal Revisions: Where a Discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Regional Water Board, it shall promptly submit such facts or information. (CWC Sections 13260 and 13267)

18. Vested Rights: This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, do not protect the Discharger from liability under federal, State or local laws, nor do they create a vested right for the Discharger to continue the waste discharge. (CWC Section 13263(g))

19. Severability: Provisions of these WDRs are severable. If any provisions of these WDRs are found invalid, the remainder of these WDRs shall not be affected. (CWC 9213)

20. Operation and Maintenance: The Discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Order. (CWC Section 13263(f))

20. Reporting of Hazardous Substance Release: If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it probably will be discharged in or on any waters of the State, the Discharger shall:

a. Report such discharge to the following:

i. The Regional Water Board by calling (510) 622-2300 during regular office hours

(Monday through Friday, 8 a.m. – 5 p.m.); and to

ii. The California Emergency Management Agency (CAL EMA) at (800) 852-7550.

b. A written report shall be filed with the Regional Water Board within five working days.
The report shall describe:

i. The nature of the waste or pollutant.

ii. The estimated quantity involved.

iii. The duration of the incident.

iv. The cause of the release.

v. The estimated size of the affected area, and nature of the effect.

vi. The corrective actions taken or planned, and a schedule of those measures.

vii. The persons/agencies notified.

This reporting is in addition to reporting to CAL EMA that is required pursuant to the Health and Safety Code.

21. Reporting Releases: Except for a discharge that is in compliance with these WDRs, any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall immediately notify CAL EMA of the discharge in accordance with the spill reporting provision of the State toxic disaster contingency plan adopted pursuant to Article 3.7 (commencing with Section 8574.7) of Chapter 7 of Division 1 of Title 2 of the Government Code, and immediately notify the Regional Water Board of the discharge as soon as:

a. That person has knowledge of the discharge;

b. Notification is possible; and

c. Notification can be provided without substantially impeding cleanup or other emergency measures.

This provision does not require reporting of any discharge of less than a reportable quantity as provided for under subdivisions (f) and (g) of CWC Section 13271 unless the Discharger is in violation of a prohibition in the Basin Plan. [CWC Section 13271(a)]

22. Release Reporting Requirements: In the case of a release defined above the following must be provided to the Regional Water Board within five days of knowledge of the release;

a. Site map illustrating location and approximate size of impacted area;

b. Photographs of the impacted area before and after remediation; and

c. A report detailing the remediation method chosen and its efficacy, and illustrating that the release contingency plan was effective, or else proposing modifications to the contingency plan to increase its effectiveness.

23. Endangerment of Health or the Environment: The Discharger shall report any noncompliance that may endanger human health or the environment. Any such information shall be provided orally to the Executive Officer, or authorized representative, **within 24 hours** from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five days of the time the Discharger becomes aware of the circumstances. The written submission shall contain:

a. A description of the noncompliance, and its cause;

b. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected;

c. The anticipated time it is expected to continue and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours [CWC sections 13263 and 13267]. The following occurrences must be reported to the Executive Officer within 24 hours:

a. Any bypass from any portion of the treatment facility;

b. Any discharge of industrial products, or treated or untreated wastewater; and

c. Any treatment plant upset that causes the discharge limitation(s) of this Order to be exceeded [CWC sections 13263 and 13267].

24. Entry and Inspection: The Discharger shall allow the Regional Water Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this order or as otherwise authorized by the CWC, any substances or parameters at any location. (CWC Section 13267)

25. Discharges to Navigable Waters: Any person discharging or proposing to discharge to navigable waters from a point source (except for discharge of dredged or fill material subject to Section 404 of the Clean Water Act and discharge subject to a general NPDES permit) must file an NPDES permit application with the Regional Water Board. (CCR Title 2 Section 22357)

26. Change in Discharge: In the event of a material change in the character, location, or volume of a discharge, the Discharger shall file with this Regional Water Board a new Report of Waste Discharge. (CWC Section 13260). A material change includes, but is not limited to, the following:

    a. Addition of a major industrial waste discharge to discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the waste;

    b. Significant change in disposal method, e.g., change from a land disposal to a direct discharge to water, or change in the method of treatment which would significantly alter the characteristics of the waste;

    c. Significant change in the disposal area, e.g., moving the discharge to another drainage area, to a different water body, or to a disposal area significantly removed from the original area potentially causing different water quality or nuisance problems;

    d. Increase in flow beyond that specified in the WDRs; or

    e. Increase in area or depth to be used for solid waste disposal beyond that specified in the WDRs. (CCR Title 23 Section 2210)

27. Monitoring Devices: All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year, or more frequently, to ensure continued accuracy of the devices. Annually, the Discharger shall submit to the Executive Officer a written statement signed by a registered professional engineer certifying that all flow measurement devices have been calibrated and will reliably achieve the accuracy required.

    Unless otherwise permitted by the Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the State Department of Public Health. The Executive Officer may allow use of an uncertified laboratory under exceptional circumstances, such as when the closest laboratory to the monitoring location is outside State boundaries and therefore not subject to certification. All analyses shall be required to be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants" (40 CFR Part 136) promulgated by U.S. EPA. (CCR Title 23, Section 2230)

28. Treatment: In an enforcement action, it shall not be a defense for the Discharger that it would have been necessary to halt or to reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the Discharger shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided. This provision applies, for example, when the primary source of power of the treatment facility fails, is reduced, or is lost. (CWC Section 13263(f)).

29. Document Distribution: Copies of correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:

    a. Regional Water Board (all submittals);

    b. Department of Toxic Substances Control (all submittals); and

    c. Contra Costa Health Services, Hazardous Materials Programs (Soils Management Plan only).

    The Executive Officer may modify this distribution list as needed.

30. General Prohibition: Neither the treatment nor the discharge of waste shall create a pollution, contamination or nuisance, as defined by Section 13050 of the CWC. (H&SC Section 5411, CWC Section 13263)

31. Earthquake Inspection: The Discharger shall submit a detailed Post Earthquake Inspection Report acceptable to the Executive Officer, in the event of any earthquake generating ground shaking of Richter Magnitude 7 or greater at or within 30 miles of the refinery. The report shall describe the containment features, groundwater monitoring, and control facilities potentially impacted by the static and seismic deformations of any WMU or groundwater containment system. Damage to any waste containment facility, which may impact State waters, must be reported immediately to the Executive Officer.

    COMPLIANCE DATE: Verbally as soon as the data becomes available and in writing within 72 hours of a triggering seismic event. Any damage that may cause negative impacts to waters of the State must be reported immediately upon discovery to the Spill Hotline at 1-800-852-7550 and by sending an email to Rb2SpillReports@waterboards.ca.gov

32. Maintenance of Records: The Discharger shall retain records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this order. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Executive Officer. Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individuals who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individuals who performed the analyses;
e. The analytical techniques or method used; and
f. The results of such analyses.

33. This Order supersedes and rescinds Order No. 00-043.

34. This Order is subject to Regional Water Board review and updating, as necessary, to comply with changing State or federal laws, regulations or policies, or guidelines; changes in the Regional Water Board's Basin Plan; or changes in discharge characteristics.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on June 8, 2011.

Digitally signed by Bruce Wolfe
Date: 2011.06.13 14:21:14 -07'00'

Bruce H. Wolfe
Executive Officer

Attachments:

Self-Monitoring and Reporting Program, Part A and B

Figure 1 - Location Map
Figure 2 - Regional Site Map with Geomorphic Boundaries
Figure 3 - Sector Boundaries
Figure 4 - Groundwater Protection System Location Map
Figure 5 - Plant 1 / Additives Plant Cap
Figure 6 - Pollard Sector
Figure 7 - Alkane Sector
Figure 8 - Landfarm/Landfill Sector
Figure 9 - Bayside Sector
Figure 10 - Effluent Sector
Figure 11 - Reclamation Sector
Figure 12 - North Yard Sector
Figure 13 - Groundwater Protection System

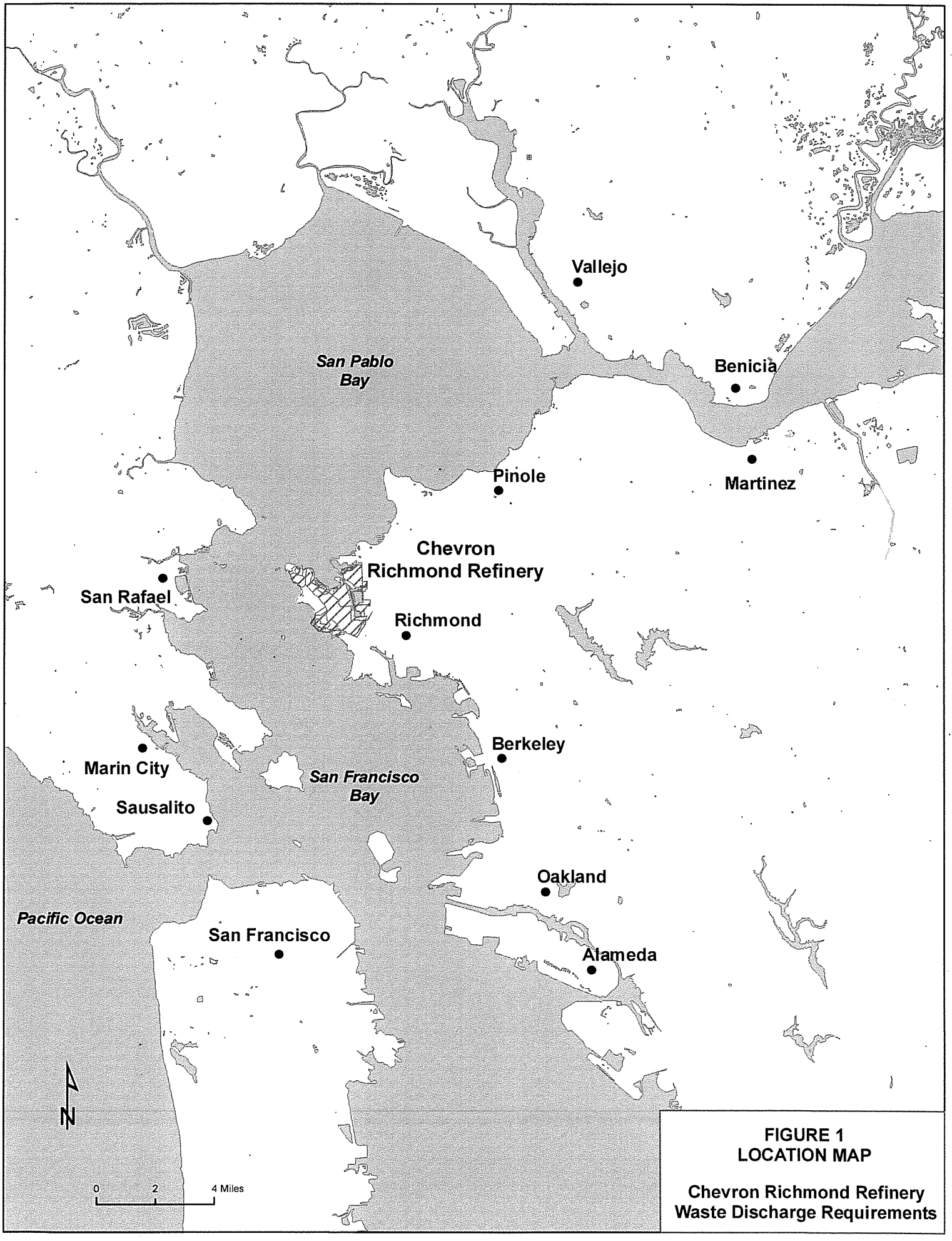


FIGURE 1
LOCATION MAP

Chevron Richmond Refinery
Waste Discharge Requirements

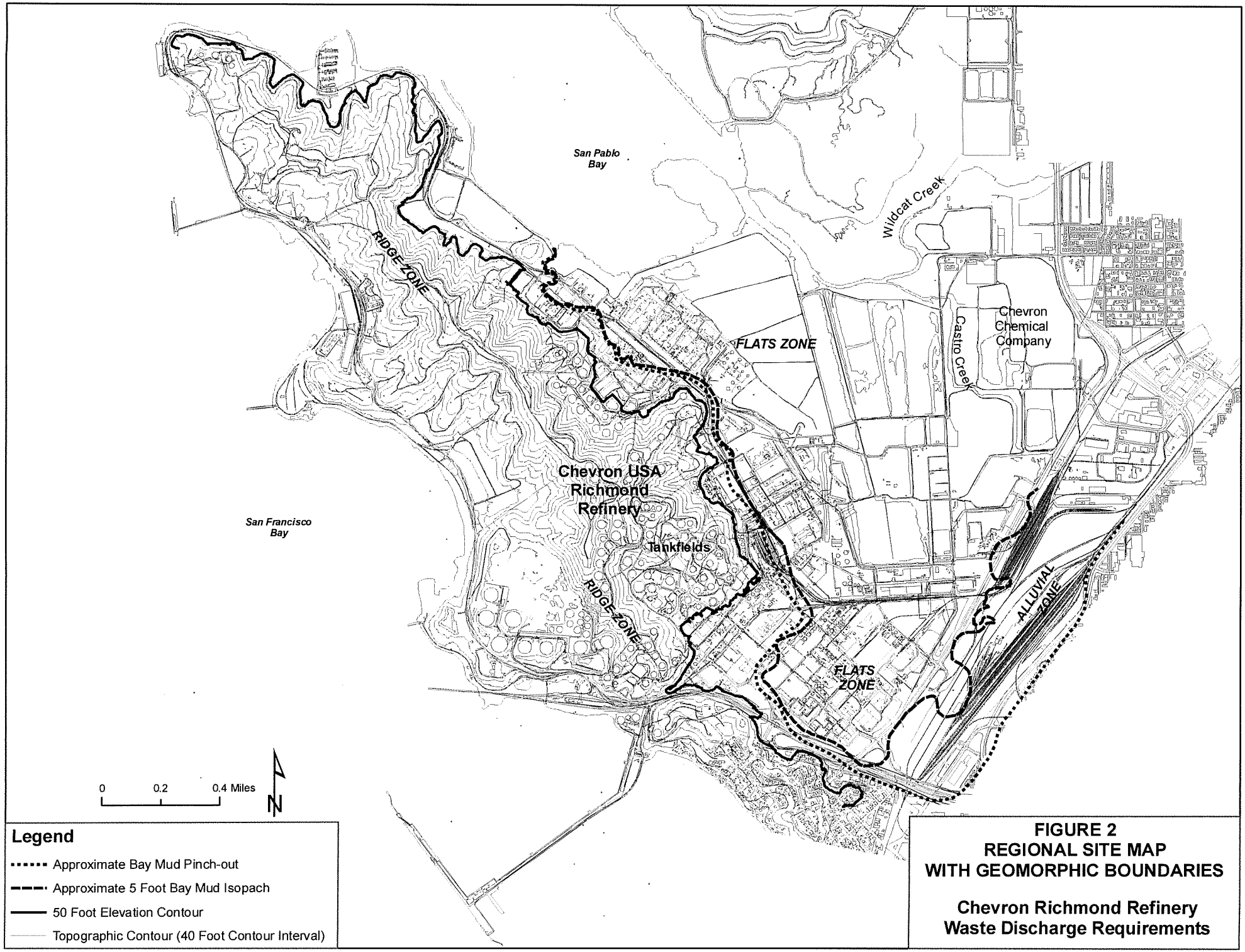


FIGURE 2
REGIONAL SITE MAP
WITH GEOMORPHIC BOUNDARIES

Chevron Richmond Refinery
Waste Discharge Requirements

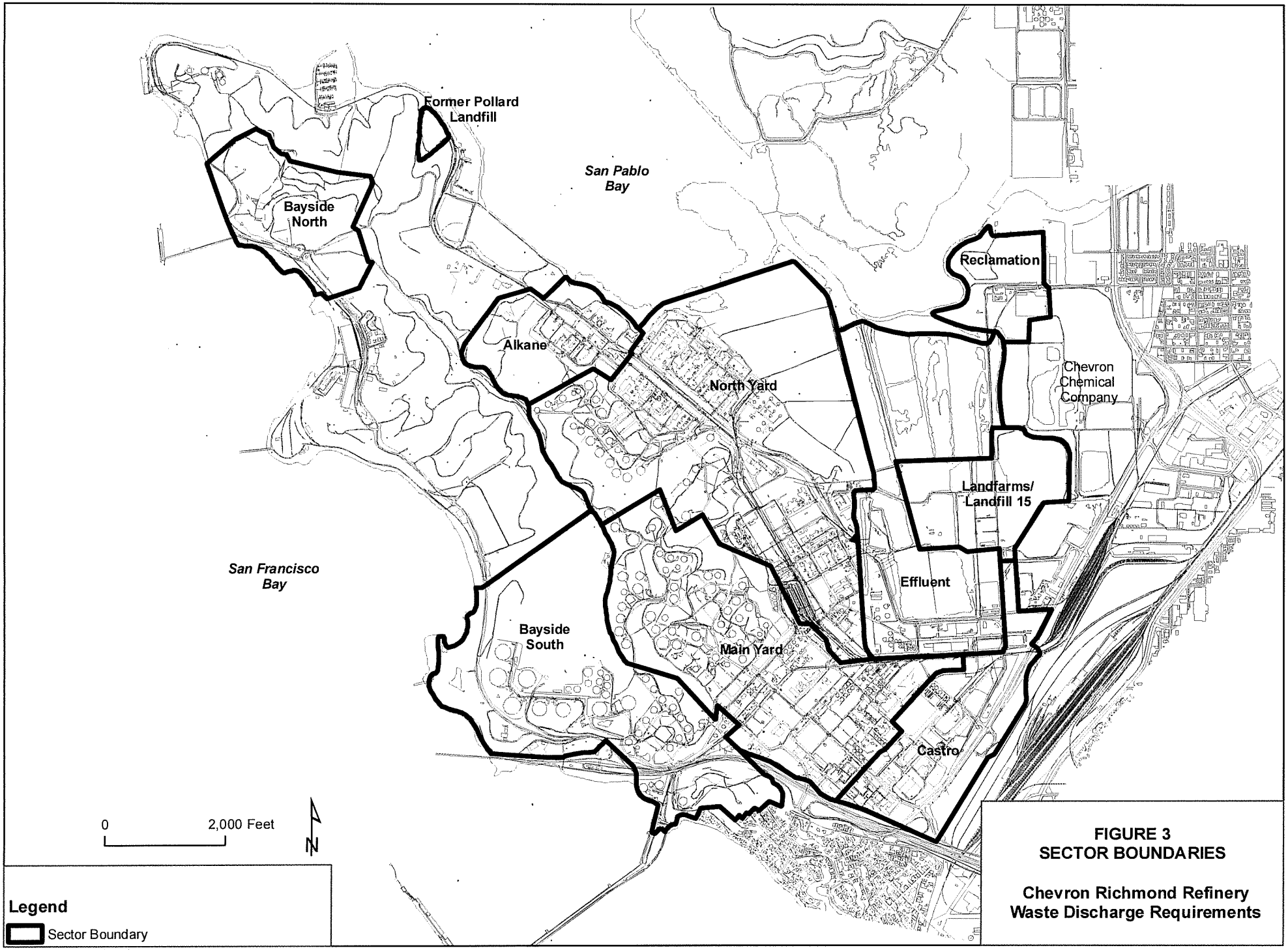


FIGURE 3
SECTOR BOUNDARIES

Chevron Richmond Refinery
Waste Discharge Requirements

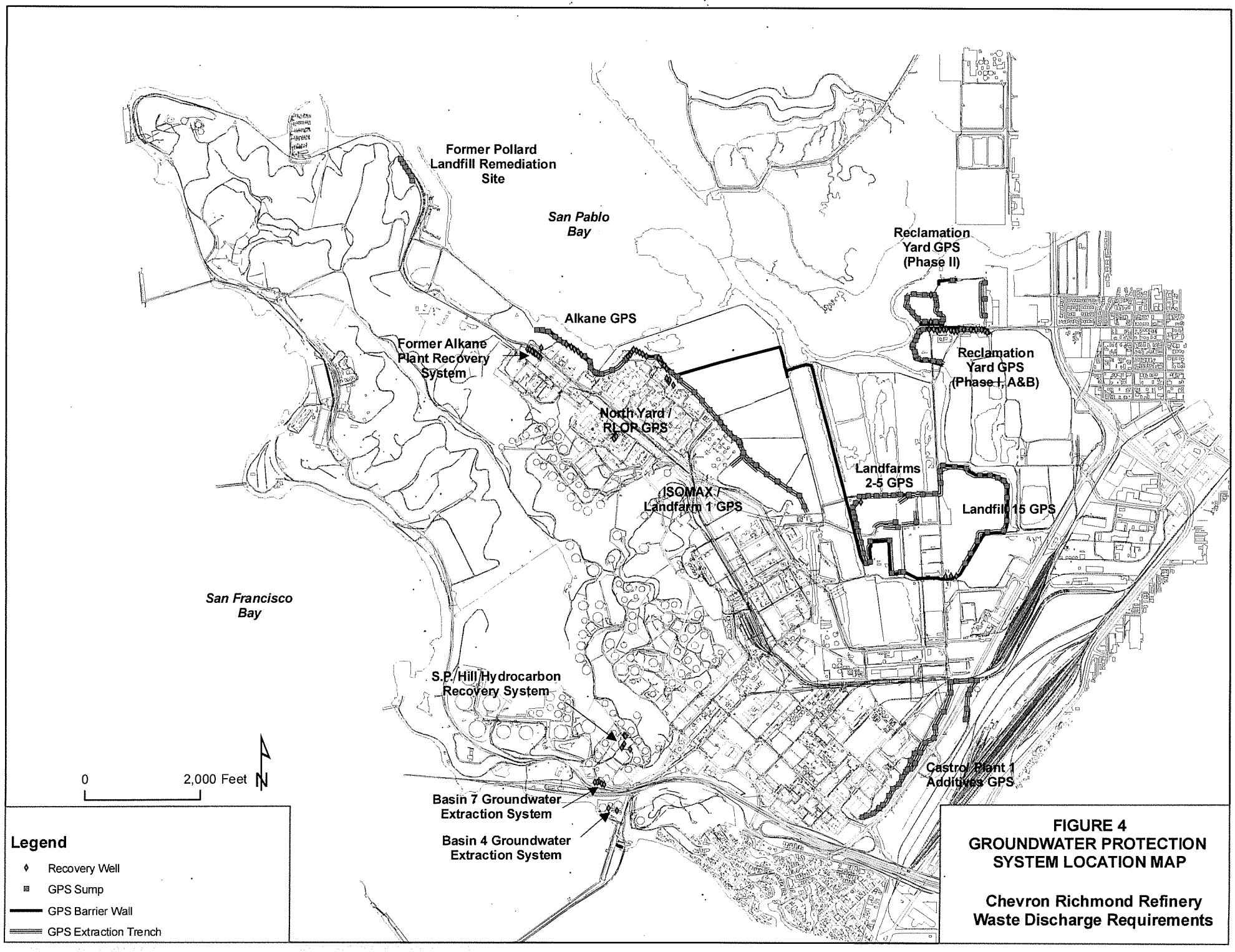
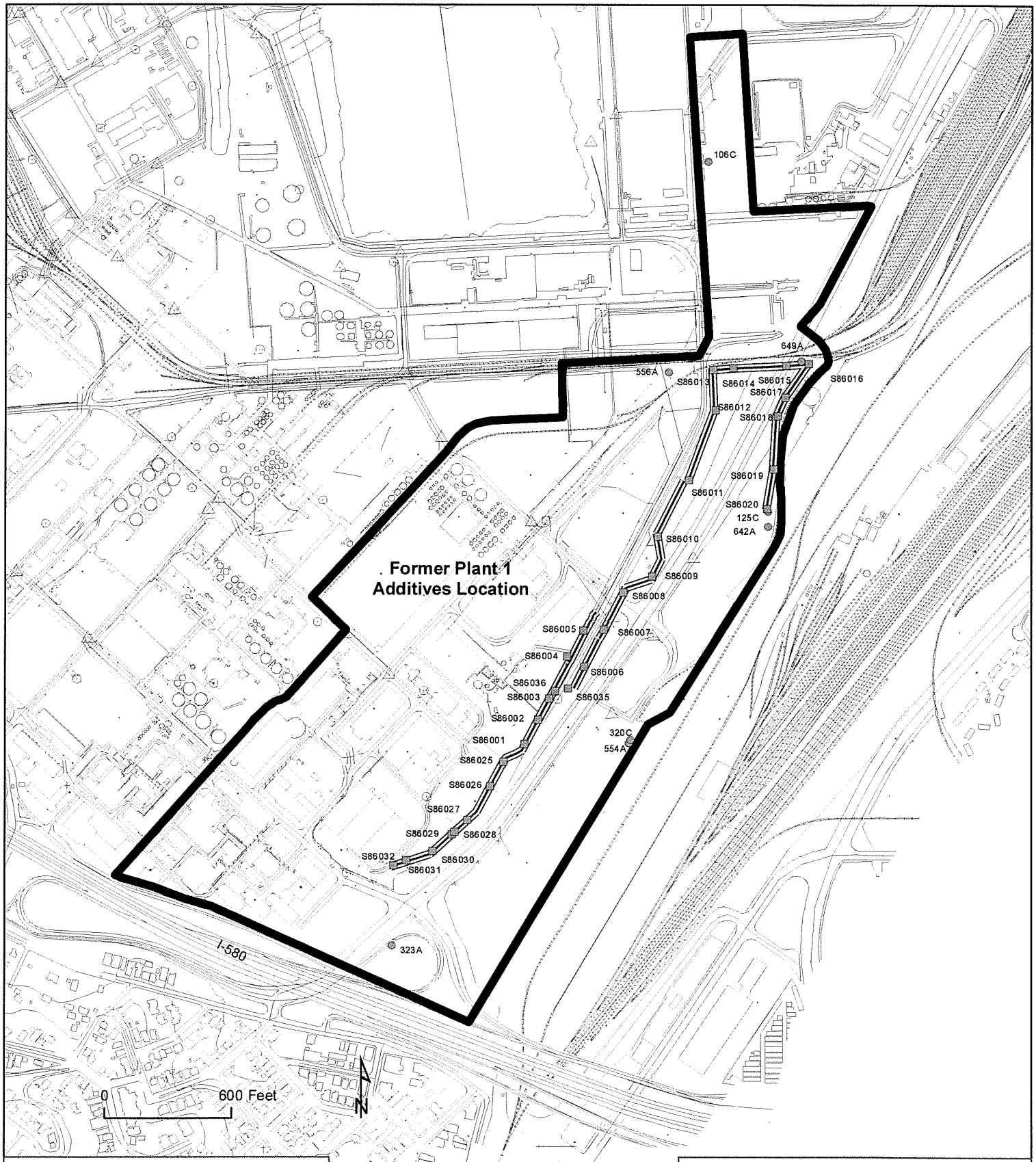


FIGURE 4
GROUNDWATER PROTECTION SYSTEM LOCATION MAP

Chevron Richmond Refinery
Waste Discharge Requirements

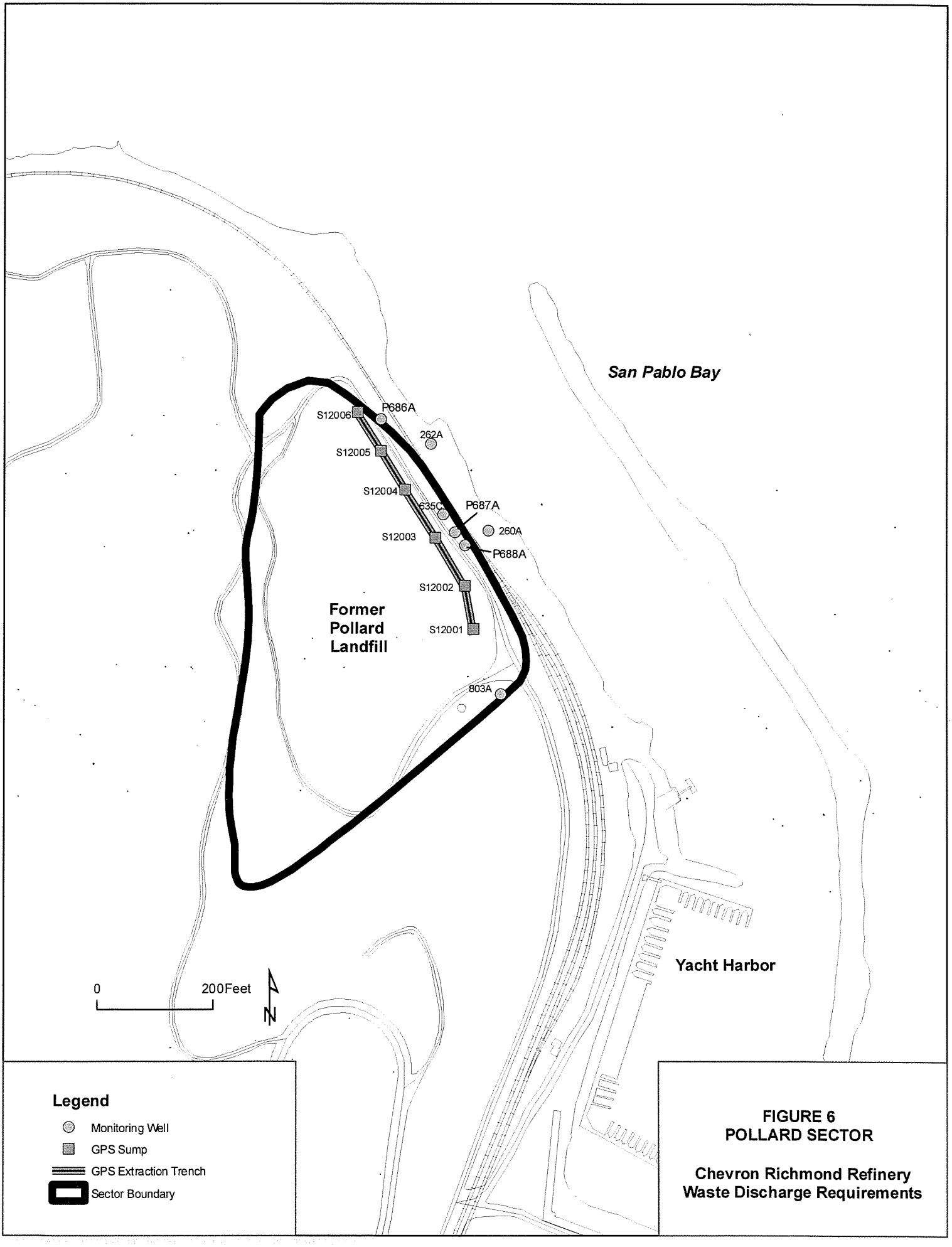


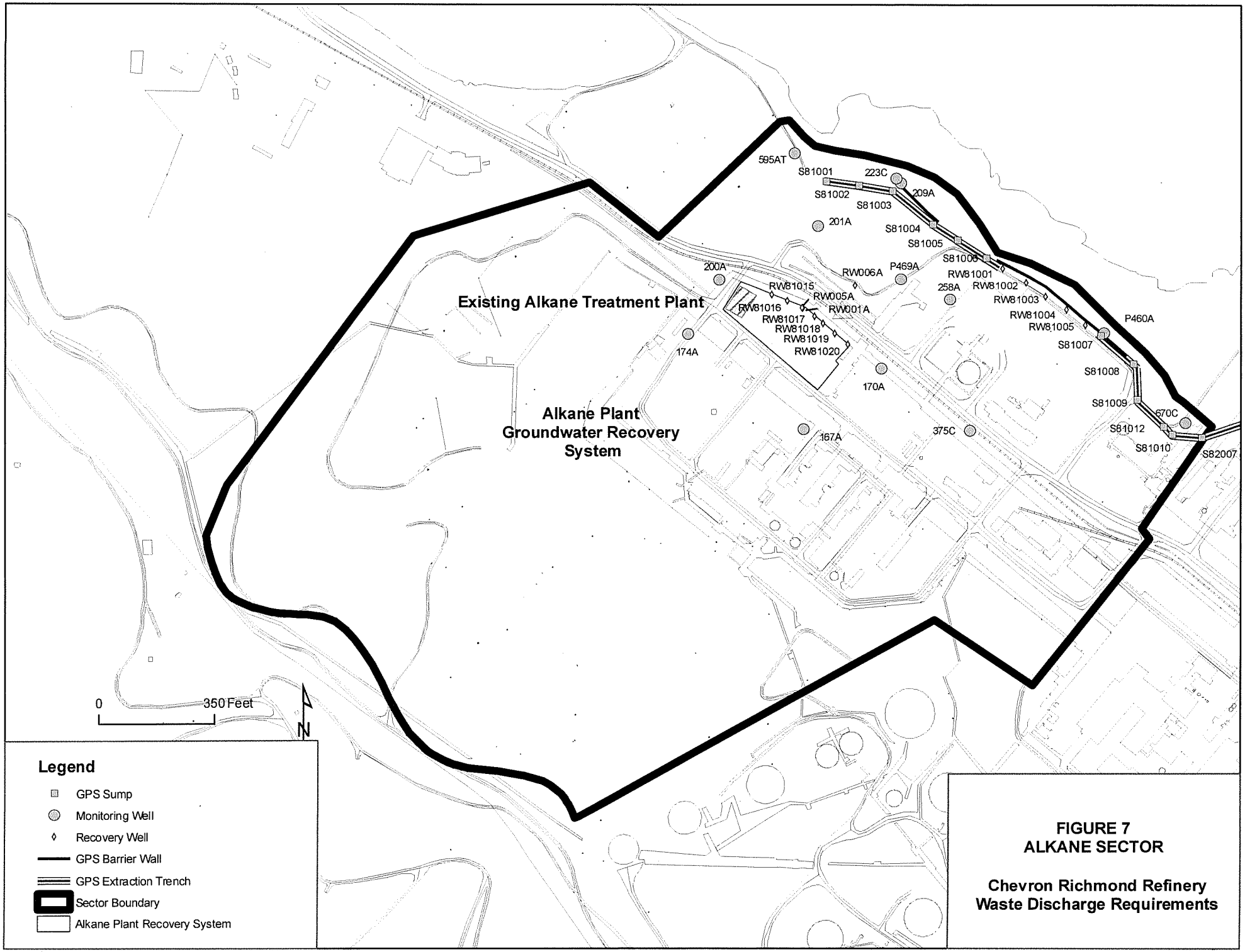
Legend

- GPS Sump
- Monitoring Well
- GPS Extraction Trench
- Sector Boundary

FIGURE 5
PLANT 1 / ADDITIVES PLANT CAP

Chevron Richmond Refinery
Waste Discharge Requirements


San Pablo Bay
S12006
P686A
262A
S12005
S12004
635C
P687A
260A
S12003
P688A
S12002
Former
Pollard
Landfill
S12001
803A
Yacht Harbor
0
200Feet
N
Legend
Monitoring Well
GPS Sump
GPS Extraction Trench
Sector Boundary
FIGURE 6
POLLARD SECTOR
Chevron Richmond Refinery
Waste Discharge Requirements



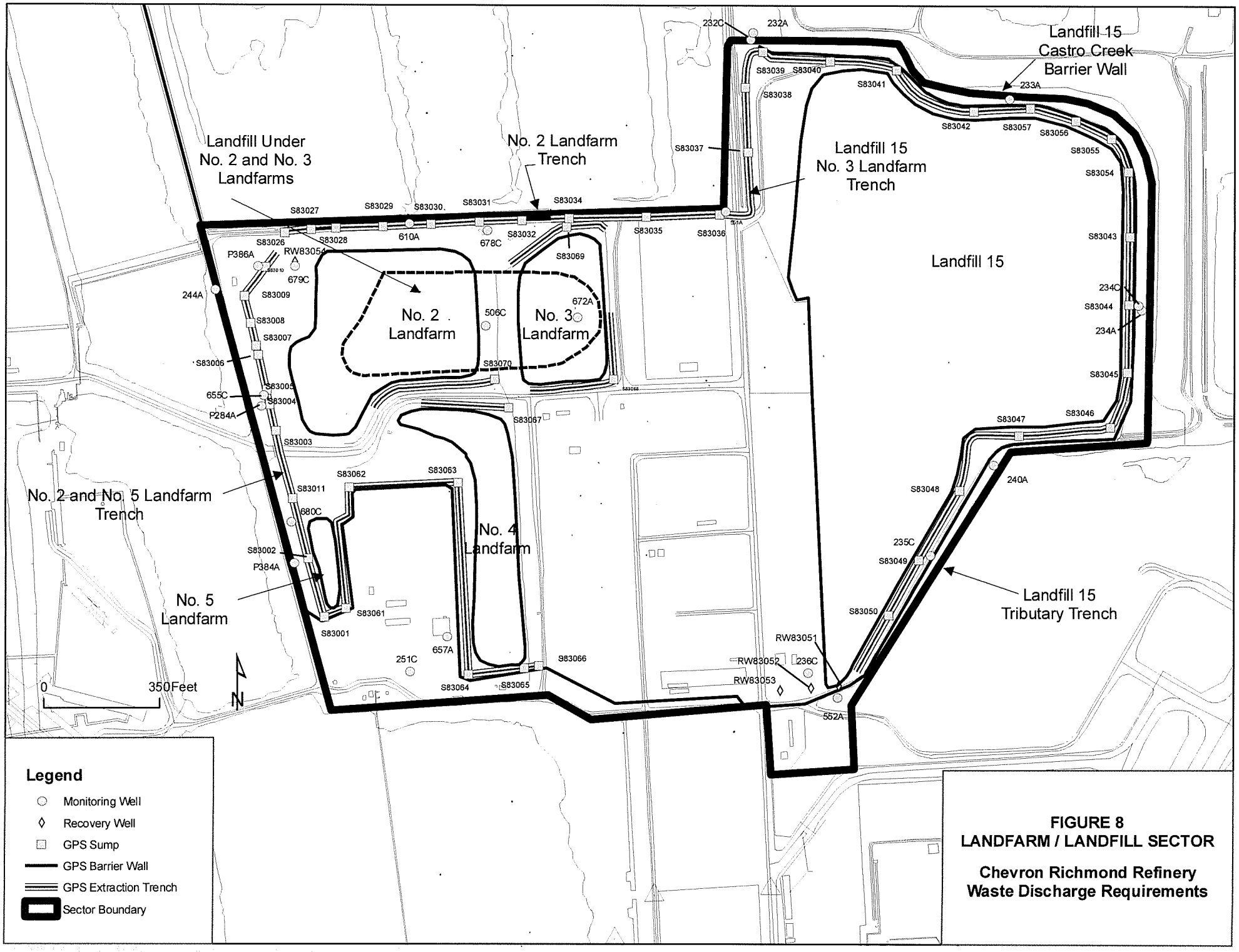


FIGURE 8
LANDFARM / LANDFILL SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

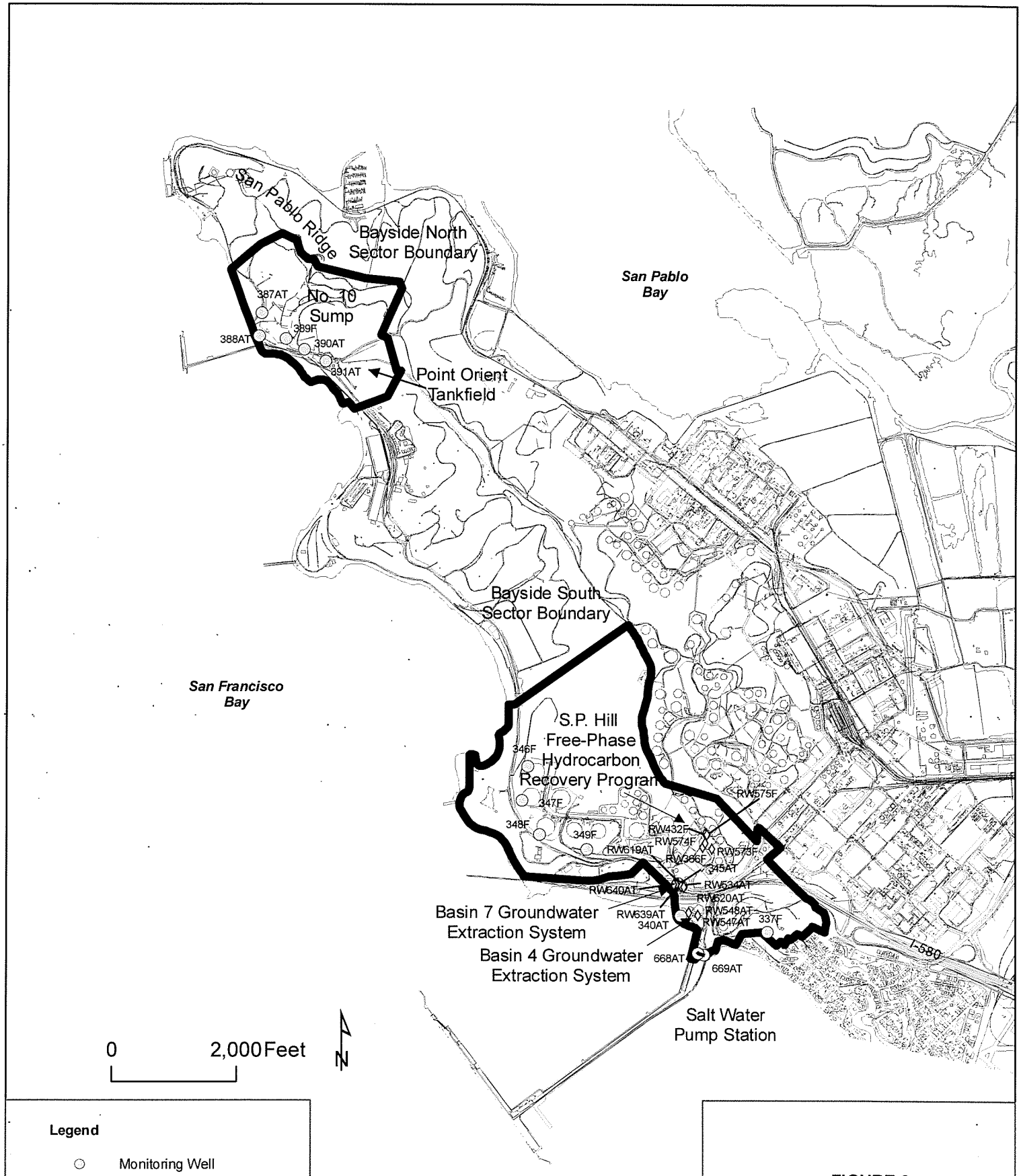


FIGURE 9
BAYSIDE SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

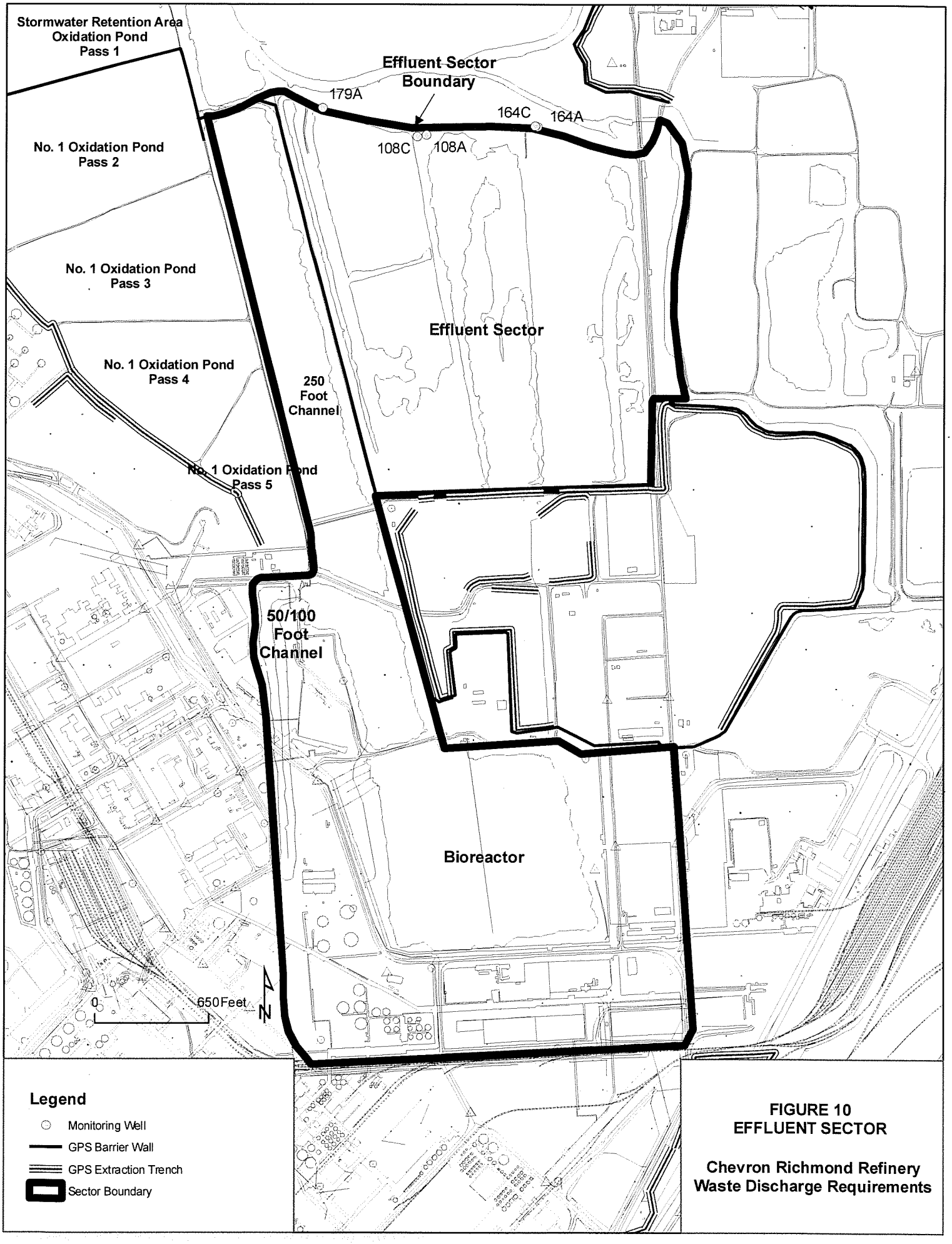


FIGURE 10
EFFLUENT SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

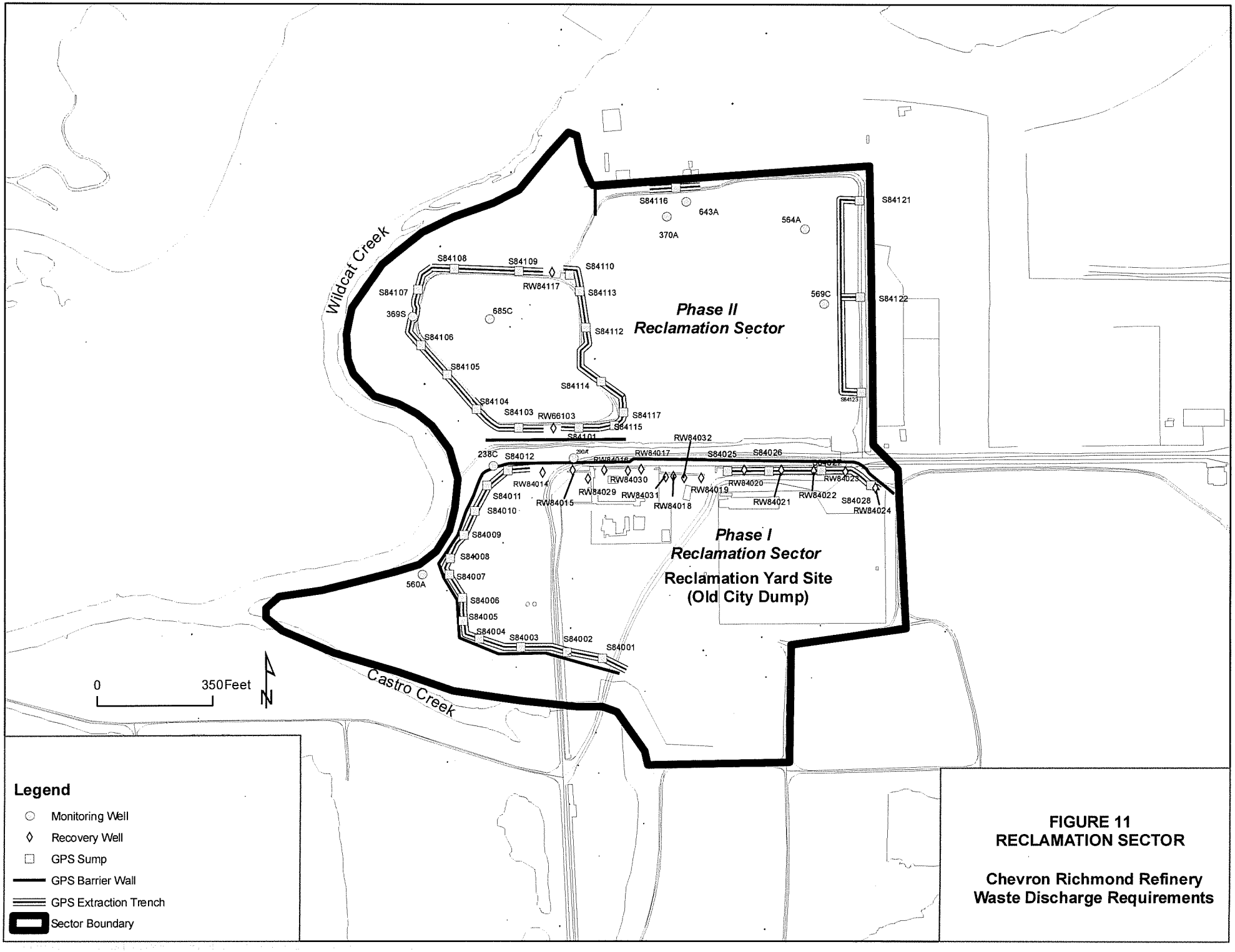


FIGURE 11
RECLAMATION SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

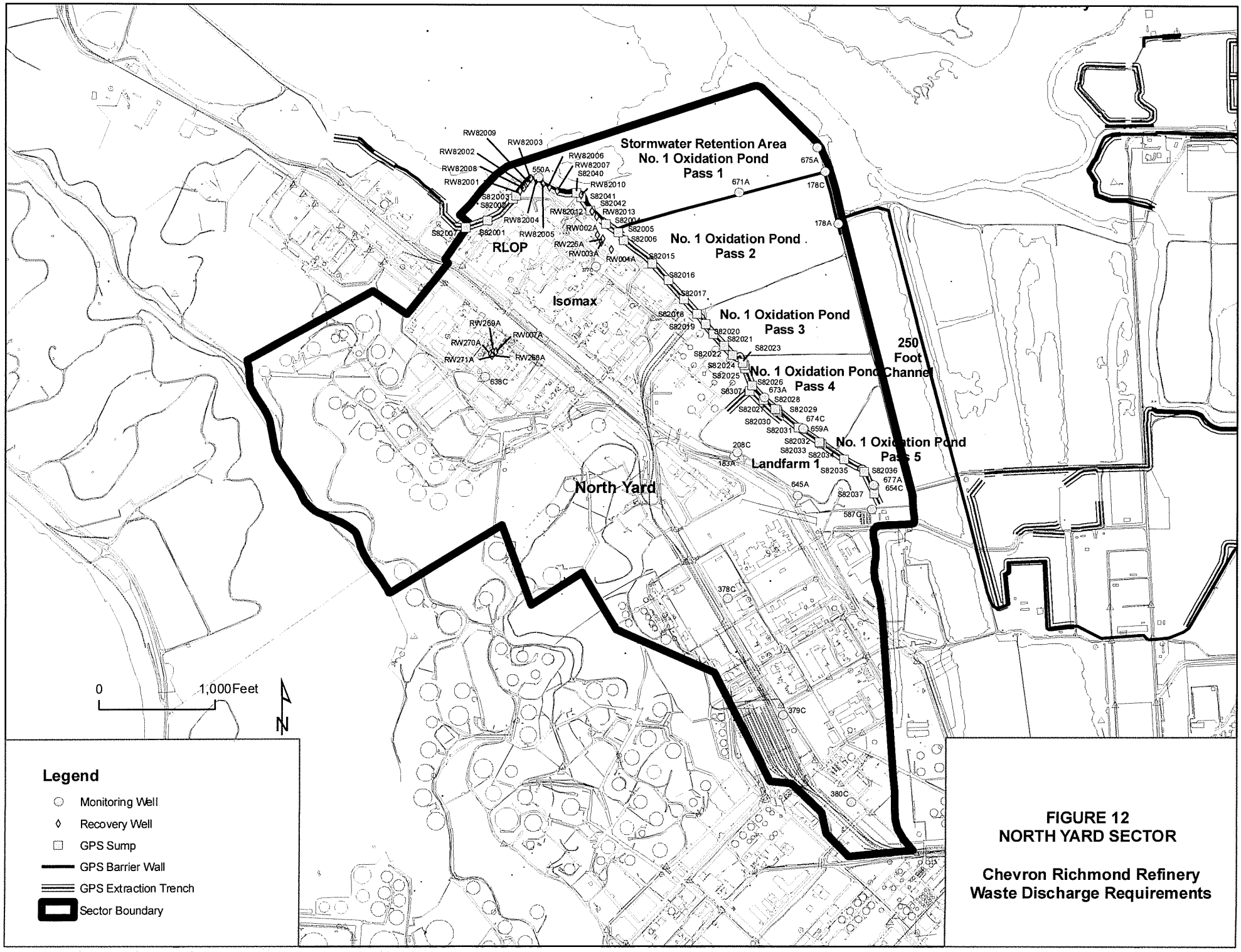
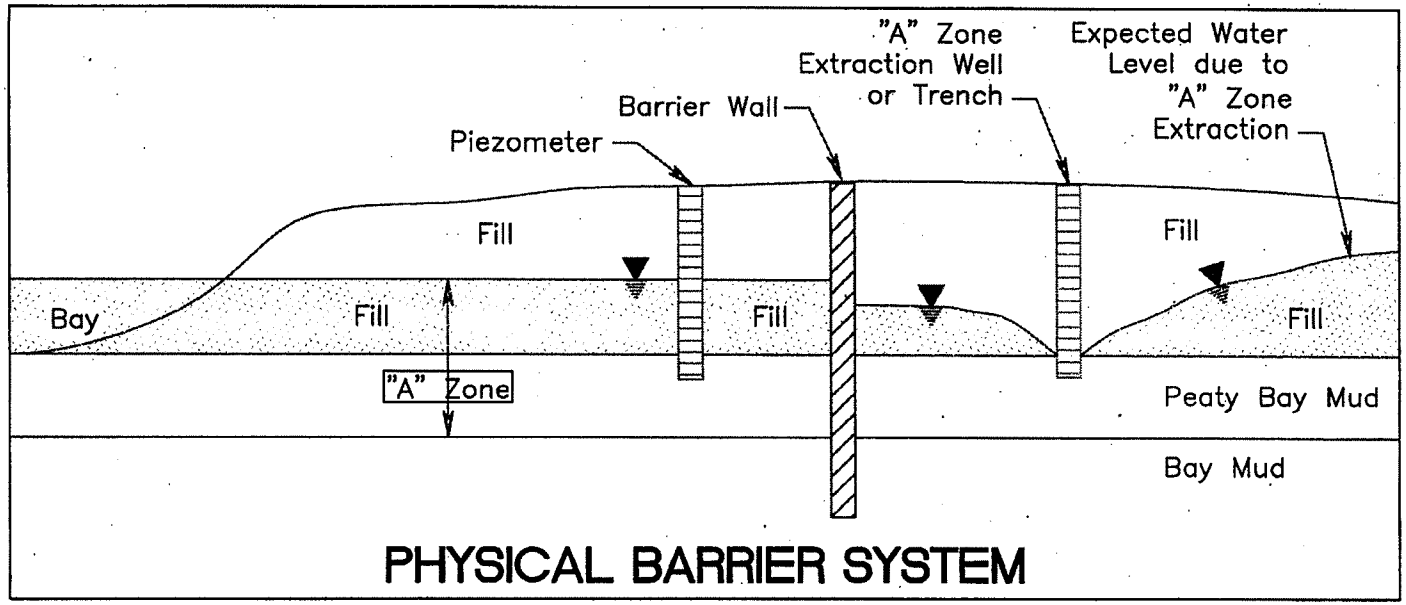
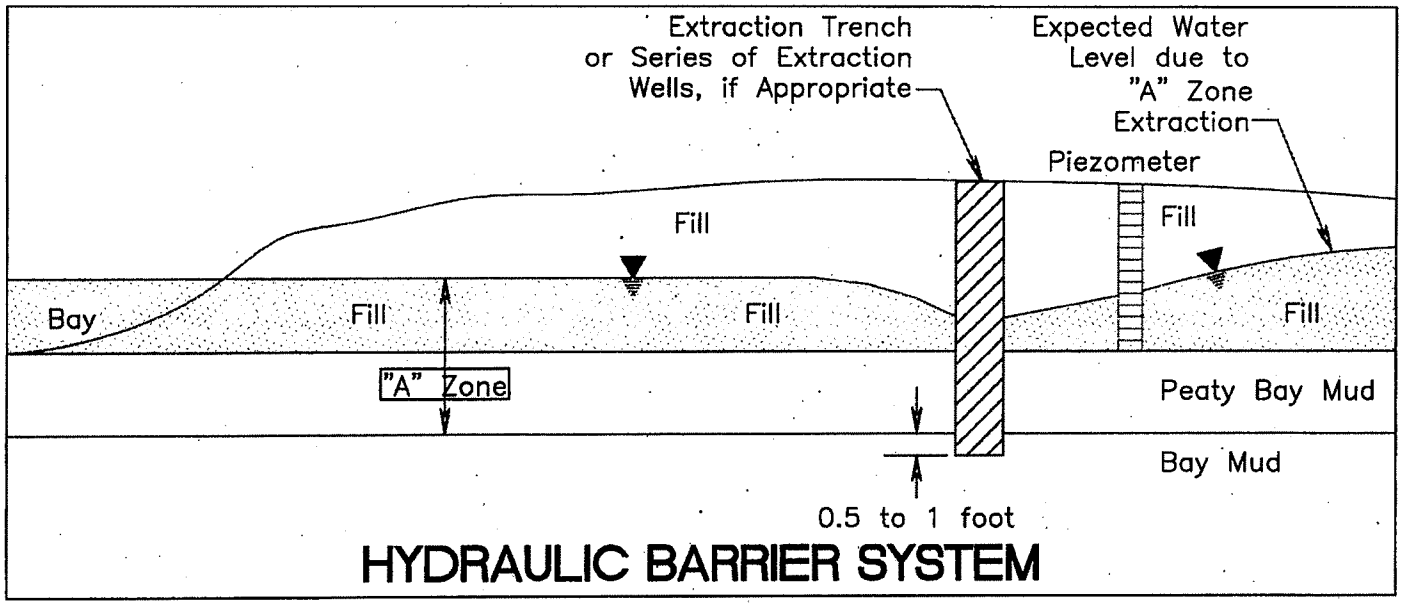


FIGURE 12
NORTH YARD SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements



PHYSICAL BARRIER SYSTEM



HYDRAULIC BARRIER SYSTEM

GROUNDWATER PROTECTION SYSTEM

Chevron Richmond Refinery
Waste Discharge Requirements

Figure 3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING AND REPORTING PROGRAM

FOR

CHEVRON PRODUCTS COMPANY
CHEVRON RICHMOND REFINERY
841 CHEVRON WAY
RICHMOND, CONTRA COSTA COUNTY

ORDER NO. R2-2011-0036

CONSISTS OF PART A AND PART B

PART A

This combined Self-Monitoring Program (SMP) specifies monitoring and reporting programs necessary to fulfill obligations under the Waste Discharge Requirements (WDRs) and Site Cleanup Requirements (SCRs), including:

a) General monitoring requirements for landfills and waste management units under the WDRs (Part A);
b) General monitoring requirements related to cleanup activities performed under the SCRs (Part A);
c) Self-monitoring report content and format (Part A);
d) Self-monitoring report submittal frequency and schedule (Part B);
e) Monitoring locations, parameters, analytes and frequency for programs under the WDRs (Part B); and
f) Monitoring locations, parameters, analytes and frequency for programs under the SCRs (Part B).

A. AUTHORITY AND PURPOSE

For discharges of waste to land, water quality monitoring is required pursuant to the California Code of Regulations (CCR), Division 2, Title 27, Subdivision 1, Chapter 3, Subchapter 3, sections 20380 through 20435. The principal purposes of an SMP include: 1) to document compliance with WDRs and prohibitions established by the Regional Water Board, 2) to facilitate self-policing by the discharger in the prevention and abatement of pollution arising from the waste discharge, 3) to develop or assist in the development of effluent standards of performance and toxicity standards, and 4) to assist the discharger in complying with the requirements of Title 27. Additionally, under California Water Code (CWC) Section 13304, Chevron is required to implement corrective actions and monitor the effectiveness of the implemented corrective actions under this combined SMP.

B. MONITORING REQUIREMENTS

Monitoring refers to the observation, inspection, measurement, and/or sampling of environmental media, waste management units (WMUs), containment and control facilities, and waste disposed in each WMU. The monitoring programs designed to evaluate the potential release of wastes from WMUs are included in the WDRs Monitoring Program described in this combined SMP. Monitoring programs designed to evaluate the effectiveness of corrective actions implemented under CWC Section 13304 are also described in the combined SMP. The following defines the types of monitoring that may be required.

Monitoring of Environmental Media

The Regional Water Board may require monitoring of groundwater, surface water, vadose zone, stormwater, leachate, and any other environmental media that may pose a threat to water quality or provide an indication of a water quality threat at the refinery.

Sample collection, storage, and analyses shall be performed according to the most recent version of U.S. EPA-approved methods or in accordance with Groundwater Monitoring Program Standard Operating Procedures (SOP) or subsequent revisions approved by Regional Water Board staff. Analytical testing of environmental media required by this SMP shall be performed by a

California State-approved laboratory for the required analyses. The director of the laboratory whose name appears on the certification shall be responsible for supervising all analytical work in his/her laboratory and shall have signing authority for all laboratory data reports or may designate signing of all such data included in reports submitted to the Regional Water Board.

All monitoring instruments and devices used to conduct monitoring in accordance with this SMP shall be maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once every two years.

Receiving waters refer to any surface water which actually or potentially receives surface or groundwater that pass over, through, or under waste materials or impacted soils. In this case, the groundwater beneath and adjacent to the WMU areas and the surface runoff from the refinery site are considered receiving waters.

Standard Observations

Standard observations refer to observations within the limits of each WMU, at their perimeter, and of the receiving waters beyond their limits. Standard observations include:

1. Waste Management Units:
   a. Evidence of ponded water at any point on the WMU;
   b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source; and
   c. Evidence of erosion and/or daylighted waste.

2. Perimeter of Waste Management Units:
   a. Evidence of liquid leaving or entering the WMU, estimated size of affected area and flow rate (show affected area on map);
   b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source; and
   c. Evidence of erosion and/or daylighted waste.

3. Receiving Waters:
   a. Floating and suspended materials of waste origin, including their presence or absence, source, and size of affected area;
   b. Discoloration and turbidity: description of color, source, and size of affected area;
   c. Evidence of odors, presence or absence, characterization, source, and distance of travel form source;
   d. Evidence of beneficial use, such as presence of water associated with wildlife;
   e. Estimated flow rate; and
   f. Weather conditions, such as estimated wind direction and velocity, total precipitation.

Facilities Inspections

Facilities inspections refer to the inspection of all containment and control structures and devices associated with the environmental monitoring of the refinery. Containment and control facilities may include the following:

1. Intermediate and final covers; and
2. Storm-water management system elements such as perimeter drainage and diversion channels, ditches and downchutes, and detention and sedimentation ponds or collection tanks;

Quality Assurance/Quality Control (QA/QC) Sample Monitoring

Chevron shall collect duplicate, field blank, equipment blank (if appropriate) and trip blank samples for each monitoring event at the frequency specified in the latest version of the Groundwater Monitoring Program SOP.

C. REPORTING REQUIREMENTS

Reporting responsibilities of waste dischargers under WDRs and SCRs are specified in CWC sections 13225(a), 13267(b), 13383, and 13387(b) and this Regional Water Board's Resolution No.73-16 and Title 27. At a minimum, each Self-Monitoring Report (SMR) shall include the following information:

1. Transmittal Letter: A cover letter transmitting the essential points of the monitoring report shall be included with each monitoring report. The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall also certify the completion of all monitoring requirements. The letter shall be signed by the Discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

2. Graphic Presentation: The following maps, figures, and graphs (if applicable) shall be included in each SMR to visually present data collected pursuant to this SMP:
   a. Plan-view maps showing all monitoring and sampling locations, WMUs, containment and control structures, treatment facilities, surface water bodies, and site/property boundaries;
   b. Groundwater level/piezometric surface contour maps for each groundwater-bearing zone of interest showing inferred groundwater gradients and flow directions under/around each WMU, based upon the past and present water level elevations and pertinent visual observations; and
   c. Any other maps, figures, photographs, cross-sections, graphs, and charts necessary to visually demonstrate the appropriateness and effectiveness of sampling, monitoring, characterization, investigation, or remediation activities relative to the goals of this SMP.

3. Tabular Presentation: The following data (if applicable) shall be presented in tabular form and included in each SMR to show a chronological history and allow quick and easy reference:
   a. Well designation;
   b. Well location coordinates (latitude and longitude);
   c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
   d. Groundwater depths;
   e. Groundwater elevations;
   f. Current analytical results (including analytical method and detection limits for each constituent);

g. Historical analytical results (including at least the past five years in the annual report unless otherwise requested); and
h. Measurement dates.

4. Compliance Evaluation Summary and Discussion:

a. A summary and certification of completion of all environmental media monitoring, standard observations, and facilities inspections;
b. The quantity and types of wastes captured by the GPS and hydrocarbon recovery program, and the location these wastes were disposed of during the reporting period, if applicable;
c. A description of the waste stream, if applicable;
d. The signature of the laboratory director or his/her designee in laboratory data deliverables indicating that he/she has supervised all analytical work in his/her laboratory; and
e. A discussion of the field and laboratory results that includes the following information:

(1) Data interpretations (including of trends, especially in the context of potential correlation to the modified waste acceptance criteria);
(2) Conclusions;
(3) Recommendations;
(4) Newly implemented or planned investigations and remedial measures;
(5) Data anomalies;
(6) Variations from protocols;
(7) Condition of wells; and
(8) Effectiveness of leachate monitoring and control facilities.

5. Appendices: The following information shall be provided as appendices in electronic format only unless requested otherwise by Regional Water Board staff and unless the information is already contained in an SAP or SOP approved by Regional Water Board staff:

a. New boring and well logs;
b. Method and time of water level measurements;
c. Purging methods and results including the type of pump used, pump placement in the well, pumping rate, equipment and methods used to monitor field pH, temperature, and electrical conductivity, calibration of the field equipment, pH temperature, conductivity, and turbidity measurements, and method of disposing of the purge water;
d. Sampling procedures, field, equipment, and travel blanks, number and description of duplicate samples, type of sample containers and preservatives used, the date and time of sampling, the name of the person actually taking the samples, and any other relevant observations; and
e. Documentation of laboratory results, analytical methods, detection limits and reporting limits, and Quality Assurance/Quality Control (QA/QC) procedures for the required sampling.

D. ANNUAL REPORTING

The Discharger shall submit an annual self-monitoring report to the Regional Water Board covering the previous calendar year. The annual report must summarize all monitoring, investigation, and remedial activities that have occurred in the previous year. The annual report shall include the following information for each monitoring event during the year required pursuant to this SMP, in addition to the transmittal letter and appendices described in Sections C.1, C.2, and C.3 of this SMP:

1. **Graphic Presentation**
Include site maps (plot plans) for each aquifer or water-bearing zone monitored that are drawn to a scale that remains constant from reporting period to reporting period. Line or bar graphs are helpful to illustrate variations in groundwater elevations, phase-separated product thickness, and dissolved chemical concentrations with time. These maps and graphs shall include the following information:

   a. Known or probable contaminant sources;
   b. Well locations;
   c. Groundwater elevation contours;
   d. Inferred groundwater flow direction(s);
   e. Identify wells containing phase-separated product;
   f. Extent of dissolved chemical constituents presented in map layout (e.g., isoconcentration maps, chemical box data maps, etc.); and
   g. Appropriate analytical results.

   Geologic cross sections are required if new data is available and/or the previous interpretation of subsurface conditions has changed. When required, geologic cross sections shall include the following:

      i. Vertical and lateral extent of contamination;
      ii. Contaminant sources;
      iii. Geologic structures;
      iv. Soil lithology;
      v. Water table/piezometric surfaces;
      vi. Sample locations;
      vii. Sample analytical results; and
      viii. Subsurface utilities and any other potential natural or manmade conduits for contaminant migration.

2. **Tabular Presentation**
Present all of the following data in one or more tables to show a chronological history and allow quick and easy reference. The table(s) shall include the following information:

   a. Well designations;
   b. Well location coordinates (latitude and longitude);
   c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
   d. Groundwater depths;
   e. Groundwater elevations;
   f. Horizontal groundwater gradients;
   g. Vertical groundwater gradients (including comparison wells from different zones);
   h. Phase-separated product elevations;
   i. Phase-separated product thickness;
   j. Current analytical results (including analytical method and detection limits for each constituent);
   k. Historical analytical results for the most recent four sampling events;
   l. Measurement dates;
   m. Groundwater extraction, including:

i. Average daily extraction rate;
ii. Total volume extracted for monitoring period;
iii. Annual cumulative total volume extracted; and

n. Estimate of contaminant volume extracted (reported in gallons) including:

i. Average daily removal rate;
ii. Total volume removed for monitoring period;
iii. Annual cumulative total volume removed.

3. **Discussion**
Provide a discussion of the field and laboratory results that includes the following information:

a. Data Interpretations;
b. Conclusions;
c. Recommendations;
d. Newly implemented or planned investigations and remedial measures;
e. Data anomalies;
f. Variations from protocols; and
g. Conditions of wells.

E. CONTINGENGY REPORTING

1. The Discharger shall report any seepage from the surface of any WMU or discharge prohibited in the WDRs or SCRs immediately after it is discovered to the Regional Water Board by calling the Spill Hotline at 1-800-852-7550 and by sending an email to Rb2SpillReports@waterboards.ca.gov. The Discharger shall submit a written report with the Regional Water Board within five days of discovery of any discharge. The written report shall contain, at a minimum, the following information:

a. A map showing the location(s) of discharge;
b. Approximate flow rate;
c. A description of the nature of the discharge; and
d. Corrective measures underway or proposed.

2. The Discharger shall submit a written report to the Regional Water Board within seven working days of determining that a statistically significant difference occurred in the sample result compared against the historical dataset and above an approved WQPS in a perimeter segment-monitoring well. In addition, evaluation of GPS performance will be reviewed to examine the effectiveness of hydraulic control.

a. Chevron shall immediately re-sample at the compliance point where the exceedence was observed, evaluate the result against the historical dataset and re-analyze if results are not consistent with historical trends.

b. If re-sampling and analysis confirm the exceedence through statistical analysis, Chevron shall document this in the text of the next Annual Report and notify the Regional Water Board in writing within 21 days of re-sampling. In this letter, Chevron shall evaluate whether any re-sampling or additional corrective measures need to be implemented.

F. ELECTRONIC REPORTING

1. **Geotracker Requirements**
   The State Water Board has adopted regulations requiring electronic report and data submittal to Geotracker. The text of the regulations can be found at the following URL:
   http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/index.shtml

   Parties responsible for cleanup of pollution at sites overseen by the Regional Water Board's Land Disposal Programs are required to submit over the internet, the following information electronically to Geotracker:

   a. Groundwater analytical data;
   b. Surveyed locations of monitoring wells;
   c. Boring logs describing monitoring well construction; and
   d. Portable data format (PDF) copies of all reports (the document in its entirety [signature pages, text, figures, tables, etc.] must be saved as a single PDF file).

   Note that the Discharger is still responsible for submitting one hard copy of all reports pursuant to this Order. The Regional Water Board may require direct submittal of electronic reports and correspondence in addition to the State Water Board's Geotracker requirements.

2. **Data Tables**
   Upon request, monitoring results shall also be provided electronically in Microsoft Excel@ or similar spreadsheet format to provide an easy to review chronological summary of site data, and to facilitate data computations and/or plotting that Water Board staff may undertake during the review process. Data tables submitted in electronic spreadsheet format will not be included in the case file for public review and should therefore be submitted on CD or diskette and included with the print report.
   Electronic tables shall include the following information:

   a. Well designations;
   b. Well location coordinates (latitude and longitude);
   c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
   d. Groundwater depths and elevations (water levels);
   e. Phase-separated product thicknesses and elevations;
   f. Current analytical results by constituent of concern (including detection limits for each constituent);
   g. Historical analytical results (including the past four sampling events); and
   h. Measurement dates.

G. MAINTENANCE OF WRITTEN RECORDS

The Discharger shall maintain information required pursuant to this SMP for a minimum of five years. The five-year period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Water Board.

PART B: MONITORING AND OBSERVATION SCHEDULE

1. DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS

A. GROUNDWATER MONITORING:

Semi-Annual Reports: **Due August 31 and March 1 of each year**
Annual Report: **Due March 1 of each year**

Groundwater shall be sampled and analyzed as detailed in Tables 2 and 4. Monitoring well locations are listed in Tables 1 and 3. Groundwater analyses shall include the following field measurements: pH, temperature, specific conductance, water level, volume purged, number of casings volumes purged, and whether the well went dry during sampling (including measures taken to ensure accuracy of analyses given this condition). Groundwater monitoring wells installed in the future will be sampled and analyzed as detailed in Tables 2 and 4 and on a quarterly basis until a statistically significant dataset is established.

B. FACILITIES MONITORING - **Observe quarterly, report semi-annually**

Semi-Annual Report: **Due August 31 and March 1 of each year**
Annual Report: **Due March 1 of each year**

The Discharger shall inspect all facilities to ensure proper and safe operation and report semi-annually. The facilities to be monitored shall include, but not be limited to:

1. Waste Containment systems;
2. Waste treatment systems;
3. Surface water retention basins;
4. Leak detection systems (where applicable); and
5. Leachate/groundwater management facilities and secondary containment where applicable.

2. GPS PERFORMANCE MONITORING

Chevron shall measure the water level in each GPS corrective action monitoring well and in a sufficient number of wells or piezometers both upgadient and downgradient of the GPS to demonstrate continuous maintenance of a hydraulic depression in the GPS trenches (inward hydraulic gradient). To demonstrate the effectiveness of the GPS, Chevron shall include the following for each refinery sector in the semi-annual SMRs:

a. contour maps of 1st and 3rd quarter GPS groundwater elevation data;
b. hydrographs showing water level data (measured at least once per week) at each operating extraction sump or recovery well;
c. a narrative summary of the GPS performance during the reporting period; and,

d. an estimate of the volume of groundwater extracted during the reporting period.

3. ON-SITE OBSERVATIONS/POST-CLOSURE MAINTENANCE AND MONITORING

Closed WMUs (Plant l/Additives Plant, Landfill 15, Landfarms 1-5, the Hydropits, Parr-Richmond Landfill and the Gertrude Street Site) shall be inspected annually by a registered California engineer or geologist prior to the onset of the rainy season. These annual inspections shall include identification of areas of the final covers where the soil has become eroded, attacked by rodents, or otherwise damaged, or where the paved areas have become damaged. Chevron shall perform appropriate repairs for these areas prior to the rainy season. In addition, Chevron shall monitor runoff/run-on control facilities for their effectiveness and overall condition as needed according to weather conditions during the winter months (November through April) and as prescribed in the approved post-closure maintenance/monitoring plan for each individual WMU. Chevron shall maintain records of all inspections and repairs and summarize in each semi-annual monitoring report any repairs made during the corresponding reporting period.

4. ALKANE PLANT PLUME REMEDIATION MONITORING

Chevron shall continue to monitor the Alkane Plant Plume remediation effort in accordance with *the Revised Alkane Plant Plume Remediation Goals Plan* (URS, 2001). The monitoring components of this plan include measuring potentiometric water levels, liquid hydrocarbon thickness, and benzene and fluoride concentrations. Benzene and fluoride concentrations will continue to be measured annually in samples collected from 6 wells (listed in Table 1), located around the perimeter of the plume to verify containment of the plume.

5. FREE-PHASE LIQUID HYDROCARBON (FPLH) RECOVERY SUMMARY

Chevron shall include a map in each semi-annual SMR that shows the locations of all wells within the refinery that contain FPLH. The measured thickness of the FPLH in each well should be indicated on the map next to the well. Recovery of FLPH will be performed in accordance with the procedures described in the *Free-Phase Liquid Petroleum Hydrocarbon Recovery Evaluation Plan, Chevron Richmond Refinery* (URS, 2000). In addition, the SMR shall include a description of FPLH recovery method used, recovery volume data for the reporting period and cumulative recovery data for each active recovery well or system.

6. CHEMICAL CONSTITUENT MONITORING

a. Refinery-Wide Groundwater Monitoring Program: Chevron shall sample the Refinery-Wide Corrective Action Groundwater Monitoring Program compliance monitoring points listed in Table 1 for the analytical parameters and at the frequencies listed in Table 2. All monitoring activities, including analytical and QA/QC procedures will be conducted in accordance with the most recent version of Chevron's Groundwater Monitoring Program Standard Operating Procedure.

b. Landfarm Post-Closure Monitoring Program: Chevron shall sample the Landfarms Post-Closure Monitoring Program monitoring points listed in Table 3 for the analytical parameters and at the frequencies listed in Table 4. All monitoring activities, including analytical and QA/QC procedures will be conducted in accordance with the most recent version of Chevron's Groundwater Monitoring Program Standard Operating Procedure.

Monitoring events for constituents of concern and Appendix IX analyses shall alternate between periods of highest and lowest groundwater levels.

c. Chevron shall sample new wells installed to monitor Landfarms 1 through 5 for COCs and MPs listed in Table 4 over eight consecutive quarters. Within the first year after installation, Chevron shall analyze new wells for the Appendix IX constituents listed in Table 4. Chevron shall add any new compounds detected in new wells to the list of COCs in Table 4.

d. Chevron shall sample the monitoring points listed in Table 3 regardless of the presence of nonaqueous phase liquid as follows:

   i. For monitoring points with persistent nonaqueous phase liquid (e.g., more than two consecutive quarters), Chevron shall collect samples every other year for COCs and Appendix IX (if well is POC). For monitoring points with intermittent nonaqueous phase liquid (e.g., not detected during consecutive quarters), Chevron shall collect samples semi-annually.

   ii. Chevron shall obtain samples for dissolved phase analysis after purging nonaqueous phase liquid from the well, by low-flow sampling, or by another appropriate method.

   iii. Chevron shall follow the most recent version of the Chevron Groundwater Monitoring Program Standard Operating Procedure.

e. Chevron shall monitor "A" Zone monitoring points in Table 3 under a corrective action monitoring program (22 CCR 66264.100).

f. Chevron shall monitor "C" Zone monitoring points in Table 3 under a detection monitoring program (22 CCR 66264.98).

Attachments:

Table 1:	List of Monitoring Wells by Sector, Refinery-Wide Groundwater Monitoring Program
Table 2:	Maximum Allowable Concentration Limits for Constituents of Concern and Monitoring Parameters for the Refinery-Wide Groundwater Monitoring Program
Table 3:	Landfarm Area Monitoring Well Network
Table 4:	Landfarm Post-Closure Monitoring Program, Monitoring Parameters, Constituents of Concern and MACLs

Table 1: List of Monitoring Wells by Sector
Refinery-Wide Groundwater Monitoring Program
Chevron Richmond Refinery

Alkane Sector	Castro and Plant 1/Add. Sector	Landfarms /Landfill 15 Sector	North Yard Sector	Reclamation Yard Sector	Pollard Sector	Effluent Sector	Bayside North	Bayside South	Interior "C" Zone
209A	323A	232A	178A	290A	260A	108A	387AT	346F	208C
P460A	642A	233A	675A	643A	262A	164A	388AT	347F	638C
595AT	554A	234A	550A	370A	803A	179A	389F	348F	378C
223C	556A	240A	377C	560A	635C	108C	390AT	349F	379C
375C	106C	244A	178C	685C		164C	391AT	351CT	380C
670C	125C		671A	238C				345AT	138C
167A*	320C	551A		369S				340AT	382C
170A*	649A	552A		564A				337F	
174A*		232C		569C				RW619AT#	
200A*		234C						RW534AT#	
201A*		235C							
258A*		236C							

Notes:
* Wells associated with Alkane Plant Plume Remediation Monitoring
# Wells with Remediation Monitoring Plan, S.P. Hill Tankfield

Table 2: Maximum Allowable Concentration Levels (MACLS) for Constituents of Concern and Monitoring Parameters for the Chevron Refinery -Wide Groundwater Monitoring Program

Constituents of concern	MACL (µg/l) Unless otherwise noted		Landfarms/landfills Sector	Castro Sector	North Yard Sector	Bayside Sector- North	Bayside Sector- south	Alkane Sector	Effluent Sector	Reclamation Sector	Pollard Sector	Interior "C" zone
TPH-Gas	1200	*	S	S	S	S	S	S	S	S	S	S
TPH- Diesel	640	*	S	S	S	S	S	S	S	S		S
Benzene	46	*	S	S	S	S	S	S	S	S	B	S
MTBE	1800	*	S	S	S	S	S	S	S	S	B	S
Acenaphthene	40	*	B	B	B	B	B	B	B	B	B	
Acenaphthylene	307	*	B	B	B	B	B	B	B	B	B	
Anthracene	21	*	B	B	B	B	B	B	B	B	B	
Benzo(a)pyrene	0.049	*	B	B	B	B	B	B	B	B	B	
Benzo(b)fluoranthene	0.049	*	B	B	B	B	B	B	B	B	B	
Benzo(g,h,i)perylene		*	B	B	B	B	B	B	B	B	B	
Benzo(k)fluoranthene	0.049	*	B	B	B	B	B	B	B	B	B	
Chrysene	0.049	*	B	B	B	B	B	B	B	B	B	
Dibenzo(a,h)anthracene	0.049	*	B	B	B	B	B	B	B	B	B	
Fluoranthene	7.1	*	B	B	B	B	B	B	B	B	B	
Fluorene	39	*	B	B	B	B	B	B	B	B	B	
Indeno(1,2,3-cd)pyrene	0.049	*	B	B	B	B	B	B	B	B	B	
Naphthalene	194	*	B	B	B	B	B	B	B	B	B	
Phenanthrene	19	*	B	B	B	B	B	B	B	B	B	
Pyrene	10	*	B	B	B	B	B	B	B	B	B	
Chlordane	0.00059	*		B						B		
G-BHC (Lindane)	0.063	*		B						B		
Dieldrin	0.0019	*		B						B		
Selenium	5.0	*	B	B	B			S	B	B	B	
Arsenic	36	*	S	B					B	S		
Cadmium	9.3	*	B	B	B			B	B	B	S	B
Chromium VI	50	*	B	B	B			B	B	B	B	B
Lead	5.6	*	S	S	S	S	S	S	S	S		B
Mercury	0.025	*	B						B	B		
Nickel	8.2	*	S	B	S			S	B	S	S	S

Constituents of concern	MACL (µg/l) Unless otherwise noted		Landfarms/landfills Sector	Castro Sector	North Yard Sector	Bayside Sector- North	Bayside Sector- south	Alkane Sector	Effluent Sector	Reclamation Sector	Pollard Sector	Interior "C" zone
Zinc	71	*	S	B	B			B	B	B	S	B
Fluoride	2400	*						S				
Un-ionized Ammonia-N	25	*							B	B		
pH	6.5 to 8.5	*	S	S	S	S	S	S	S	S	S	S
Turbidity (NTUs)	N/A	N/A	S	S	S	S	S	S	S	S	S	S
Temperature	N/A	N/A	S	S	S	S	S	S	S	S	S	S

Notes:
* MACLs to be reviewed and updated by the Discharger per Provision 9

S = Monitoring Parameter per Sector (analyzed semi-annually)
B= Constituent of concern per Section (analyzed during summer/fall reporting period every 2 years (even-numbered years)

N/A = not applicable
(NTUs) = Nephelometric Turbidity Units

Table 3
Landfarm Area Monitoring Well Network

Monitoring Wells for Landfarm Area
"A" Zone Wells
183A (POC)
610A (POC)
645A
657A
659A (POC)
672A
673A
677A
P284A (POC)
P384A
P386A
"C" Zone Wells
251C (POC)
506C (POC)
587C
654C (POC)
655C (POC)
674C
678C (POC)
679C (POC)
680C (POC)

Notes:
POC indicates that well is a point of compliance well.

Table 4
Landfarms Post-Closure Monitoring Program
Monitoring Parameters, Constituents of Concern and MACLs

Constituent	MACL µg/l (2)	MACL Source	"A" zone Well Monitoring Frequency (5)	"C" zone Well Monitoring Frequency (5)
Monitoring Parameters				
pH	6.5 to 8.5	1	S	S
Specific Conductivity	N/A	N/A	S	S
Turbidity	N/A	N/A	S	S
Temperature	N/A	N/A	S	S
Arsenic	36	*	S	S
Lead	5.6	*	S	S
Nickel	8.2	*	S	S
Zinc	71	*	S	S
TPH-Gasoline	1200	*	S	S
TPH-Diesel	640	*	S	S
TPH-Diesel Silica Gel	640	*	S	S
Benzene	46	*	S	S
MTBE	1800	*	S	S
Toluene	5000	*	S	S
Phenolics (Total)	50	*	S	S
Constituents of Concern				
Cadmium, Dissolved	9.3	*	B	B
Chromium VI, Dissolved	50	*	B	B
Mercury, Dissolved	0.025	*	B	B
Selenium, Dissolved	5	*	B	B
Dissolved sulfide	100	*	B	B
Methylene Chloride	1600	*	B	B
Acenaphthene	40	*	B	S
Acenaphthylene	307	*	B	S
Anthracene	21	*	B	S
Benzo(a)anthracene	2.2	*	B	S
Benzo(a)pyrene	0.96	*	B	S
Benzo(b)fluoranthene	0.049	*	B	S
Benzo(g,h,i)perylene	X	*	B	S
Benzo(k)fluoranthene	0.049	*	B	S
Chysene	0.049	*	B	S
Dibenzo(a,h)anthracene	0.049	*	B	S
Fluoranthene	7.1	*	B	S
Fluorene	39	*	B	S
Indeno(1,2,3-cd)pyrene	0.049	*	B	S
Naphthalene	194	*	B	S
Phenanthrene	19	*	B	S
Pyrene	10	*	B	S
Pentachlorophenol	7.9	*	B	B

Constituent	MACL µg/l (2)	MACL Source	"A" zone Well Monitoring Frequency (5)	"C" zone Well Monitoring Frequency (5)
Benzenethiol	5	*	B	B
Benzyl Butyl phthalate	5200	*	B	B
Bis 2-ethylhexyl phthalate	6	*	B	B
Chromium, dissolved	50	*	B	B
Di-n-butyl phthalate	12000	*	B	B
2,4-dimethylphenol	110	*	B	B
Ethylbenzene	29000	*	B	B
1-methylnapthalene	75	*	B	B
7,12-dimethyl benzo(a)anthracene	X	*	B	B
2-methylphenol	XX	*	B	B
3,4-methylphenol	XX	*	B	B
Phenol	2560	*	B	B
Trichloroethene	381	*	B	B
1,1,1-trichloroethane	62	*	B	B
Chlorobenzene	21000	*	B.	B
Methyl chrysene	X	*	B	B
Total Xylenes	13	*	B	B
2-methylnaphthalene	2.1	*	B	B
Acetophenone		*	B	B
Barium	1000	*	B	B
Cobalt	3	*	B	B
Copper	3.1	*	B	B
N-Nitrosopiperidine		*	B	B
Silver	0.19	*	B	B
Vanadium	19	*	B	B
Vinyl chloride	3.8	*	B	B
Appendix IX Parameters (3)				
Metals (Methods 6010,7060, 7470)	N/A	N/A	(4)	N/A
SVOCs (Method 8270)	N/A	N/A	(4)	N/A
VOCs (Method 8260)	N/A	N/A	(4)	N/A

Notes:
* MACLs to be reviewed and updated by the Discharger per Provision 9

1. SF Bay Basin Plan, 2010
2. MACL is the maximum allowable concentration limit. Applicable to A-Zone wells only. C-Zone wells evaluated based on background concentrations of inorganic constituents and practical quantization limits for organic constituents.
3. Parameters are listed in Appendix IX to 22CFR 66264 for analysis via Methods 6010, 7060, 7470, 8260, 8270. Appendix IX parameters that are detected, but are not COCs, will be added to the list of COCs for all wells.
4. Bi-annually at POC wells. Every five years at all other wells. Within first year in new wells.
5. Monitoring for COCs and Appendix IX parameters will alternate between highest and lowest groundwater levels.

X=Total PAH concentration less than 0.015 mg/l
XX=Total phenolics concentration less than 0.05 mg/l
PAHS are polynuclear aromatic hydrocarbons
POC is point of compliance
B is biennial or monitoring every other year for non-POC wells
S is semi-annual monitoring at all wells
N/A is not applicable

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS

(Those requiring TMDLS (A), being addressed by USEPA approved TMDLS (B), and being addressed by actions other than TMDLs (C))*

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	TMDL REQUIREMENT STATUS*	ESTIMATED SIZE AFFECTED	PROPOSED OR USEPA APPROVED TMDL COMPLETION
2	R	San Mateo Creek	20440032					
				Diazinon		**B**	**11 Miles**	**2007**
				This listing was made by USEPA for the 1998 303(d) list. For 2006, diazinon was moved by USEPA from the 303(d) list to this being addressed list because of a completed USEPA approved TMDL.				
					Urban Runoff/Storm Sewers			
2	B	San Pablo Bay	20610010					
				Chlordane		**A**	**68349 Acres**	**2008**
				This listing was made by USEPA.				
					Nonpoint Source			
				DDT		**A**	**68349 Acres**	**2008**
				This listing was made by USEPA.				
					Nonpoint Source			
				Dieldrin		**A**	**68349 Acres**	**2008**
				This listing was made by USEPA.				
					Nonpoint Source			
				Dioxin Compounds (including 2,3,7,8-TCDD)		**A**	**68349 Acres**	**2019**
				The specific compounds are 2,3,7,8-TCDD, 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDD, and OCDD. This listing was made by USEPA.				
					Atmospheric Deposition			
				Exotic Species		**A**	**68349 Acres**	**2019**
				Disrupt natural benthos; change pollutant availability in food chain; disrupt food availability to native species.				
					Ballast Water			
				Furan Compounds		**A**	**68349 Acres**	**2019**
				The specific compounds are 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6, 7,8,-HxCDF, 1,2,3,7,8,9-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, and OCDF. This listing was made by USEPA.				
					Atmospheric Deposition			
				Mercury		**A**	**68349 Acres**	**2006**
				Current data indicate fish consumption and wildlife consumption impacted uses: health consumption advisory in effect for multiple fish species including striped bass and shark. Major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources.				
					Atmospheric Deposition			
					Municipal Point Sources			
					Natural Sources			
					Nonpoint Source			
					Resource Extraction			

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS

(Those requiring TMDLS (A), being addressed by USEPA approved TMDLS (B), and being addressed by actions other than TMDLs (C))*

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	TMDL REQUIREMENT STATUS*	ESTIMATED SIZE AFFECTED	PROPOSED OR USEPA APPROVED TMDL COMPLETION
				Nickel		A	68349 Acres	2019
				This listing was made by USEPA.				
					Source Unknown			
				PCBs (Polychlorinated biphenyls)		A	68349 Acres	2006
				This listing covers non dioxin-like PCBs.Interim health advisory for fish; uncertainty regarding water column concentration data.				
					Unknown Nonpoint Source			
				PCBs (Polychlorinated biphenyls) (dioxin-like)		A	68349 Acres	2019
				The specific dioxin like compounds are 3,4,4,5-TCB (81), 3,3,3,3-TCB (77), 3,3,4,4,5-PeCB (126), 3,3,4,4,4,4-HxCB (169), 2,3,3,4,4-PeCB (105), 2,3,4,4,5-PeCB (114), 2,3,4,4,5-PeCB (118), 2,3,4,4,5-PeCB (123), 2,3,3,4,4,5-HxCB (156), 2,3,3,4,4,5-HxCB (157), 2,3,4,4,5,5,-HxCB (167), 2,3,3,4,4,5,5-HpCB (189). This listing was made by USEPA.				
					Unknown Nonpoint Source			
				Selenium		A	68349 Acres	2019
				Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds, significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because Individual Control Strategy in place.				
					Agriculture			
					Exotic Species			
					Industrial Point Sources			
					Natural Sources			
2	R	San Pablo Creek	20660014					
				Diazinon		B	9.9 Miles	2007
				This listing was made by USEPA for the 1998 303(d) list. For 2006, diazinon was moved by USEPA from the 303(d) list to this being addressed list because of a completed USEPA approved TMDL.				
					Urban Runoff/Storm Sewers			
2	L	San Pablo Reservoir	20660012					
				Chlordane		A	784 Acres	2019
					Source Unknown			
				Dieldrin		A	784 Acres	2019
					Source Unknown			
				Heptachlor epoxide		A	784 Acres	2019
					Source Unknown			

Draft

McHENRY SOLAR FARM

Environmental Impact Report

SCH#: 2010122021

Prepared for
Modesto Irrigation District
P.O. Box 4060
Modesto, CA 95352

May 2011

ESA

TABLE 3-2
SUMMARY OF ALTERNATIVES SCREENING ANALYSIS
McHENRY SOLAR FARM

Alternative	Project Objectives Criteria	Feasibility Criteria	Environmental Criteria
Passes Screening			
Reduced Project Alternative • Increases setback from roadways to 300 feet • Reduces solar array area by approximately 10% • Reduces energy generating capacity of the site by approximately 3 MW	Would generate 22 MW rather than 25 MW with the proposed Project. Meets most project objectives, but would be less effective than the proposed Project with assisting MID in meeting its Renewable Portfolio Standard and goals aimed at reducing greenhouse gas (GHG) emissions, and in furthering MID's efforts to achieve its goals for renewable energy generating capacity within MID's total energy portfolio.	No elimination factors were identified.	Meets environmental criteria. Aesthetics: would lessen potential visual impacts along McHenry Avenue and Patterson Road Air Quality: would slightly lessen construction air emissions Noise: would slightly lessen construction noise New Impacts: None likely
Non-Agriculture Site Alternative • Former Shell Lab Site, approximately 29 acres • Zoned Planned Industrial • Existing buildings and structures would need to be removed • Approximately 5 MW solar energy output • Approximately 1.25-mile sub-transmission line	Would generate 5 MW rather than 25 MW with the proposed Project. Meets most project objectives, but would be less effective than the proposed Project with assisting MID in meeting its Renewable Portfolio Standard and goals aimed at reducing greenhouse gas (GHG) emissions, and in furthering MID's efforts to achieve its goals for renewable energy generating capacity within MID's total energy portfolio.	No elimination factors were identified.	Meets environmental criteria, although some impacts may be similar to the proposed Project but would merely occur in a different location. Aesthetics: would avoid impacts along McHenry Avenue and Patterson Road Agricultural: would avoid potential conversion of Prime Farmland to non-agricultural use Air Quality: would lessen construction air emissions Noise: would lessen construction noise New Impacts: Demolition of existing structures would at least partially offset any reduction in construction air emissions and noise; aesthetic impact of 1.25-mile sub-transmission line could be greater that the proposed Project
Fails Screening			
Alternative Site: Airport/Industrial Park • In flood plain • Biological habitat along Tuolumne River • Prime Farmland	Meets most project objectives.	No elimination factors were identified.	Fails environmental criteria. Potential impacts would be greater than the proposed Project because this alternative site is located in a flood plain, is designated Prime Farmland, and is very likely to have sensitive species and/or habitat due to its proximity to the Tuolumne River.
Alternative Site: Geer Road Landfill • Ground settling • Construction restrictions in landfill cap	Meets most project objectives.	Fails. Site would not be suitable for a utility-scale solar project due to differential settling of the landfill and construction restrictions on the landfill cap.	Meets environmental criteria. This alternative site is not located on Prime Farmland and would be unlikely to have any new impacts.

Arsenic - ToxFAQs™

CAS # 7440-38-2

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 1,149 of the 1,684 National Priority List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

What happens to arsenic when it enters the environment?

- Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
- Arsenic cannot be destroyed in the environment. It can only change its form.
- Rain and snow remove arsenic dust particles from the air.
- Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
- Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

- Ingesting small amounts present in your food and water or breathing air containing arsenic.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.
- Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Almost nothing is known regarding health effects of organic arsenic compounds in humans. Studies in animals show that some simple organic arsenic

Arsenic

CAS # 7440-38-2

compounds are less toxic than inorganic forms. Ingestion of methyl and dimethyl compounds can cause diarrhea and damage to the kidneys.

How likely is arsenic to cause cancer?

Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic arsenic is carcinogenic to humans.

How can arsenic affect children?

There is some evidence that long-term exposure to arsenic in children may result in lower IQ scores. There is also some evidence that exposure to arsenic in the womb and early childhood may increase mortality in young adults.

There is some evidence that inhaled or ingested arsenic can injure pregnant women or their unborn babies, although the studies are not definitive. Studies in animals show that large doses of arsenic that cause illness in pregnant females, can also cause low birth weight, fetal malformations, and even fetal death. Arsenic can cross the placenta and has been found in fetal tissues. Arsenic is found at low levels in breast milk.

How can families reduce the risks of exposure to arsenic?

- If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.
- If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.
- If you work in a job that may expose you to arsenic, be aware that you may carry arsenic home on your clothing, skin, hair, or tools. Be sure to shower and change clothes before going home.

Is there a medical test to determine whether I've been exposed to arsenic?

There are tests available to measure arsenic in your blood, urine, hair, and fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict whether the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

The EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or cancelled many of the uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) of 10 micrograms of arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Arsenic (Update). Atlanta, GA: U.S. Department of Health and Human Services. Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.wildlife.ca.gov

***EDMUND G. BROWN JR.**, Governor*
***CHARLTON H. BONHAM,** Director*

September 30, 2015

Mr. Greg Brehm
Marin Clean Energy
1125 Tamalpais Avenue
San Rafael, CA 94901

Dear Mr. Brehm:

Subject: Marin Clean Energy Solar PV Project, SCH #2015042040, Draft Environmental Impact Report, City of Richmond, Contra Costa County

The California Department of Fish and Wildlife (CDFW) has reviewed the draft Environmental Impact Report for the Marin Clean Energy Richmond Solar PV Project (Project). The proposed Project would involve site preparation, installation and operation of a 10.5-megawatt (MW) solar photovoltaic (PV) system. The Project site is due west of the intersection of Castro Street and West Hensley Street on three separate assessor parcels (561-100-038-0, 561-100-034-9, and 561-100-037-2) in the City of Richmond, in Contra Costa County. Marin Clean Energy has an option to lease a 60-acre site within the Chevron Richmond Refinery property from the Chevron Products Company for solar energy development. Approximately 40 of these acres is a capped landfill, while the remaining 20 acres consist of filled and compacted fertilizer ponds. The Project site was operated as a landfill site and evaporation pond until 1987. In the late 1990s both sites were filled, re-contoured, re-vegetated, and are currently being maintained under a landfill closure agreement as vacant lots.

The Project would be built in two phases. Phase 1 would consist of the installation of a 2 MW non-penetrating, ballasted, fixed-tilt PV array on approximately 13 acres of the 40-acre landfill. Phase 2 includes the installation of a 3.5 MW single axis tracking PV array on the 20-acre compacted fertilizer pond and of the installation of a 5 MW non-penetrating, ballasted, fixed-tilt PV array on 27 acres of the landfill site. This Project would include extensive grading, trenching, and soil compaction, as well as the removal of native California purple needle grass habitat and has the potential to limit movement of wildlife in the tributary of Wildcat Creek and the surrounding habitat. CDFW has the following comments:

Trustee Agency Authority

CDFW is a Trustee Agency with responsibility under the California Environmental Quality Act (CEQA) for commenting on projects that could impact plant and wildlife resources. Pursuant to Fish and Game Code Section 1802, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species. As a Trustee Agency for fish and wildlife resources, CDFW is responsible for providing, as available, biological expertise to review and comment upon environmental documents and impacts arising from project activities, as those terms are used under CEQA [Division 13 (commencing with Section 21000) of the Public Resources Code].

Responsible Agency Authority

CDFW has regulatory authority over projects that could result in the "take" of any species listed by the State as threatened or endangered, pursuant to Fish and Game Code Section 2081. If the Project could result in the "take" of any species listed as threatened or endangered under the California Endangered Species Act (CESA), CDFW may need to issue an Incidental Take Permit for the Project. CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species (Sections 21001(c), 21083, Guidelines Sections 15380, 15064, 15065). Impacts must be avoided or mitigated to less-than-significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code Section 2080.

Fish and Wildlife Resources

The Project site was heavily disturbed when it was used as a landfill and as evaporation ponds. Since the cessation of those activities, the landfill and evaporation ponds have been capped, re-contoured, and re-vegetated. The majority of the Project site is now currently covered with annual and perennial non-native grasses, herbaceous plants, and coyote bush that has been naturally recruited on the site. In addition, the draft EIR notes that a small community of purple needle grass totaling less than one acre has been discovered on a raised berm near the southeast corner of the retired landfill. Based on aerial imagery, the Project site is also located within or adjacent to areas that are characterized by perennial streams, tidal marsh habitat, native grassland and ruderal grassland. Therefore, CDFW believes the Project has the potential to impact nesting birds, migratory birds and state special-status or listed wildlife species including but not limited to: the federally and State endangered and fully protected California clapper rail (*Rallus longirostris obsoletus*); the State listed threatened and fully protected California black rail (*Laterallus jamaicensis coturniculus*); the State fully protected white-tailed kite (*Elanus leucurus*); the State species of special concern Osprey (*Pandion haliaetus*) and Northern Harrier (*Circus cyaneus*); the federally and State endangered and fully protected salt marsh harvest mouse (*Reithrodontomys raviventris*); and the State species of special concern the salt marsh wandering shrew (*Sorex vagrans halicoetes*). Based on the proximity to and the patches of potentially suitable habitat for the above species within the Project site, the Project site has appropriate habitat for nesting, denning, or foraging opportunities for the species listed above and all are known to occur in the vicinity of the Project. If there is potential for a project to "take" such species, CDFW considers such an action as significant. Therefore, CDFW recommends focused biological surveys be conducted by a qualified wildlife biologist during the appropriate survey period(s) and prior to any Project-related activities to determine if the above special-status species are present and if they could be impacted. Survey results can then be used to identify any mitigation, minimization, and avoidance measures which are advised to be included as enforceable by inclusion in the CEQA document prepared for this Project. More information on survey and monitoring protocols for sensitive species can be found at CDFW's website (www.wildlife.ca.gov/wildlife/nongame/survey_monitor.html). CDFW also requests that a copy of the survey results be sent to the staff contact listed below.

Fully Protected Species

Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take, except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. The project has the potential to impact fully protected species that are also State listed or species of concern;

therefore, the CEQA document should specify impacts, avoidance measures, minimization measures, mitigation measures and a mitigation monitoring and reporting program. If the project will impact fully protected species, early consultation is encouraged as a permit cannot be issued for the take of fully protected species.

Special-Status Species Employee Training Program

It is advised that a qualified biologist conduct a pre-construction training session for all employees, contractors, or representatives of the Permittee who will take part in any action within the project boundaries. No employee, contractor, or representative of the Permittee should conduct any project action without having gone through the training. The training should include a discussion of sensitive biological resources within the project area, the life histories of possible special-status species, the potential presence of special-status species, and the project boundaries. The pre-construction training should also provide images of special-status species and review the avoidance, minimization, and protection measures provided in this agreement to ensure species are not impacted by project activities and project boundaries.

Section 1600 Lake and Streambed Alteration Agreements

The proposed solar panel arrays may have the potential to impact tributaries of Wildcat Creek and tidal marsh habitat influenced by these tributaries and drainages. CDFW recommends the CEQA document address any potential impacts to tributaries of Wildcat Creek, identify appropriate avoidance and minimization measures to reduce these impacts to less-than-significant. There appear to be on-site swales and drainages on the eastern parcel of the Project site. The updated environmental document should further discuss avoidance of impacts to these areas.

For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, CDFW may require a Lake and Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of an LSAA is subject to CEQA. CDFW, as a responsible agency under CEQA, will consider the CEQA document for the project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement. To obtain information about the LSAA notification process, please access our website at https://www.wildlife.ca.gov/Conservation/LSA; or to request a notification package, contact the Bay Delta Regional Office at (707) 944-5500.

Thank you for the opportunity to provide information and comment on the draft EIR. If you have any questions, please contact Mr. Robert Stanley, Environmental Scientist, at (707) 944-5573; or Ms. Annee Ferranti, Senior Environmental Scientist (Supervisory), at (707) 944-5554.

Sincerely,

Scott Wilson
Regional Manager
Bay Delta Region

cc: State Clearinghouse

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

September 29, 2015

Greg Brehm
Marin Clean Energy
1125 Tamalpais Avenue
San Rafael, CA 94901

Subject: Richmond Solar PV Project
SCH#: 2015042040

Dear Greg Brehm:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. The review period closed on September 28, 2015, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Document Details Report
State Clearinghouse Data Base

SCH# 2015042040
Project Title Richmond Solar PV Project
Lead Agency Marin Clean Energy

Type EIR Draft EIR

Description The proposed 10.5 MW PV system would deploy approximately 80,000 think-film solar panels at the project site. The solar panels would be non-reflective and, in combination with 11 utility scale inverters, would convert sunlight into electricity, which would be fed directly into the PG&E utility grid at locations adjacent to the site. The project would be a combination of non-penetrating ballasted fixed tilt arrays (maximum height of approximately 6 feet) and single axis tracking ground mount arrays (maximum of height of 14 feet in highest position). Multiple transformers would be connected via aboveground lines to adjacent switching substations. Access would be from the existing Hensley Street gate to the property.

Lead Agency Contact

Name Greg Brehm
Agency Marin Clean Energy
Phone 415-464-6037 **Fax**
email
Address 1125 Tamalpais Avenue
City San Rafael **State** CA **Zip** 94901

Project Location

County Contra Costa
City Richmond
Region
Lat / Long 37° 56' 44" N / 122° 22' 34" W
Cross Streets Castro Street and West Hensley Street
Parcel No. 561-100-038-0, -034-9, and -037-2
Township **Range** **Section** **Base**

Proximity to:

Highways Hwy 580
Airports No
Railways RPRC, UP and BNSF
Waterways SF Bay, Wildcat Creek, San Pablo Creek
Schools Peres El, multiple others
Land Use Capped Landfill and Filled Former Fertilizer Pond / M-3 Heavy Industrial / Industrial

Project Issues Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Drainage/Absorption; Economics/Jobs; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Fish and Wildlife, Region 3; Department of Parks and Recreation; Department of Water Resources; California Highway Patrol; Caltrans, District 4; Air Resources Board, Major Industrial Projects; Regional Water Quality Control Board, Region 2; California Energy Commission; Native American Heritage Commission; Public Utilities Commission

Date Received 08/13/2015 **Start of Review** 08/13/2015 **End of Review** 09/28/2015

Note: Blanks in data fields result from insufficient information provided by lead agency

October 15, 2015

TO: Marin Clean Energy Board of Directors

FROM: Katie Gaier, Human Resources Manager

RE: Compensation Analysis Update (Agenda Item #09)

ATTACHMENT: Compensation Analysis Survey Results Summary

SUMMARY:

On May 7, 2010, when Marin Clean Energy switched on power to 5,400 customers, the staff consisted of four employees. In the five years since, the number of service areas, the volume of customers, and the size of staff have grown significantly. With the recent hire of a Community Power Organizer and the upcoming selection of Finance and Project Manager, MCE will be an agency with 32 regular hire employees across its five departments: Legal and Regulatory, Public Affairs, Procurement, Energy Efficiency, and Internal Operations, plus the Chief Executive Officer. As new positions have been added, salaries were set by external surveys or internal comparisons or a combination of the two.

In the last year, MCE has conducted twelve recruitments to fill fifteen positions in all areas of the organization. Prior to recruiting for several of the positions, it was necessary to conduct classification and compensation studies since the positions were newly created in order to meet MCE's expanding service areas. Many of the positions were difficult to fill due to the salary ranges resulting in additional compensation studies and creation of higher tiers relative to existing positions. At least two candidates declined job offers because MCE salaries were lower than what the candidates were making with other public or private agencies. Increasing salaries at some levels resulted in compaction with the supervisory positions and increases in supervisory salaries were made. Rather than continue to study positions on an ad-hoc basis, it was determined that the best approach to handling salary review was to embark on a comprehensive compensation analysis of all MCE positions. External consultants were engaged in May to survey a group of agencies and companies that had similar positions.

As the first Community Choice Aggregation (CCA) program in the state and due to the unique nature of MCE positions, it has often been difficult to find positions that are comparable. Typically, jobs that are similar to MCE are in the private sector, and compensation information in that sector can be difficult to obtain. However, with the growth in CCAs (Sonoma Clean Power and Lancaster Choice Energy) as well as public municipalities that provide similar services,

there were at least five matches for almost all of the MCE positions. The methodology which was used by the consultants was to review the websites and/or talk to Human Resources representatives at the identified survey agencies. The surveys and the respective job descriptions were reviewed by MCE staff and a final product was delivered to MCE in early September.

Comparable jobs were found across the state, including the City of Redding in the North, the City of Anaheim in Southern California, and the City of Palo Alto in the Bay Area. For the most part, MCE salaries were behind the market compared to similarly situated positions in other jurisdictions. Based on the results of the survey, there are 26 positions which are below the median in the market at either the bottom or the top of the range or both.

Because comparable positions were found in a broad geographic area, MCE staff reviewed the cost of housing (as provided by the California Association of Realtors as of June 2015) in Marin County compared to the county of the surveyed jurisdictions. Compared to Marin, the average cost of a single family home in the comparator counties is 58%. Some jurisdictions such as San Francisco and San Mateo counties had a higher cost of housing than Marin. The majority of the other counties were between 40% and 70% compared to Marin. However, because the federal standard for the percent of income that should be spent on housing is 30%, the average impact on compensation ranges in those areas was adjusted yielding and average difference of 17%.

Staff also researched the consumer price index (as provided by the Bureau of Labor Statistics) in the San Francisco Bay Area compared to consumer price indices in the regions where surveyed jurisdictions were found. The cost of living is based on the cost of items including food, energy, clothing and so on. Housing is included only as the amount for which a homeowner could rent his or her principal residence. The baseline is set at 100 from the first period of measurement and is reviewed regularly by the BLS to reflect the increases. For example, the San Francisco Bay Area bimonthly baseline is 100 as of 1967 and the current (as of August 2015) index is at 259. The average increase to account for the difference in the cost of living in the surveyed jurisdictions outside of the San Francisco Bay Area region would be 18%. However, the majority of the agencies were in the range of 94% to 96% of the San Francisco Bay Area cost index.

In order to remain competitive in the labor market and to continue to attract and retain highly knowledgeable and skilled employees, MCE management recognizes the challenges of keeping pace with salaries as well as the factors of housing and living costs in this area.

Several parameters that could be implemented in order to address these challenges were presented to the Executive Committee at its October 7 meeting. They were:

1. Where compensation ranges for MCE positions are below the median of equivalent positions in the market at one or both ends of the range, to bring the salary ranges for the positions equal to the median in the market;
2. To attract and retain the highest quality candidates for MCE positions compensation ranges could be adjusted to the median if below, and then further adjusted to bring all salary ranges above the median as determined by the Executive Committee.
3. To account for the cost of housing in Marin and/or the consumer price index in the region compared to the average of the surveyed agencies by individual job class, compensation

ranges could be adjusted to the median if below, and then further adjusted to bring the salary range by job class above median reflective of the cost of housing in the comparator agencies.

The Executive Committee reviewed the results of the compensation analysis survey and recommended that all compensation ranges be adjusted to the median if below, and then further adjusted to bring the top of all compensation ranges above the median by 15%.

Recommendation: Approve adjusted compensation ranges to align with current market and set the top of each range at 15% above median. Direct staff to adjust existing compensation ranges if needed when new or updated comparators are identified to stay current with market conditions.

COMPENSATION ANALYSIS SALARY SURVEY RESULTS - SEPTEMBER 2015

Job Title	Current Range	Median in Labor Market	% in market (bottom)	% in market (top)	Adjusted Top of Range: Median + 15%
Account Manager I	$ 51,480 - $ 71,422	$ 48,484 - $ 58,989	106%	121%	$ 67,837
Account Manager II	$ 57,784 - $ 79,847	$ 60,178 - $ 80,436	96%	99%	$ 92,501
Administrative Assistant	$ 40,000 - $ 52,000	$ 46,072 - $ 59,628	87%	87%	$ 68,572
Board Clerk/Exec Asst to CEO	$ 44,202 - $ 63,736	$ 64,495 - $ 89,219	69%	71%	$ 102,602
Community Dev. Manager	$ 77,833 - $ 96,657	$ 79,080 - $ 101,005	98%	96%	$ 116,156
Community Power Organizer	$ 57,784 - $ 79,847	$ 63,511 - $ 77,203	91%	103%	$ 88,783
Creative Content Designer	$ 58,000 - $ 80,000	$ 76,818 - $ 94,908	76%	84%	$ 109,144
Director of Energy Efficiency	$ 88,408 - $ 119,428	$ 103,119 - $ 148,400	86%	80%	$ 170,660
Director of Power Resources	$ 106,000 - $ 162,258	$ 112,143 - $ 164,527	95%	99%	$ 189,206
Director of Public Affairs	$ 102,596 - $ 123,973	$ 123,669 - $ 149,292	83%	83%	$ 171,686
EE Program Manager	$ 77,833 - $ 96,657	$ 84,166 - $ 106,062	92%	91%	$ 121,971
EE Program Specialist I	$ 54,632 - $ 71,596	$ 63,490 - $ 77,182	86%	93%	$ 88,759
EE Program Specialist II	$ 61,518 - $ 80,617	$ 70,980 - $ 87,267	87%	92%	$ 100,357
Finance & Project Manager	$ 91,000 - $ 122,866	$ 90,605 - $ 122,886	100%	100%	$ 141,319
Human Resources Manager	$ 79,040 - $ 104,000	$ 90,588 - $ 115,996	87%	90%	$ 133,395
Internal Ops Coordinator	$ 62,000 - $ 78,000	$ 72,899 - $ 94,560	85%	82%	$ 108,744
Legal Director	$ 154,200 - $ 179,900	$ 184,657 - $ 219,929	84%	82%	$ 252,918
Manager of Account Services	$ 90,032 - $ 100,744	$ 83,059 - $ 118,324	108%	85%	$ 136,073
Manager of Bus & Comm Dev	$ 77,833 - $ 96,657	$ 91,243 - $ 125,278	85%	77%	$ 144,070
Marketing Manager	$ 47,728 - $ 68,290	$ 70,706 - $ 82,368	68%	83%	$ 94,723
Power Supply Contracts Mgr I	$ 54,632 - $ 71,596	$ 71,064 - $ 97,417	77%	73%	$ 112,030
Power Supply Contracts Mgr II	$ 77,833 - $ 96,657	$ 96,966 - $ 126,204	80%	77%	$ 145,135
Program Specialist	$ 54,632 - $ 71,422	TBD - TBD	TBD	TBD	TBD
Reg & Leg Coordinator	$ 54,632 - $ 71,596	$ 62,145 - $ 80,200	88%	89%	$ 92,230
Regulatory & Leg Counsel	$ 79,322 - $ 102,960	$ 119,748 - $ 173,436	66%	59%	$ 199,451
Regulatory Analyst I	$ 68,588 - $ 79,422	$ 72,579 - $ 98,073	95%	81%	$ 112,784
Regulatory Analyst II	$ 72,214 - $ 89,302	$ 77,924 - $ 105,056	93%	85%	$ 120,814
Regulatory Counsel I	$ 56,540 - $ 79,156	$ 82,525 - $ 99,874	69%	79%	$ 114,855

Regulatory Counsel II	$ 79,322 - $ 102,960	$ 94,564 - $ 131,061	84%	79%	$ 150,720
Senior Regulatory Analyst	$ 90,032 - $ 100,744	$ 94,353 - $ 122,617	95%	82%	$ 141,010

Ad Hoc Ratesetting Committee

In late 2015 and early 2016 MCE will undertake the process of developing proposed rates for the fiscal year that will take effect in April of 2016. An Ad Hoc committee of the MCE Board will be convened to discuss factors related to rate setting and assist in the development of proposed rates to recommend for MCE Board approval. Topics for discussion will include revenue requirements, cost of service, assignment of costs to various customer groups, rate stability and rate competitiveness.

Time commitment: Estimated 2-3 meetings between January 6 and March 15.

**Note: Participants on this committee cannot represent a quorum of the Board, or a quorum of any other Board committee.*

Overview of MCE Board Offices and Committees
June, 2015

Board Offices
Kate Sears, Chair
Tom Butt, Vice Chair
Denise Athas, Auditor/Treasurer
Dawn Weisz, Secretary

Executive Committee
1. Tom Butt, Chair
2. Denise Athas
3. Sloan Bailey
4. Ford Greene
5. Kevin Haroff
6. Bob McCaskill
7. Kate Sears

Technical Committee
1. Kate Sears, Chair
2. Kevin Haroff
3. Ford Greene
4. Emmett O'Donnell
5. Carla Small
6. Ray Withy
7. Greg Lyman

Ad Hoc Contracts Committee for 2015 Open Season
1. Sloan Bailey
2. Genoveva Calloway
3. Ford Greene
4. Kevin Haroff
5. Garry Lion
6. Greg Lyman
7. Alan Schwartzman

Ad Hoc Expansion Committee for 2015
1. Barbara Coler
2. Garry Lion
3. Andrew McCullough
4. Brad Wagenknecht
5. Ray Withy

Ad Hoc Ratesetting Committee for 2016
1.
2.
3.
4.
5.

October 15, 2015

TO: Marin Clean Energy Board

FROM: Jeremy Waen, Senior Regulatory Analyst

RE: Regulatory Update for October 2015

Dear Board Members:

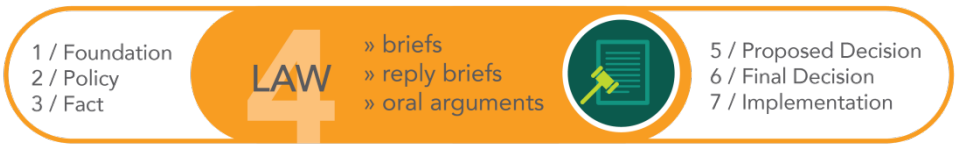
Executive Summary of Regulatory Affairs for October 2015

Below is a summary of the key activities at the California Public Utilities Commission (CPUC) for October 2015 impacting community choice aggregation and MCE.

1. **MCE Promotes EE Rolling Portfolios for 2016 and Beyond (R.13-11-005)**

On August 18 the Commission issued its Proposed Decision ("PD") regarding EE rolling portfolios for 2016 and beyond. On September 8 and 14 MCE filed comments and reply comments on the PD respectively. MCE also joined a coalition of numerous parties in co-authoring joint comments on the PD. Based on subsequent revisions to the PD, the Commission appears to be receptive to some of MCE's concerns regarding language within the PD. The Commission is scheduled to vote on this Decision as of October 1, 2015.

2. **MCE Advocates for Changes to CCA Customer Vintaging in Phase 2 of the PG&E 2015 Energy Resource Recovery Account (ERRA) (A.14-05-024)**



In response to the Commission Ruling issued on August 10 for additional legal briefing regarding potential reform to how vintages are assigned to CCA customers under the Power Charge Indifference Adjustment ("PCIA"), MCE, along with Lancaster

and Sonoma Clean Power, jointly filed opening and reply briefs on September 4 and 25 respectively. MCE staff believes the second opportunity for briefing within this unprecedented second phase of an ERRA proceeding is a strong signal from the Commission for its willingness to consider reform for how PCIA vintages are assigned to CCA customers and communities. The Proposed Decision is not anticipated until the first quarter of 2016.

3. <u>MCE Challenges the Proposal for Significant Increases to the Power Charge Indifference Adjustment (PCIA) in PG&E 2016 ERRA (A.15-06-001)</u>

On August 14 MCE submitted testimony regarding the potential impacts that PG&E's proposed increase to the PCIA rates on CCAs and CCA customers. Through discovery and discussions with PG&E staff, MCE and PG&E came to an agreement that evidentiary hearings would not be necessary for this proceeding; therefore, on September 16 MCE filed a Motion to admit its testimony and additional factual exhibits into the record per Commission rules. On September 21 and October 1 MCE filed its opening and reply briefs respectively. Therein MCE argues for the Commission to impose limitations on the overall magnitude of PCIA rate increases from year to year. At this point the initiative resides with the Commission to either draft its Proposed Decision for this proceeding or issue additional Rulings to develop the proceeding record further. The Commission is anticipated to reach a final Decision on this matter before the end of the calendar year.

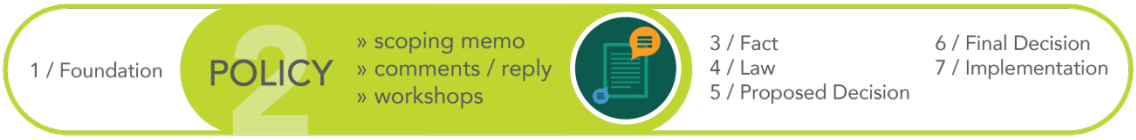
4. <u>MCE Works to Ensure Ratepayer and Marketing Protections in PG&E's Green Tariff Shared Renewables (GTSR) and Enhanced Community Renewables (ECR) (A.12-01-008 *et al.*)</u>

a. <u>Implementation of GTSR and ECR Programs</u>

On September 1 the Commission's Energy Division staff issued Draft Resolution E-4734 which would adopt, with significant modifications, the various Advice Letters ("AL") presented by the Investor-Owned Utilities ("IOUs") for approval in necessary to implement their GTSR and ECR programs. On September 21 MCE and Lancaster co-authored comments in response to this Draft Resolution. Though the majority of MCE's concerns about the various ALs were heard and acted upon to within the Draft Resolution, the issue of whether GTSR and ECR program participants should be subjected to Transitional Bundled Service ("TBS") requirements could not be resolved without further development within a proceeding record. Additionally MCE presented additional comments on the Draft Resolution on September 29 in light of PG&E's recent decision to rebrand its GTSR program as "Community Solar Choice" and its ECR

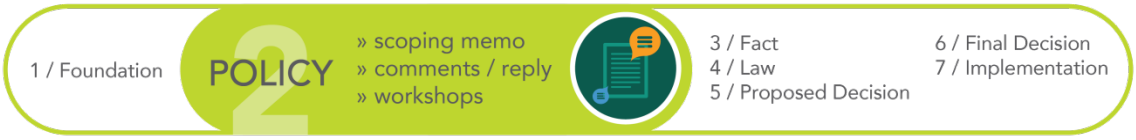
program as “Local Solar Choice” without Commission authority to adopt these names. MCE staff remains concerned with the likelihood of ratepayers confusing these programs with CCAs and CCA-specific offerings.

b. Phase 4 – Remaining GTSR and ECR Issues



On August 28 MCE filed its reply comments on Phase 4 matters, including whether and how the PCIA should apply to GTSR and ECR program participants. After the issuance of the Draft Resolution described above, MCE followed Energy Division’s guidance and filed a Motion to amend the scope of Phase 4 to include the consideration of TBS requirements for GTSR and ECR programs. Only PG&E provided comments in protest to MCE’s Motion. MCE is now awaiting a ruling from the Administrative Law Judge regarding its Motion.

5. MCE Engages in Net Energy Metering Successor Tariff Proceeding to advocate for fair treatment for CCA customers (R.14-07-002)



On September 1 and September 15 MCE filed opening and reply comments, respectively, responding to various parties’ proposals for Net Energy Metering (“NEM”) successor tariffs. MCE focused its comments on potential anti-competitive impacts that these proposals might have on CCAs and CCA Customers. On September 16 MCE preparing a Prehearing Conference (“PHC”) Statement to address potential factual areas that should be explored through evidentiary hearings. MCE is awaiting guidance for next steps from the Commission regarding the schedule for the issuance of testimony and hearings. MCE will remain involved in a limited manner within this proceeding to ensure fair treatment for CCA customers.

Updated June 9, 2015

KEY LEGISLATION, GLOSSARY OF TERMINOLOGY AND KEY ACRONYMS

Key Legislation

AB 32 – Assembly Bill 32, the Global Warming Solutions Act of 2006
AB 32 is an environmental law in California that establishes a timetable to bring California into near compliance with the provisions of the Kyoto Protocol.

AB 117 – Assembly Bill 117, Community Choice Aggregation Enabling Legislation
AB 117 is the California legislation passed in 2002 that enabled community choice aggregation, authored by then Assemblywoman Carole Migden.

SB 790 – SB 790, Charles McGlashan Community Choice Aggregation Act
SB 790, authored by state Senator Mark Leno, was passed in 2012. This bill institutes a code of conduct, associated rules, and enforcement procedures for IOUs' regarding how they interact with CCA. This bill also clarified a CCA's equal right to participating in ratepayer-funded energy efficiency programs.

Terminology

Bundled & Unbundled Renewable Energy Certificates
All renewable-based electricity generators produce two distinct products, physical electricity and renewable energy certificates (RECs). At the point of generation, both product components can be sold together or separately, as a bundled or unbundled product.

Bundled Customers
Bundled customers receive both their electricity generation and distribution services from the same entity. If a customer "opts out" of MCE service, they would be a bundled customer of PG&E.

Unbundled Customers
Unbundled customers receive their electricity generation and distribution services from separate entities. Customers of MCE are considered unbundled customers because they purchase their electricity generation services from MCE and their electricity distribution services from PG&E.

Key Acronyms

CAISO – California Independent System Operator
The CAISO maintains reliability and accessibility to the California transmission grid. The CAISO manages, but does not own, the transmission system and oversees grid maintenance.

CAM – Cost Allocation Mechanism
CAM is a mechanism for passing through Resource Adequacy costs of generation resources – generally new resources brought online by an investor-owned utility (IOU) such as PG&E – to customers that do not receive generation service from the IOU. The generation facility is supposed to fulfill a system or local area reliability need.

CARB – California Air Resources Board
CARB is the State's agency established by California's Legislature in 1967 to: 1) attain and maintain healthy air quality; 2) conduct research to determine the causes of and solutions to air pollution; and 3) address the issue of motor vehicles emissions. Today CARB is tasked with implementing the State's efforts to reduce and track the reduction of greenhouse gases (GHGs) emitted statewide, by overseeing the AB 32 Scoping Plan and managing major GHG-related programs like Cap-and-Trade and the Low Carbon Fuel Standard. CARB with guidance from the Governor and Legislature controls how revenues from these programs are spent to further the State's GHG reducing efforts.

CARE – California Alternate Rates for Energy
CARE is a program that allows low-income energy customers to receive a 30-35 percent discount on their electric and natural gas bills. Customers may be eligible for CARE if they are enrolled in public assistance programs such as Food Stamps and Temporary Assistance for Needy Families (TANF). There are no changes to the CARE discount for CCA customers.

CCA – Community Choice Aggregation
CCA allows cities and counties to aggregate the buying power of individual customers within a defined jurisdiction in order to secure alternative energy supply. MCE is the first operational CCA in California. Other operational CCAs in California include Sonoma Clean Power and Lancaster Choice Energy.

CEC – California Energy Commission
The CEC is California's primary energy policy and planning agency. It has responsibility for activities that include forecasting future energy needs, promoting energy efficiency through appliance and building standards, and supporting renewable energy technologies.

CHP – Combined Heat and Power
CHP (also referred to as Cogeneration) is the use of a heat engine or a power station to convert waste heat (usually steam) into additional electricity. Not necessarily considered renewable energy, CHP is still encouraged by state policy and regulations.

CIA – Conservation Incentive Adjustment
The CIA is a non-bypassable charge unrelated to generation, transmission or distribution. This rate design will be implemented in the PG&E service territory in July 2012 and will result in flat generation and distribution rates, and a tiered CIA charge.

CPUC – California Public Utilities Commission
The CPUC, also simply called the Commission, is the entity that regulates privately-owned utilities in the state of California, including electric power, telecommunications, railway, livery, natural gas and water companies. The CPUC has limited jurisdiction over CCAs.

DA – Direct Access
DA is an option that allows eligible customers to purchase their electricity directly from competitive generation providers. There are legislatively mandated caps on DA that have gradually increased since the energy crisis. Large energy users in particular seek the cost certainty associated with being on DA service.

DER – Distributed Energy Resource
DER is a relatively new term that refers to a broad number of energy resource types (roof-top solar, fuel cells, energy storage, demand response, electric vehicles, energy efficiency controls, etc.) that are deployed along the distribution grid level. DERs can be controlled in aggregate to behave like localized generation resources there by increasing local grid reliability while meeting the constraints of broader grid reliability needs.

DG – Distributed Generation
DG refers to small, modular power sources sited at the point of power consumption. One example of residential distributed generation is an array of solar panels installed on a home's roof.

DR – Demand Response
DR is a way of controlling customers' electricity demand through either voluntary or obligatory programs via either manual or automated control systems. While there are many different flavors of DR designed to attain distinct types of benefits, DR is generally intended to shift electricity demand to better align with the real-time electricity supply.

EE – Energy Efficiency
EE is a way of managing and restraining the growth in energy consumption. It refers to using less energy to provide the same service. For example: In the summer, efficient windows keep the heat out so that the air conditioner runs less often which helps save electricity.

ESAP – Energy Savings Assistance Program
The Energy Savings Assistance Program provides no-cost weatherization services to low-income households who meet the California Alternate Rates for Energy (CARE) income guidelines. Some of the services provided include attic insulation, energy efficient refrigerators, energy efficient furnaces, and weather stripping.

ESP – Electricity Service Provider
ESPs are non-utility entities that offer Direct Access (DA) electric service to customers within the service territory of an electric utility. CCAs are not considered ESPs. However, ESPs, CCAs and investor-owned utilities (IOUs) are all considered load-serving entities (LSEs).

FIT – Feed-In Tariff
FITs are long-term, standard-offer, must-take contracts offered by electricity retailers to small-scale renewable developers for the procurement of DG renewable energy. MCE currently offers a FIT to encourage local development of renewable energy.

GHG – Greenhouse Gas
GHGs are gases in Earth's atmosphere that prevent heat from escaping into space. The burning of fossil fuels, such as coal and oil, and deforestation has caused the concentrations of GHGs to increase significantly in the Earth's atmosphere. This increase in GHGs is the driving force behind climate change.

HUR – Home Utility Report
A HUR is a document that provides customers with a detailed analysis of their individual usage data, comparisons to other similar customers, and tips on how to reduce energy usage, HURs are delivered through the mail on a regular schedule to a subset of MCE customers as part of MCE's Single Family Energy Efficiency Program. Customers are selected to receive the HUR based on historic energy usage.

IDSM – Integrated Demand-Side Management
IDSM is still being defined by the CPUC but is generally used to refer to coordination among customer-side energy technologies and services. The technologies are often found behind a customer's meter and may be related to distributed generation, energy efficiency, electric vehicles, energy storage, and other areas. The services include demand response programs, specialized rate structures, and education programs. IDSM is viewed as a way to reduce the negative impact of organizational silos among utilities and regulators and to improve customer understanding of available options.

IOU – Investor Owned Utility
IOU refers to an electric utility provider that is a private company, owned by shareholders. The three largest IOUs in California are Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E).

LSE – Load-Serving Entity
LSEs are a categorization term that refers to investor-owned utilities (IOUs), electric service providers (ESPs), and CCAs, all of which offer generation service in the IOU's service territory. POUs are excluded from this categorization.

NBC – Non-Bypassable Charge
NBCs are line item charges that all distribution customers (both Bundled and Unbundled) must pay. Types of NBCs include the Power Charge Indifference Adjustment (PCIA) and the Cost

Allocation Mechanism (CAM). These charges have significant impacts on CCA customers. The Public Purpose Program (PPP) charge is also a NBC.

NEM – Net Energy Metering
NEM allows a customer to be credited when their renewable generation system generates more power than is used on site. The customer continues to pay for electricity when more power is used on site than the system produces.

OBF – On Bill Financing
OBF is a financing mechanism in which repayment is integrated into a customer's utility bill.

OBR – On Bill Repayment
OBR is a mechanism for loan repayment in which the loan payments are integrated into a customer's utility bill.

PAC – Program Administrator Cost
The PAC is one of two tests of energy efficiency program costs effectiveness used by the CPUC. The test measures the net benefits and costs that accrue to the program administrator (usually a utility) as a result of energy efficiency program activities. The PAC compares the benefits, which are the avoided cost of generating electricity and supplying natural gas, with the total costs, which include program administration costs. The PAC includes the cost of incentives, but excludes any participant costs or tax credits.

PACE – Property Assessed Clean Energy
PACE is a way of financing energy efficiency upgrades or renewable energy installations for buildings. In areas with PACE legislation in place municipal governments offer a specific bond to investors and then loan the money to consumers and businesses to put towards an energy retrofit. The loans are repaid over the assigned terms (typically 15 to 20 years) via an annual assessment on their property tax bill. One of the most notable characteristics of PACE programs is that the loan is attached to the property rather than an individual.

PCIA – Power Charge Indifference Adjustment
The PCIA is an "exit fee" imposed on departing load that is intended to protect bundled utility customers. When customers leave bundled service to purchase electricity from an alternative supplier, such as MCE, the IOU, who had previously contracted for generation to serve these customers on a going-forward basis, is able to charge these departing customers the above market costs of that power.

POU – Publicly Owned Utility
POUs are locally publically owned electric utilities that are administered by a board of publically appointed representatives (similar to a CCA). POUs are not within the jurisdiction of the California Public Utilities Commission (CPUC), and are thus subject to different regulation and enforcement than investor-owned utilities (IOUs), electricity service providers (ESPs) and CCAs.

PPP – Public Purpose Program
PPP charges are collected from all Bundled and Unbundled customers in order to fund, among others, discounts for low-income customers on the CARE rate and energy efficiency programs.

PV – Photovoltaic
PV is solar electric generation by conversion of light into electrons. The most commonly known form of solar electric power is roof panels on homes.

RA – Resource Adequacy
RA refers to a statewide mandate for all load-serving entities (LSEs) to procure a certain quantity of electricity resources that will ensure the safe and reliable operation of the grid in real time, over the course of the calendar year. RA also provides incentives for the siting and construction of new resources needed for reliability in the future.

RPS – Renewable Portfolio Standard
The RPS was created in 2002 under Senate Bill 1078 and most recently modified by SB (1X) 2 (2011). A RPS is a requirement that all Load-Serving Entities (LSEs) maintain a minimum percentage of renewable electricity resources within their broader generation supply portfolio. The present RPS requires all of California's LSEs to have no less than 33% renewable generation content by 2020. Recently Governor Brown has challenged the State to aspire to a 50% RPS requirement by 2030. The Legislature and the CPUC are exploring means to adopting a higher RPS mandate.

SPOC – Single Point of Contact
The SPOC is a facilitator and participant guide to MCE program offerings, helping to guide the customer through the participation process from initial contact to project completion.

TRC – Total Resource Cost
The TRC is one of two tests of energy efficiency program cost effectiveness used by the CPUC. The test measures the net benefits and costs that accrue to society, which is defined as a program administrator (usually a utility) and all of its customers, as a result of energy efficiency program activities. The TRC compares the benefits, which are the avoided cost of generating electricity and supplying natural gas, with the total costs, which include program administration and customer costs. The TRC does not include the costs of incentives.

ZNE – Zero Net Energy
A building is ZNE if the amount of energy provided by on-site renewable energy sources is equal to the amount of energy used by the building.