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January 13, 2014

Ms. Patricia Kelly
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Redondo Beach Energy Project (12-AFC-03)
Data Response Set 1B – Responses to CEC Staff Data Requests 50 and 51

Dear Ms. Kelly:

Attached please find the Redondo Beach Energy Project's Data Response Set 1B, including responses to Data Requests 50 and 51. This Data Response Set was prepared in response to California Energy Commission Staff Data Requests 48 through 66 for the Application for Certification for the Redondo Beach Energy Project (12-AFC-03) dated November 12, 2013.

If you have any questions about this matter, please contact me at (916) 286-0249 or Mr. Jerry Salamy at (916) 286-0207.

Sincerely,

CH2M HILL

Sarah Madams
AFC Project Manager

Attachment
cc: S. O'Kane, AES
G. Wheatland, ESH
J. Salamy, CH2M HILL

Redondo Beach Energy Project

(12-AFC-03)

Data Responses, Set 1B

(Responses to Data Requests 50-51)

Submitted to

California Energy Commission

Prepared by

AES Southland Development, LLC

With Assistance from

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January 13, 2013

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Introduction

Attached are AES Southland Development, LLC's (AES-SLD or the Applicant) responses to the California Energy Commission (CEC) Data Request, Set 1B (numbers 50-51) regarding the Redondo Beach Energy Project (RBEP) (12-AFC-03) Application for Certification (AFC).

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as the CEC presented them and are keyed to the Data Request numbers (50-51).

New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 50 would be numbered Table DR50-1. The first figure used in response to Data Request 55 would be Figure DR55-1, and so on. Figures or tables from the RBEP AFC that have been revised have "R" following the original number, indicating revision.

Additional tables, figures, or documents submitted in response to a data request (for example, supporting data, standalone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Alternatives (50–51)

Background

Section 6.4 of the AFC discusses No Project Alternative scenarios, which included a cursory level analysis of several retrofit options at the existing RBGS to comply with the State Water Resources Control Board (SWRCB) once-through cooling (OTC) policy. Additional information is needed by staff to adequately consider and analyze these No Project Alternative retrofit scenarios.

DATA REQUEST

50. Please provide the following information regarding a No Project Alternative that entails retrofitting the RBGS facility to comply with the SWRCB OTC policy:

a. For a closed-loop cooling system, please provide a location and height of the necessary cooling towers (wet cooling system) and/or air-cooled condenser (dry cooling system). Please describe all necessary improvements and infrastructure needed for retrofitting the RBGS to a closed-loop system, as well as cooling design parameters (such as heat rejection capacity, number of cells, and water recirculation rate).

Response: In 2006, Powers Engineering[1] assessed the feasibility of installing a closed-cycle wet cooling system at the AES Huntington Beach Generating Station as part of the Huntington Beach Generating Station Retool Project (00-AFC-13C). The AES Huntington Beach Generating Station Retool Project was proposed to be a nominal 450 megawatt (MW), natural gas-fired boiler retooling at the existing Huntington Beach Generating Station (HBGS) located in the City of Huntington Beach, in Orange County. Although the size of the project was considerably smaller than RBGS (1,310 MWs), it provides information—without having to incur engineering costs for a project-specific analysis—that would be comparable to what would need to be done if RBGS were it retrofitted. HBGS required the installation of two plume-abated wet cooling towers with overall dimensions of 60 feet by 648 feet (i.e., 12 cells, 60 feet wide by 54 feet long by approximately 50 feet high). The design circulating water flow rate used was 190,000 gallons per minute (gpm). The design approach temperature specified by Powers Engineering for the HBGS wet towers was 12°F. Powers Engineering used a 12°F approach temperature at HBGS because it represented a good balance between cooling tower capital cost and performance. The design wet bulb temperature for the HBGS site is 69°F based on available weather data. This means that at full load operation (430 MW) when the ambient wet bulb temperature is 69°F, the temperature of the "cold" cooling water exiting the cooling tower will be 81°F. Based on the HBGS cooling tower assessment, the cooling water system demand was estimated at 12 million gallons per day (mgd). Based on the 12 mgd estimate and scaling to 1,310 MWs, wet cooling RBGS would require 34.9 mgd of water or 638 acre-feet per year for a 5 percent annual capacity factor.[2]

The RBGS site is served by 4 separate potable water pipelines. Therefore, no additional potable water conveyance infrastructure would be required if potable water were used for wet cooling. Potable water use for RBGS would be approximately 944 afy (638 afy for cooling tower make up plus 306 afy for boiler make up and other onsite uses).

The use of air cooled condensers requires no make-up water for heat rejection (assuming that mechanical vacuum pumps are used in lieu of steam air ejectors to maintain condenser vacuum). Therefore, RBGS's water make-up requirements during steady state operation at maximum capacity are estimated to be:

[1] Powers, Bill. 2006. "Assessment of Feasibility of Closed-Cycle Wet Cooling and Impact of Desalination at Huntington Beach Generating Station," July 29. The study was docketed on August 7, 2006; Docket number 00-AFC-13C.

[2] 12 million gallons per day * 1310 MWs/450 MWs

- Unit 5: 60 gpm
- Unit 6: 60 gpm
- Unit 7: 150 gpm
- Unit 8: 150 gpm[3]

The infrastructure required to use reclaimed water in wet cooling towers is discussed below in the response to Data Request 50b.

The all inclusive historic water volume usage for the facility (potable, steam plant make up, steam plant start-up and maintenance) amounts to 306 acre-feet per year (0.27 mgd) with the facility operating at only 5 percent of its maximum capacity. RBGS uses large amounts of water during startup. Its dispatch merits are such that the number of starts per year are unlikely to decrease.

The cooling equipment for wet- or dry-cooling could be located in any vacant area onsite with adequate space. A potential location is along the east/south edges of the site as shown in Figures DR50A-1 and -2. The size of the cooling towers is provided in the lower right-hand corner of the drawings.

b. AFC Section 6.4 states that Title 22 Reclaimed water is limited in the South Bay area. Provide in detail and substantiate why reclaimed water in the South Bay area is not available in sufficient quantities to serve the RBGS under a wet- or dry-cooled retrofit utilizing such a water source. Please provide details regarding the nearest available reclaimed water source able to adequately support a wet-or dry-cooled retrofit for the long-term and discuss what necessary infrastructure (pipeline, pipeline route, treatment facility, etc.) would be needed to provide reclaimed water to the site in quantities sufficient to serve either a wet- or dry-cooled retrofit scenario utilizing a reclaimed water source. Also, provide an estimate as to the daily amount of non-potable water used under these retrofit scenarios.

Response: While AFC Section 6.4 stated that Title 22 Reclaimed water is limited in the South Bay area, Section 6.6.3 provided a detailed analysis of possible reclaimed water sources from three alternatives:

- Secondary treated wastewater from the City of Los Angeles Hyperion Treatment Plant (HTP) approximately 5.4 miles to the north of the RBEP site adjacent to the Los Angeles International Airport
- Secondary treated wastewater from the Sanitation Districts of Los Angeles County's Joint Water Pollution Control Plant[4] (JWPCP) in the city of Carson, approximately 8.4 miles southeast of the RBEP site
- Recycled water from the West Basin Municipal Water District (WBMWD), which purchases secondary treated water from the HTP and treats it to recycled water standards at its Edward C. Little Water Recycling Facility (ECLWRF) in El Segundo, to the east of the HTP, and about 8.4 miles southeast of the RBEP site.

These and other possible facilities are addressed below and summarized in Table DR50B-1. Pipeline routes shown in Figure DR50B-1 are illustrative only and do not include consideration for right-of-way availability, engineering or other considerations.

1. City of Los Angeles Hyperion Treatment Plant (HTP) / West Basin Municipal Water District (WBMWD) / Edward C. Little Water Recycling Facility (ECLWRF)

   The HTP treats up to 450 million gallons per day of wastewater generated in Los Angeles and surrounding communities, and discharges about 91 percent of the treated effluent into the ocean. The

[3] Water usage rates do not account for startup and during maintenance periods

[4] The City of Redondo Beach participates in the Sanitation Districts of Los Angeles wastewater treatment system as part of the South Beach Cities District, along with the cities of Palos Verdes Estates, Manhattan Beach, and Hermosa Beach. All sewage produced within the city of Redondo Beach is pumped via a main sewer trunk line to the JWPCP for treatment. The sewage is treated to secondary treatment standards, with the effluent discharged into the Los Angeles River and into the Pacific Ocean.

WBMWD purchases the remaining 9 percent (on average 32.4 mgd) for treatment to tertiary standards at the ECLWRF. However, since the current and planned reclaimed product water from ECLWRF is fully committed, it is not a potential source of tertiary treated reclaimed water for RBGS.

The WBMWD and California Water Service Company both have expressed goals of using greater amounts of recycled water to meet their customers' fresh water needs. However, according to the WBMWD, due to ongoing water quality issues, despite improvements made as recently as 2010, the HTP has not been able to produce secondary treated wastewater to the standards needed as influent into the recycled water facility at sufficient volumes to meet full demand.[5]

Assuming another alternative is to use secondary treated wastewater directly from the HTP, it would require construction of a pipeline from the HTP, located just south of the Los Angeles International Airport, to the RBGS about 5.4 miles away. Use of secondary treated wastewater would require construction of a treatment facility either at HTP or at the RBGS site to further treat the wastewater to the Title 22 standards required for power plant use, as well as storage facilities to ensure sufficient treated water is on hand at all times, and an approximately 5.4-mile-long pipeline connecting the two facilities. Cost of constructing the additional treatment facilities is estimated at $1.5 million to $2 million. The estimated cost for treatment was made for planning and comparison purposes only, based on known costs of conventional mono-media sand filtration and sodium hypochlorite disinfection, as well as typical engineering, permitting, procurement, and construction costs. The estimates did not include detailed investigations of permitting, exact locations of treatment facilities, interference with existing utilities. Therefore, considering cost and availability, secondary treated wastewater from the HTP is not a viable source of makeup water for RBGS.

2. Sanitation Districts of Los Angeles County's Joint Water Pollution Control Plant (JWPCP)

   Using secondary treated reclaimed water from the JWPCP would require construction of an approximately 8.4-mile-long pipeline from the RBGS site to the JWPCP located in the city of Carson. The JWPCP does not currently produce secondary treated wastewater for reuse, but rather discharges its effluent through a series of outfalls into the Pacific Ocean. This is because the JWPCP is designed to accept the effluent from 10 other treatment plants operating at higher elevations that is considered too salty for use as reclaimed water. As with HTP, use of treated secondary wastewater from the JWPCP would require additional treatment to meet tertiary treatment influent standards as well as storage facilities to ensure sufficient treated water is on hand at all times.

3. West Basin Municipal Water District, Carson Regional Water Reclamation Facility (CRWRF)

   The CRWRF receives tertiary treated recycled water from the ECLWRF and treats it further to produce both nitrified Title 22 recycled water as well as advanced treated recycled water through the use of microfiltration (MF) and reverse osmosis (RO). Currently, the CRWRF sends all reclaimed water to existing recycled water users. However, the CRWRF may have available reclaimed water to supply a portion but not all of RBGS's water demand following a 16.5-mgd expansion by 2016, assuming this planned reclaimed product water is not already committed. As shown in Figure DR50B-1, this would require construction of 9.6 miles of pipeline between CRWRF and the RBGS site as well as storage facilities to ensure sufficient treated water is on hand at all times.

4. City of Los Angeles Terminal Island Water Reclamation Plant (TIWRP)

   The TIWRP produces both tertiary treated water and advanced treated water through the use of MF/RO. However, any potential future available reclaimed water from the TIWRP for use at the RBGS site would require about 12.8 miles of extensive conveyance facilities across bays and estuaries as well as storage

[5] West Basin Municipal Water District (WBMWD). 2011. *2010 Urban Water Management Plan*. May

facilities to ensure sufficient treated water is on hand at all times. As shown in Table DR50B-1, reclaimed water is available to supply a portion but not all of RBGS's requirements for wet cooling.

5. Sanitation Districts Los Coyotes Water Reclamation Plant (LCWRP)

   The LCWRP produces tertiary treated recycled water. The current reclaimed water usage is much less than what is produced. Only half of the reclaimed water produced at the LCWRP is contractually committed to other recycled water users, so the LCWRP may have available reclaimed water (approximately 11.6 mgd) for RBGS, which would provide a portion but not all of RBGS water required for wet cooling. Access to this reclaimed water source would require a pipeline about 18.4 miles long as well as storage facilities to ensure sufficient treated water is on hand at all times.

6. Sanitation Districts of Los Angeles County, Long Beach Water Reclamation Plant (LBWRP)

   The LBWRP also produces tertiary treated recycled water. The current reclaimed water usage is much less than what is produced. However, all of the reclaimed water produced at the LBWRP is contractually committed to other recycled water users and is therefore unavailable for use at RBGS.

TABLE DR50B-1
Availability of Reclaimed Water From Local Wastewater Treatment Facilities
AES Redondo Beach Energy Project

Treatment Facility	Effluent Level of Treatment: Secondary	Effluent Level of Treatment: Tertiary (Title 22)	Effluent Level of Treatment: Advanced	2012 Treatment Capacity (mgd)	2020 Planned Treatment Capacity (mgd)	2012 Average Daily Flows (mgd)	2012 Reclaimed Water Production (mgd)	2012 Committed Reuse (mgd)	Potentially Available Reclaimed Water Now or in the Near Future (mgd)	Length of Proposed Pipeline Alignment (miles)	Notes/Potential Limitations or Opportunities
1. City of Los Angeles Hyperion Treatment Plant (HTP))	✓			450[a,b,c]	450[a,b,c]	342[a,b,c]	0[c]	0[c]	0[c]	5.4	Secondary effluent pumped to ECLWRF for tertiary treatment. WBMWD estimated a maximum 121 mgd of secondary effluent may be available for delivery from HTP by 2030[d].
West Basin Municipal Water District (WBMWD) Edward C. Little Water Reclamation Facility (ECLWRF)		✓		40.0[d,e]	46.5[d,e]	25.0[e]	25.0[e]	25.0[d,e]	0[e]	5.1	ECLWRF receives secondary effluent from HTP, where supply is limited only by the agreement between WBMWD, BOS and LADWP[f]. Goal is to increase HTP secondary effluent supply to 121 mgd by 2030, requiring flow equalization at ECLWRF[d]. ECLWRF treatment capacity is limited to 40 mgd by Title 22 filters, with planned 6.5-mgd expansion for committed customers.[d]
2. Sanitation Districts of Los Angeles County's Joint Water Pollution Control Plant (JWPCP)	✓			400[a,g]	400[a,g]	265[g]	0[g]	0[g]	0[g]	8.4	The JWPCP does not currently produce secondary treated wastewater for reuse, but rather discharges its effluent through a series of outfalls into the Pacific Ocean.
3. Carson Regional Water Reclamation Facility (CRWRF)			✓	5.9[d,f]	22.4[d,f]	4.5[f]	4.5[f]	4.5[f]	16.5[f]	9.6	Includes nitrified Title 22 water and advanced treated water (MF/RO). CRWRF receives Title 22 recycled water from ECLWRF and Is limited by the Influent feed line capacity of 22 to 24 mgd.[f] Proposed expansion of nitrification and advanced treatment capacities by 2016.[d,f] Potential availability of 16.5 mgd reclaimed water after completion of proposed expansions, assuming quantity Is not already committed.

TABLE DR50B-1
Availability of Reclaimed Water From Local Wastewater Treatment Facilities
AES Redondo Beach Energy Project

Treatment Facility	Effluent Level of Treatment: Secondary	Effluent Level of Treatment: Tertiary (Title 22)	Effluent Level of Treatment: Advanced	2012 Treatment Capacity (mgd)	2020 Planned Treatment Capacity (mgd)	2012 Average Daily Flows (mgd)	2012 Reclaimed Water Production (mgd)	2012 Committed Reuse (mgd)	Potentially Available Reclaimed Water Now or in the Near Future (mgd)	Length of Proposed Pipeline Alignment (miles)	Notes/Potential Limitations or Opportunities
4. Terminal Island Water Reclamation Plant (TIWRP)		✓		25.0[a,b]	25.0[a,b]	9.6[h]	9.6[h]	0[h]	9.6[h]	12.8	Any potential future available reclaimed water from TIWRP for use at RBGS would require extensive conveyance facilities across bays and estuaries, resulting in significant conveyance costs. Tertiary effluent does not meet Title 22 requirements due to high effluent TDS concentrations.[c]
			✓	5.0[a,b,h]	11.5[h]	5.0[h]	5.0[h]	5.0[h]	6.5[h]	12.8	Advanced treated water using MF/RO, with chlorine disinfection. Planned 6.5 mgd expansion by 2020.
5. Los Coyotes Water Reclamation Plant (LCWRP)		✓		37.5[g]	37.5[g]	23.2[g]	23.2[g]	5.4[g]	11.6[g]	18.4	Treated effluent delivered to City of Cerritos, City of Bellflower, and CBMWD for reclaimed water distribution. Although current recycled water usage is only 5.4 mgd, half of the reclaimed product water is contractually committed and unavailable.[g]
6. Long Beach Water Reclamation Plant (LBWRP)/Leo J. Vander Lans Advanced Water Treatment Facility			✓	25.0[a,g,i]	25.0[a,g,i]	18.3 [a,g,i]	18.3[g]	6.1[g]	0[g]	18.4	Tertiary effluent pumped to Leo J. Vander Lans Advanced Water Treatment Facility for advanced treatment. Effluent owned by City of Long Beach. Although current recycled water usage is only 6.1 mgd, all reclaimed product water is contractually committed and is therefore unavailable.[g]

TABLE DR50B-1
Availability of Reclaimed Water From Local Wastewater Treatment Facilities
AES Redondo Beach Energy Project

Treatment Facility	Effluent Level of Treatment			2012 Treatment Capacity (mgd)	2020 Planned Treatment Capacity (mgd)	2012 Average Daily Flows (mgd)	2012 Reclaimed Water Production (mgd)	2012 Committed Reuse (mgd)	Potentially Available Reclaimed Water Now or in the Near Future (mgd)	Length of Proposed Pipeline Alignment (miles)	Notes/Potential Limitations or Opportunities
	Secondary	Tertiary (Title 22)	Advanced								

Notes:
mgd = million gallons per day

Sources:
[a]United States Bureau of Reclamation Southern California Regional Brine-Concentrate Management Study – Phase 1 Lower Colorado Region, CH2M HILL 2009
[b]City of Los Angeles Recycled Water Mater Plan, CH:CDM 2006
[c]Data confirmed by Mark Starr of City of Los Angeles in November 2012.
[d]West Basin Municipal Water District Capital Implementation Master Plan for Recycled Water Systems, Carollo 2009
[e]Data provided and/or confirmed by Rajen Budhia of WBMWD in November 2012.
[f]Data provided and/or confirmed by Don Zylstra of WBMWD in November 2012
[g]Data provided and/or confirmed by Andrew Hall of the Sanitation Districts in November 2012
[h]Data provided and/or confirmed by Roshanak Aflaki of City of Los Angeles in November 2012
[i]Long Beach Water Department and Water Replenishment District of Southern California Recycled Water Master Plan, MWH 2010

c. Please provide details regarding the infrastructure upgrades (new pipeline, etc.) that would be needed to utilize potable water in quantities sufficient to serve either wet- or dry-cooled retrofit scenarios. Also, provide an estimate as to the daily amount of potable water used under these retrofit scenarios.

Response: Wet cooling using potable water would not require any additional pipelines because RBGS is supported by 4 existing potable water connections. Dry cooling would also not require additional potable make up water. Estimates of daily potable water use and infrastructure upgrades (new pipelines, water storage facilities and systems, etc.) are presented in the responses above.

d. Please describe all necessary improvements and infrastructure needed for retrofitting the RBGS to utilize an air-cooled condenser, describing changes to on-site component height and massing. Provide details (including a site map, layout, etc.) and substantiate any RBGS site size constraints for this retrofit scenario.

Response: The following are necessary improvements and infrastructure needed for retrofitting RBGS to use an air cooled condenser:

- Existing steam turbine re-blading to account for the decreased condensing efficiency between the existing once through cooling system and an air cooled condenser.
- The existing steam turbines are located on the opposite side of the existing boilers from the available free space at the RBGS site where an air cooled condenser could be constructed. This causes the following implications:
    - The existing condenser would have to be replaced
    - The steam turbine casing would need to be replaced in order to redirect the path of the exhaust steam
    - The steam turbine exhaust duct, whose internal diameter would range from 20 to 30 feet would have to undergo a very circuitous path around the boilers, stacks and transformers in order to reach the air cooled condenser.
        - The steam turbine exhaust duct routing of all existing units would introduce friction losses which would make the plant more inefficient.
        - The mechanical installation for the Unit 8 steam duct is very complicated for Unit 8.
        - The mechanical installation for Units 5, 6 and 7 would require further investigation to confirm feasibility due to the interferences posed by the existing plant equipment.

Background

Based on preliminary staff analysis of the RBEP, staff will be considering a Reconfigured Site Alternative to potentially lessen or avoid environmental impacts (at this time, focused on reducing potentially significant RBEP visual and/or noise impacts). Staff acknowledges that within the West Basin Municipal Water District (WBMWD) Ocean Water Desalination Program Master Plan (PMP) Project Entitlements Acquisition Plan (PEAP), dated January 2013, WBMWD proposes ocean water desalination facilities at either the NRG El Segundo Generating Station (ESGS) property or AES RBGS property. Staff also acknowledges that at this time, WBMWD has stated siting a proposed 30 or 60 MGD ocean water desalination facility at the RBGS is their preferred location.

Given the potential for use of the RBGS site for other projects, additional information is needed by staff to adequately consider and analyze the feasibility of a Reconfigured Site Alternative.

DATA REQUEST

51. Please provide the following information regarding a Reconfigured Site Alternative:

a. Provide an itemized list and map explaining/showing site constraints including, but not limited to: existing site restrictions, necessary RBEP infrastructure and components, possible locations of the WBMWD desalination facility, and other site constraints.

Response:

Existing Site Restrictions: The primary site constraints in siting the RBEP are the existing generating RBGS facilities onsite. These facilities are shown in Figure DR 51-1. Because the RBEP is to be placed in operation at or near the time that the existing units cease operation, the RBEP must be constructed adjacent to the existing plant. In addition, the existing 230 kV and 66 kV SCE switchyard needs to remain operational.

Necessary RBEP Infrastructure: The existing 230 kV and 66 kV switchyards need to remain where they are currently located. Since SCE has an easement on the land where the switchyards are located and since these facilities must remain in service for the existing RBGS and for the switch over to the RBEP upon commercial operations, relocation or removal of the 230 kV switchyards is not a feasible option. In addition, linear facilities (e.g., natural gas, potable water, wastewater discharge, etc.) are necessary infrastructure components. These facilities can be rerouted within the site, therefore, their existing locations are not critical.

WBMWD Desalination Facility: There are no agreements, letters of intent or even any serious commercial discussions regarding the potential for the development of a WBMWD desalination plant on the RBGS site. While AES has accommodated WBMWD staff requests to discuss these issues, the Applicant has no, and is aware of no, site-specific data, information or design plans regarding a potential WBMWD desalination plant on the RBGS site. To the Applicant's knowledge there has been no WBMWD Board-level approvals or commitments authorizing the WBMWD staff to spend any significant funds to explore the feasibility of such a facility, let alone funds to pursue design, development, environmental review, and permitting, and the WBMWD Board has not initiated any CEQA-compliant environmental review or permitting processes.

In addition to site-specific constraints and development issues, there are a number of policy issues related to desalinization that make any such project speculative. A similar concept and desalinization plant has been proposed to be located at the AES Huntington Beach Generating Station. That proposed project is still in the early development stages, despite having been discussed conceptually for some time. In fact, according to a November 13, 2013, article in the LA Times[6], the California Coastal Commission postponed a vote on the Huntington Beach desalination plant because of concerns about use of the plant's off-shore intake in supplying the ocean water for desalination. Similar concerns would be present with locating a desalination facility at RBGS.

b. Provide an alternative site layout directed toward lessening potential visual changes/impacts of the RBEP from key public observation points, including but not limited to, residential and recreational locations surrounding the facility. Describe and substantiate any feasibility issues of this alternative site configuration.

Response: Placement of the proposed AES Redondo Beach Energy Project (RBEP) in either the northern or southern portions of the project site envisioned as construction laydown areas for the project as proposed would likely result in substantially greater visual impacts to the residential areas most proximate to each location. Either location would also likely increase the general visibility of the project in views from the marina area, since each laydown area extends further to the west than the proposed project area (see view from KOP 1 for example of difference between existing power plant and location of RBEP as proposed). Discussions below focus on views from residential areas to the north, east and south of the project area.

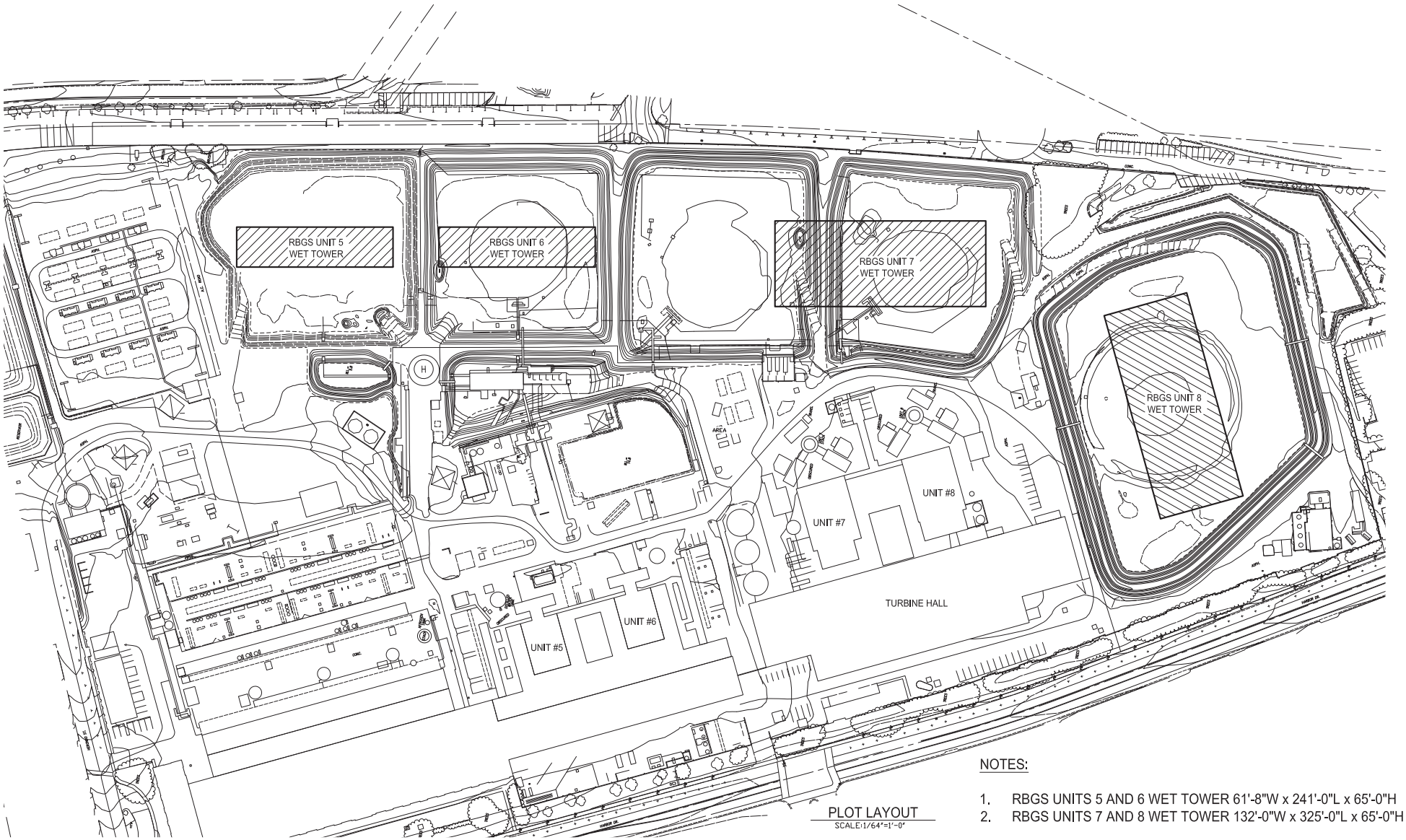
[6] http://www.latimes.com/local/la-me-desal-20131114,0,7690306.story#axzz2pfWMEIBy

If the project were to be placed in the northern laydown area, and arranged so that facilities extended along Herondo Street between North Harbor Drive and North Francisca Avenue, residential views to the south and west from the north side of Herondo Street would likely be dominated by a row of power plant structures and equipment (see views from KOP 5 and KOP DR 44). Given the proposed height of some of the project structures, placement of the project in this location could effectively create a wall of structures along the southern side of Herondo Street, obstructing most, if not all, residential views toward the ocean and the hills in Palos Verdes. Because of the physical constraints of the narrow laydown space, structures would likely need to be sited close to the street; they could therefore loom over the streetscape, increasing the presence and duration of shadows in the area, which includes public spaces (Kay Etow Park at Herondo Street and Monterrey Boulevard, and the southern terminus of the Veterans Memorial Parkway, at Herondo Street and Valley Drive). The contrast in scale, form and texture between the project and nearby residences would be more pronounced in this scenario, compared with the project being set back further from the residential area, as proposed. In views from the residential areas to the south and east of the project site (see views from KOP DR 46 and KOP DR 47), including views from uphill locations to the east (see views from KOP 4 and KOP DR 45), a project located within the northern laydown area would likely be less visible. In views from lowland residences, it would appear further away, smaller in relative scale, and would likely be mostly obscured by intervening structures. In views from higher elevations (e.g., from along Anita Street above North Prospect Avenue), a project placed within the northern laydown area would be visible but would appear aligned with the SCE transmission corridor that extends up the hill, reinforcing that linear feature in the landscape as opposed to appearing separately in its proposed location.

If the project were to be placed in the southern laydown area, it would dominate views from the residential area southeast of the project site. Portions of the project would be adjacent to the Roland Mindeman Senior Residences at the Salvation Army and the Best Western Hotel (which would be adjacent to the south) and the technology center / office building (which would be adjacent to the east). Views from these facilities to the north and west, respectively, would likely be almost completely obscured by power plant structures and equipment if the project were to be placed in the southern laydown area. The RBEP would be prominent in views to the north from the marina and pier areas (see views from KOP 2 and KOP 3) and in views to the west and northwest from within the residential area between North Catalina Avenue and Pacific Coast Highway (see views from KOP DR 46 and KOP DR 47). The existing power plant is also intermittently visible from the residential area, but the RBEP in the southern laydown area would be closer and thus appear larger, occupying a greater portion of a greater number of views. Conversely, the project would be less prominent in views from the north and northeast (e.g., views from KOP 4, KOP 5, KOP DR 44, and KOP DR 45) since it would be further away, appearing smaller and likely being at least partially obscured by intervening structures. In unobstructed views from the eastern hills, the RBEP in the southern laydown location might appear less compact than in the proposed location, since the laydown location has a somewhat larger area than the proposed site. From this vantage point, it would still likely appear smaller in scale compared with the existing power plant.

c. Provide an alternative site layout directed toward lessening potential noise changes/impacts of the RBEP to adjacent sensitive receptors including residential and recreational locations surrounding the facility. Describe and substantiate any feasibility issues of this alternative site configuration.

Response: The proposed site layout incorporates numerous acoustical design features to lower the sound emissions of the facility. As configured in the AFC, the main power island equipment is located near the center of the site and is nearly fully enclosed within an acoustical structure. Shifting this structure further north or south generally decreases distance to other potentially noise sensitive areas. Rotating the steam turbine and air cooled condenser to the south place them almost immediately adjacent to the technology center/office building. Hence, locating RBEP centrally on the site balances the nose generation between sensitive receptors adjacent to the project on the north and those on the south.



NOTES:

1. RBGS UNITS 5 AND 6 WET TOWER 61'-8"W x 241'-0"L x 65'-0"H
2. RBGS UNITS 7 AND 8 WET TOWER 132'-0"W x 325'-0"L x 65'-0"H

FIGURE DR50A-1
Conceptual Wet Tower Placement
AES Redondo Beach Energy Project
Redondo Beach, California

Source: Power Engineers Collaborative, LLC., 01/09/2014.

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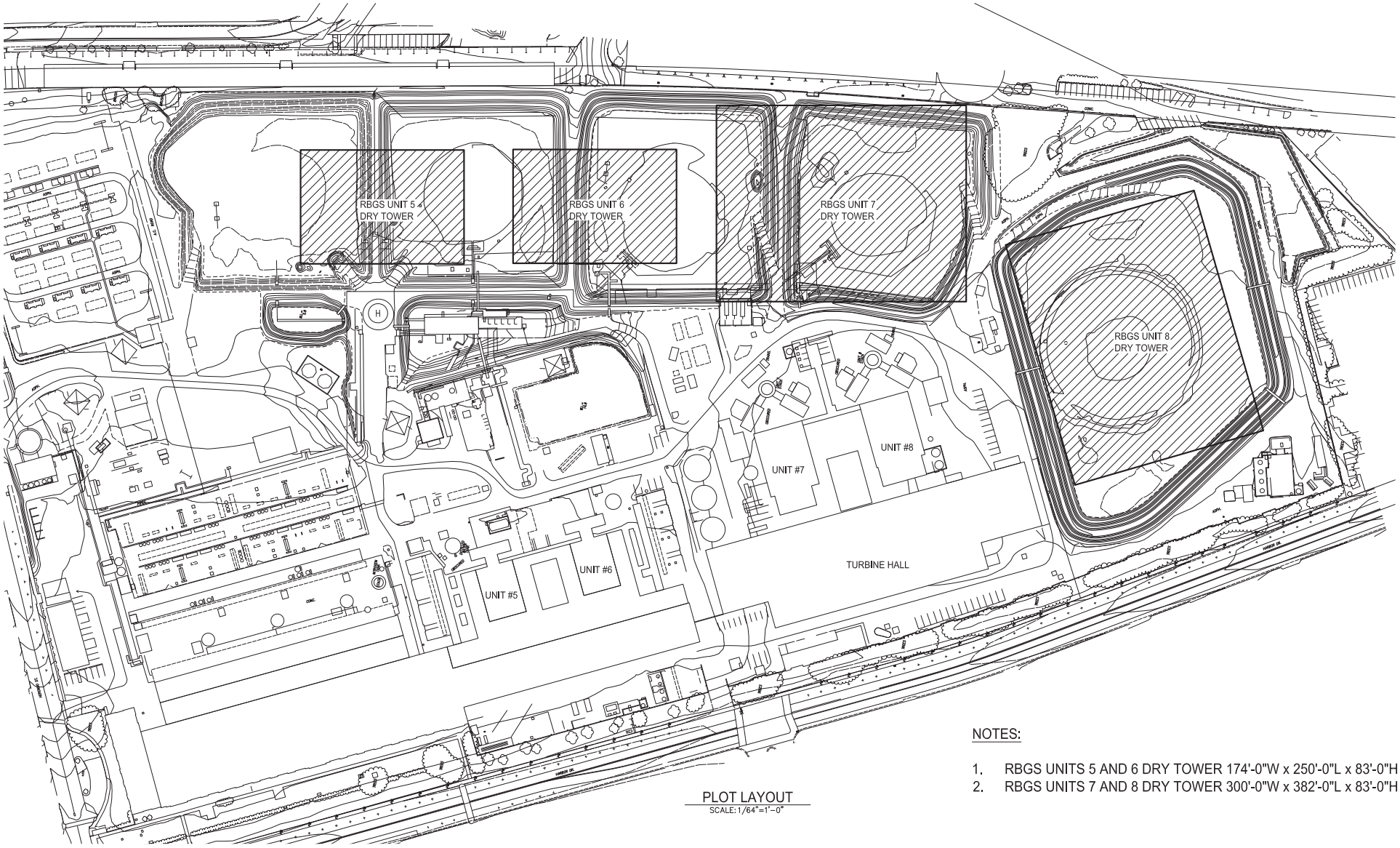

PLOT LAYOUT
SCALE: 1/64"=1'-0"

NOTES:

1. RBGS UNITS 5 AND 6 DRY TOWER 174'-0"W x 250'-0"L x 83'-0"H
2. RBGS UNITS 7 AND 8 DRY TOWER 300'-0"W x 382'-0"L x 83'-0"H

FIGURE DR50A-2
Conceptual Dry Tower Placement
AES Redondo Beach Energy Project
Redondo Beach, California

Source: Power Engineers Collaborative, LLC., 01/09/2014.

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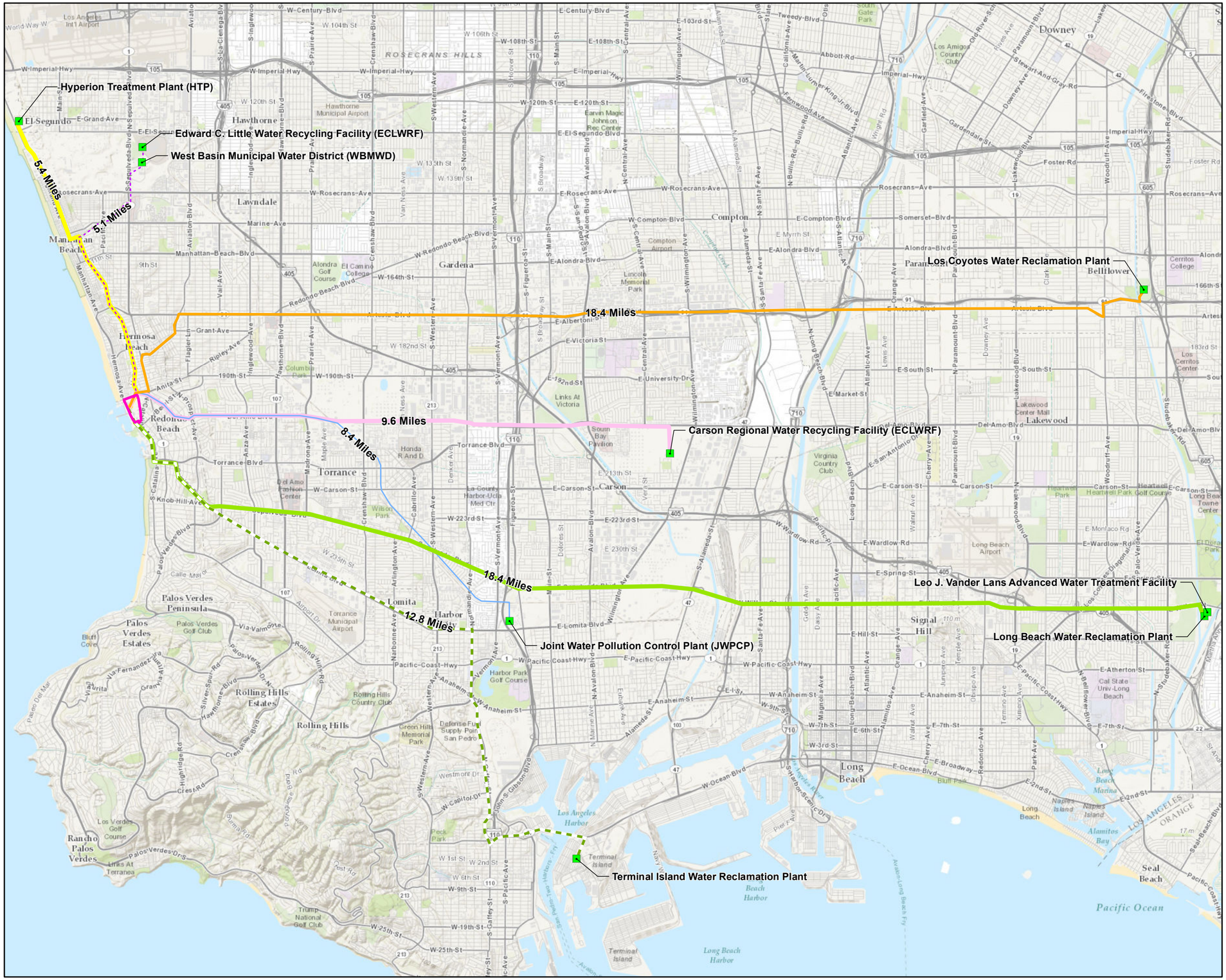

Legend

- Wastewater Treatment Facility

Possible Pipeline Alignment

- Hyperion Treatment Plant (HTP)
- Edward C. Little Water Recycling Facility (ECLWRF)
- Joint Water Pollution Control Plant (JWPCP)
- Carson Regional Water Recycling Facility (ECLWRF)
- Terminal Island Water Reclamation Plant
- Los Coyotes Water Reclamation Plant
- Leo J. Vander Lans Advanced WTF
- AES Redondo Beach Energy Project

0 1.5 3
Miles

N

FIGURE DR50B-1
Reclaimed Water Sources
AES Redondo Beach Energy Project
Redondo Beach, California

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