Appendix F

AMENDED AND RESTATED FIELD MANAGEMENT PLAN

Presidential Substation Project

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. EXECUTIVE SUMMARY

This document is Southern California Edison Company's (SCE) Field Management Plan (FMP) for the proposed Presidential Substation Project (Proposed Project).

SCE proposes to construct a new 66/16 kilovolt (kV) substation (Proposed Presidential 66 kV Substation,) and new 66 kV subtransmission lines (Proposed 66 kV subtransmission Lines) to meet forecasted electrical demand in the cities of Thousand Oaks, Simi Valley, and adjacent areas of unincorporated Ventura County. SCE's current forecast shows that projected demand for electrical system in Simi Valley, Thousand Oaks and adjacent areas will exceed SCE's operating capacity at its existing facilities as early as summer of 2011. The project, therefore, would increase electrical capacity to the area, maintain system reliability, and serve the area's projected electrical demand.

SCE provides this FMP in order to inform the public, the California Public Utilities Commission (CPUC), and other interested parties of its evaluation of "no-cost and low-cost" magnetic field reduction design options for this project, and SCE's proposed plan to apply these design options to this project. This FMP has been prepared in accordance with CPUC Decision No. 93-11-013 and Decision No. 06-01-042 relating to extremely low frequency[1] electric and magnetic fields (EMF). This FMP also provides background on the current status of scientific research related to possible health effects of EMF, and a description of the CPUC's EMF policy.

The "no-cost and low-cost" magnetic field reduction design options that are incorporated into the design of the Proposed Project are:

- Utilizing pole heights that meet or exceed the Preferred Design criteria specified in SCE's EMF Design Guidelines in areas where there are residences near the proposed line route;

[1] The extreme low frequency is defined as the frequency range from 3 Hz to 3,000 Hz.

- Using compact type pole-head configurations for the 66 kV single-circuit subtransmission lines;
- Using double-circuit for subtransmission lines for portions of the line route
- Phasing circuits to reduce the magnetic fields; and
- Placing major substation electric equipment (such as transformers) away from the existing substation property lines.

Table 1 on page 6 summarizes "no-cost and low-cost" magnetic field reduction design options that SCE considered for the Proposed Project:

SCE's plan for applying the above "no-cost and low-cost" magnetic field reduction design options for the Proposed Project is consistent with CPUC's EMF policy and with the direction of leading national and international health agencies. Furthermore, the plan complies with SCE's EMF Design Guidelines[2], and with applicable national and state safety standards for new electric facilities.

[2] EMF Design Guidelines, August 2006.

Table 1- Summary of "No-cost and Low-cost" Magnetic Field Reduction Design Options

Area No.	Location[3]	Adjacent Land Use[4]	MF Reduction Design Options Considered	Estimated Cost to Adopt	Design Option(s) Adopted? (Yes/No)	Reason(s) if not adopted
Section 1:	From Moorpark-Thousand Oaks No. 2 66 kV Line Tapping point along Read Road to Sunset Valley Road	2, 5, 6	• Taller poles • Compact Pole-head Design	• No-Cost • No-Cost	• Yes • Yes	
Section 2:	From Moorpark-Royal No. 2 66 kV line tapping point to along Sunset Valley Road to Read Road	5, 6	• Compact Pole-head Design • Taller Poles	• No-Cost • No-Cost	• Yes • Yes	
Section 3:	From intersection of Read Road and Sunset Valley along Read Road to Proposed Substation	2, 3, 6	• Taller poles • Phasing Circuits for field reduction	• Low-Cost • No-Cost	• Yes • Yes	
Presidential Substation	South of Olsen Road and West of Country Club Drive	3, 6	• Placing major substation electric equipment (such as transformers) away from the existing substation property lines	• No-Cost	• Yes	

[3] This column shows the major cross streets, existing subtransmission lines, or substation name as reference points.
[4] Land usage codes are as follows: 1) schools, licensed day-cares, and hospitals, 2) residential, 3) commercial/industrial, 4) recreational, 5) agricultural, and 6) undeveloped land.

II. BACKGROUND REGARDING EMF AND PUBLIC HEALTH RESEARCH ON EMF

There are many sources of power frequency[5] electric and magnetic fields, including internal household and building wiring, electrical appliances, and electric power transmission and distribution lines. There have been numerous scientific studies about the potential health effects of EMF. After many years of research, the scientific community has been unable to determine if exposures to EMF cause health hazards. State and federal public health regulatory agencies have determined that setting numeric exposure limits is not appropriate.[6]

Many of the questions about possible connections between EMF exposures and specific diseases have been successfully resolved due to an aggressive international research program. However, potentially important public health questions remain about whether there is a link between EMF exposures and certain diseases, including childhood leukemia and a variety of adult diseases (e.g., adult cancers and miscarriages). As a result, some health authorities have identified magnetic field exposures as a possible human carcinogen. As summarized in greater detail below, these conclusions are consistent with the following published reports: the National Institute of Environmental Health Sciences (NIEHS) 1999[7], the National Radiation Protection Board (NRPB) 2001[8], the International Commission on non-Ionizing Radiation Protection (ICNIRP) 2001, the California Department of Health Services (CDHS) 2002[9], and the International Agency for Research on Cancer (IARC) 2002[10].

---

5 In U.S., it is 60 Hertz (Hz).

6 CPUC Decision 06-01-042, p. 6, footnote 10

7 National Institute of Environmental Health Sciences' Report on Health Effects from Exposures to Power-Line frequency Electric and Magnetic Fields, NIH Publication No. 99-4493, June 1999.

8 National Radiological Protection Board, Electromagnetic Fields and the Risk of Cancer, Report of an Advisory Group on Non-ionizing Radiation, Chilton, U.K. 2001

9 California Department of Health Services, An Evaluation of the Possible Risks from Electric and Magnetic Fields from Power Lines, Internal Wiring, Electrical Occupations, and Appliances, June 2002.

10 World Health Organization / International Agency for Research on Cancer, IARC Monographs on the evaluation of carcinogenic risks to humans (2002), Non-ionizing radiation, Part 1: Static and extremely low-frequency (ELF) electric and magnetic fields, IARCPress, Lyon, France: International Agency for Research on Cancer, Monograph, vol. 80, p. 338, 2002

The federal government conducted EMF research as a part of a $45-million research program managed by the NIEHS. This program, known as the EMF RAPID (Research and Public Information Dissemination), submitted its final report to the U.S. Congress on June 15, 1999. The report concluded that:

- "The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak."[11]
- "The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard."[12]
- "The NIEHS suggests that the level and strength of evidence supporting ELF-EMF exposure as a human health hazard are insufficient to warrant aggressive regulatory actions; thus, we do not recommend actions such as stringent standards on electric appliances and a national program to bury all transmission and distribution lines. Instead, the evidence suggests passive measures such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. NIEHS suggests that the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards."[13]

In 2001, Britain's NRPB arrived at a similar conclusion:

> "After a wide-ranging and thorough review of scientific research, an independent Advisory Group to the Board of NRPB has concluded that the power frequency electromagnetic fields that exist in the vast majority of homes are not a cause of cancer in general. However, some epidemiological studies do indicate a possible small risk of childhood leukemia associated with exposures to unusually high levels of power frequency magnetic fields."[14]

In 2002, three scientists for CDHS concluded:

---

[11] National Institute of Environmental Health Sciences, NIEHS Report on Health Effects from Exposures to Power-Frequency Electric and Magnetic Fields, p. ii, NIH Publication No. 99-4493, 1999

[12] *ibid.*, p. iii

[13] *ibid.*, p. 37 - 38

[14] NRPB, NRPB Advisory Group on Non-ionizing Radiation Power Frequency Electromagnetic Fields and the Risk of Cancer, NRPB Press Release May 2001

"To one degree or another, all three of the [CDHS] scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's Disease, and miscarriage.

They [CDHS] strongly believe that EMFs do not increase the risk of birth defects, or low birth weight.

They [CDHS] strongly believe that EMFs are not universal carcinogens, since there are a number of cancer types that are not associated with EMF exposure.

To one degree or another they [CDHS] are inclined to believe that EMFs do not cause an increased risk of breast cancer, heart disease, Alzheimer's disease, depression, or symptoms attributed by some to a sensitivity to EMFs. However, all three scientists had judgments that were "close to the dividing line between believing and not believing" that EMFs cause some degree of increased risk of suicide, or

For adult leukemia, two of the scientists are 'close to the dividing line between believing or not believing' and one was 'prone to believe' that EMFs cause some degree of increased risk."[15]

Also in 2002, the World Health Organization's (WHO) IARC concluded:

"ELF magnetic fields are possibly carcinogenic to humans"[16], based on consistent statistical associations of high-level residential magnetic fields with a doubling of risk of childhood leukemia...Children who are exposed to residential ELF magnetic fields less than 0.4 microTesla (4.0 milliGauss) have no increased risk for leukemia…. In contrast, "no consistent relationship has been seen in studies of childhood brain tumors or cancers at other sites and residential ELF electric and magnetic fields."[17]

In June of 2007, the WHO issued a report on their multi-year investigation of EMF and the possible health effects. After reviewing scientific data from numerous EMF and human health studies, they concluded:

"Scientific evidence suggesting that everyday, chronic low-intensity (above 0.3-0.4 µT [3-4 mG]) power-frequency magnetic field exposure poses a health risk is based on epidemiological

15 CDHS, An Evaluation of the Possible Risks From Electric and Magnetic Fields (EMFs) From Power Lines, Internal Wiring, Electrical Occupations and Appliances, p. 3, 2002

16 IARC, Monographs, Part I, Vol. 80, p. 338

17 *ibid*., p. 332 - 334

studies demonstrating a consistent pattern of increased risk for childhood leukaemia."[18]

"In addition, virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern."[19]

"A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in both children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukaemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease"[20]

"Furthermore, given both the weakness of the evidence for a link between exposure to ELF magnetic fields and childhood leukaemia, and the limited impact on public health if there is a link, the benefits of exposure reduction on health are unclear. Thus the costs of precautionary measures should be very low."[21]

III. APPLICATION OF THE CPUC'S "NO-COST AND LOW-COST" EMF POLICY TO THE PROPOSED PROJECT

Recognizing the scientific uncertainty over the connection between EMF exposures and health effects, the CPUC adopted a policy that addresses public concern over EMF with a combination of education, information, and precaution-based approaches. Specifically, Decision 93-11-013 established a precautionary based "no-cost and low-cost" EMF policy for California's regulated electric utilities based on recognition that scientific research had not demonstrated that

---

18 WHO, Environmental Health Criteria 238, EXTREMELY LOW FREQUENCY FIELDS, p. 11 - 12, 2007

19 *ibid.*, p. 12

20 *ibid.*, p. 12

21 *ibid.*, p. 13

exposures to EMF cause health hazards and that it was inappropriate to set numeric standards that would limit exposure.

In 2006, the CPUC completed its review and update of its EMF Policy in Decision 06-01-042. This decision reaffirmed the finding that state and federal public health regulatory agencies have not established a direct link between exposure to EMF and human health effects,[22] and the policy direction that (1) use of numeric exposure limits was not appropriate in setting utility design guidelines to address EMF,[23] and (2) existing "no-cost and low-cost" precautionary-based EMF policy should be continued for proposed electrical facilities. The decision also reaffirmed that EMF concerns brought up during Certificate of Public Convenience and Necessity (CPCN) and Permit to Construct (PTC) proceedings for electric and transmission and substation facilities should be limited to the utility's compliance with the CPUC's "no-cost and low-cost" policies.[24]

The decision directed regulated utilities to hold a workshop to develop standard approaches for EMF Design Guidelines and such a workshop was held on February 21, 2006. Consistent design guidelines have been developed that describe the routine magnetic field reduction measures that regulated California electric utilities consider for new and upgraded transmission line and transmission substation projects. SCE filed its revised EMF Design Guidelines with the CPUC on July 26, 2006.

"No-cost and low-cost" measures to reduce magnetic fields would be implemented for this project in accordance with SCE's EMF Design Guidelines. In summary, the process of

---

[22] CPUC Decision 06-01-042, Conclusion of Law No. 5, mimeo. p. 19 ("As discussed in the rulemaking, a direct link between exposure to EMF and human health effects has yet to be proven despite numerous studies including a study ordered by this Commission and conducted by DHS.").

[23] CPUC Decision 06-01-042, mimeo. p. 17 - 18 ("Furthermore, we do not request that utilities include non-routine mitigation measures, or other mitigation measures that are based on numeric values of EMF exposure, in revised design guidelines or apply mitigation measures to reconfigurations or relocations of less than 2,000 feet, the distance under which exemptions apply under GO 131-D. Non-routine mitigation measures should only be considered under unique circumstances.").

[24] CPUC Decision 06-01-042, Conclusion of Law No. 2, ("EMF concerns in future CPCN and PTC proceedings for electric and transmission and substation facilities should be limited to the utility's compliance with the Commission's low-cost/no-cost policies.").

evaluating "no-cost and low-cost" magnetic field reduction measures and prioritizing within and between land usage classes considers the following:

1. SCE's priority in the design of any electrical facility is public and employee safety. Without exception, design and construction of an electric power system must comply with all applicable federal, state, and local regulations, applicable safety codes, and each electric utility's construction standards. Furthermore, transmission and subtransmission lines and substations must be constructed so that they can operate reliably at their design capacity. Their design must be compatible with other facilities in the area and the cost to operate and maintain the facilities must be reasonable.

2. As a supplement to Step 1, SCE follows the CPUC's direction to undertake "no-cost and low-cost" magnetic field reduction measures for new and upgraded electrical facilities. Any proposed "no-cost and low-cost" magnetic field measures, must, however, meet the requirements described in Step 1 above. The CPUC defines "no-cost and low-cost" measures as follows:

    - Low-cost measures, in aggregate, should:
        - Cost in the range of 4 percent of the total project cost.
        - Result in magnetic field reductions of "15% or greater at the utility ROW [right-of-way]…"[25]

    The CPUC Decision stated,

    > "We direct the utilities to use 4 percent as a benchmark in developing their EMF mitigation guidelines. We will not establish 4 percent as an absolute cap at this time because we do not want to arbitrarily eliminate a potential measure that might be available but costs

[25] CPUC Decision 06-01-042, p. 10

more than the 4 percent figure. Conversely, the utilities are encouraged to use effective measures that cost less than 4 percent."[26]

3. The CPUC provided further policy direction in Decision 06-01-042, stating that, "[a]lthough equal mitigation for an entire class is a desirable goal, we will not limit the spending of EMF mitigation to zero on the basis that not all class members can benefit."[27] While Decision 06-01-042 directs the utilities to favor schools, day-care facilities and hospitals over residential areas when applying low-cost magnetic field reduction measures, prioritization within a class can be difficult on a project case-by-case basis because schools, day-care facilities, and hospitals are often integrated into residential areas, and many licensed day-care facilities are housed in private homes, and can be easily moved from one location to another. Therefore, it may be practical for public schools, licensed day-care centers, hospitals, and residential land uses to be grouped together to receive highest prioritization for low-cost magnetic field reduction measures. Commercial and industrial areas may be grouped as a second priority group, followed by recreational and agricultural areas as the third group. Low-cost magnetic field reduction measures will not be considered for undeveloped land, such as open space, state and national parks, and Bureau of Land Management and U.S. Forest Service lands. When spending for low-cost measures would otherwise disallow equitable magnetic field reduction for all areas within a single land-use class, prioritization can be achieved by considering location and/or density of permanently occupied structures on lands adjacent to the projects, as appropriate.

[26] CPUC Decision 93-11-013, § 3.3.2, p.10.
[27] CPUC Decision 06-01-042, p. 10

This FMP contains descriptions of various magnetic field models and the calculated results of magnetic field levels based on those models. These calculated results are provided only for purposes of identifying the relative differences in magnetic field levels among various transmission or subtransmission line design alternatives under a specific set of modeling assumptions and determining whether particular design alternatives can achieve magnetic field level reductions of 15 percent or more. The calculated results are not intended to be predictors of the actual magnetic field levels at any given time or at any specific location if and when the project is constructed. This is because magnetic field levels depend upon a variety of variables, including load growth, customer electricity usage, and other factors beyond SCE's control. The CPUC affirmed this in D. 06-01-042 stating:

> "Our [CPUC] review of the modeling methodology provided in the utility [EMF] design guidelines indicates that it accomplishes its purpose, which is to measure the relative differences between alternative mitigation measures. Thus, the modeling indicates relative differences in magnetic field reductions between different transmission line construction methods, but does not measure actual environmental magnetic fields."[28]

VI. PROJECT DESCRIPTION

SCE proposes to construct the Proposed Project to meet forecasted electrical demands in the cities of Simi Valley and Thousand Oaks, as well as adjacent areas of unincorporated Ventura County. The Proposed Project would include the following components:

- A new 66/16 kV distribution substation on an approximate three acre parcel
- Two new 66 kV subtransmission line segments (approximately 3.5 miles long) that would feed the proposed substation from existing 66 kV subtransmission lines. Along a short portion of a line segment, two subtransmission lines will be installed underground beneath the 23 Freeway (approximately 900 feet in length) for engineering reasons (not for EMF reduction).

---

[28] CPUC Decision 06-01-042, p. 11

- Four new 16 kV distribution getaways
- Two new 66 kV subtransmission getaways

The Proposed Project is planned to be operational June 2011 to ensure that safe and reliable electric service is available to serve customer electrical demand.

Figure 1 below shows the overall project areas showing the proposed substation site as well as proposed subtransmission line routes (Proposed Routes). SCE's proposed substation site is located on the south side of Olsen Road in the City of Thousand Oaks. The Proposed 66 kV Subtransmission Source Line Route is approximately 3.5 mile and connects two existing subtransmission lines to two new subtransmission source lines.

The first source line would connect to the Moorpark-Thousand Oaks No. 2 66 kV subtransmission line near the intersection of Read Road and Moorpark Road in unincorporated Ventura County. This subtransmission source line would extend east along the south side of Read Road to the intersection of Read Road and Sunset Valley Road

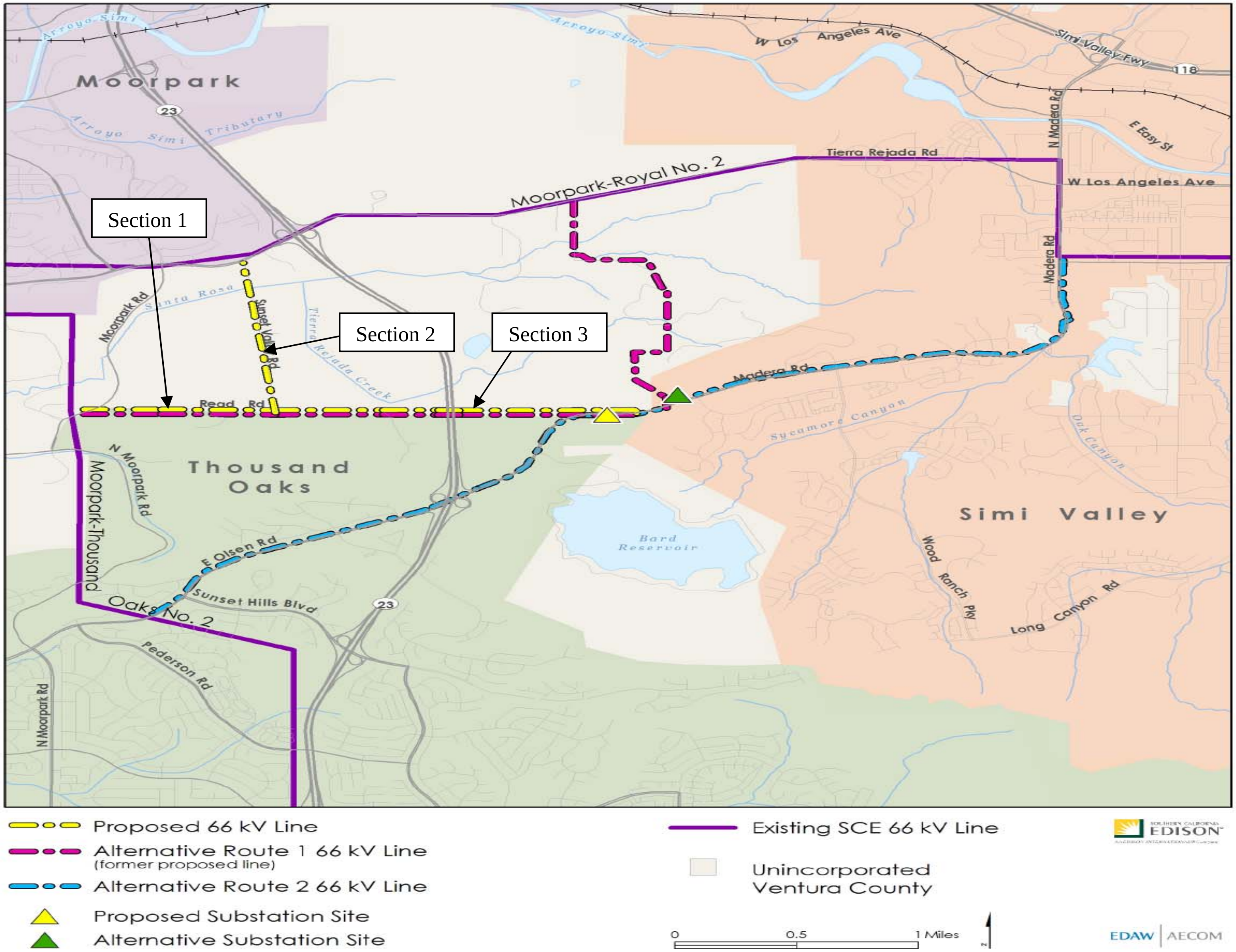
The second subtransmission source line would connect to the Moorpark-Royal No. 2 66 kV subtransmission line near the intersection Tierra Rejada Road and Sunset Valley Road in unincorporated Ventura County. This subtransmission source line would extend south along Sunset Valley Road until it reaches the intersection of Sunset Valley Road and Read Road.

The two subtransmission lines would meet at the intersection of Read Road and Sunset Valley Road within the City of Thousand Oaks. From this intersection, the subtransmission lines will continue on the same pole line along Read Road to near the edge of the Caltrans right of way (ROW), will be installed underground to cross below State Highway 23 and continue overhead east of the highway within the same ROW corridor as the existing 16 kV into the substation site.

For the purpose of analyzing possible field reduction, the line routes will be broken up into three sections as follows:

- Section 1: Along Read Road from the intersection of Read Road and Moorpark Road to the intersection of Read Road and Sunset Valley Road
- Section 2: Along Sunset Valley Road from the intersection of Tierra Rejada Road and Sunset Valley Road to the intersection of Sunset Valley and Read Road
- Section 3: Along Read Road from the intersection of Sunset Valley Road and Read Road to the proposed substation

Figure 1. Project Area and Proposed Routes



Currently, there are no schools along the Proposed Routes. The Proposed Routes run adjacent to few scattered homes in mainly agricultural areas. The Proposed Substation location is approximately 350 feet, property line to property line, from a preschool/ day-care center[29]. This distance exceeds the California Department of Education setback guidance for new schools of 100 feet for 66 kV facilities.

The total cost of this project is approximately $35.8 million in 2008 constant dollars[30]. Four percent of the proposed project cost is $1.4 million. SCE engineers added magnetic field reduction measures early in the design phase for this project. The total project cost, therefore, includes "low-cost" magnetic field reduction measures in the proposed designs.

V. EVALUATION OF "NO-COST AND LOW-COST" MAGNETIC FIELD REDUCTION DESIGN OPTIONS

For the purpose of evaluating "no-cost and low-cost" magnetic field reduction design options, the Proposed Project is divided into two parts:

- Part 1: Proposed 66 kV Subtransmission Lines
- Part 2: Proposed Presidential 66 kV Substation

Part 1: Proposed 66 kV Subtransmission Lines

After ten years of evaluating and implementing no-cost and low-cost magnetic field reduction design options for subtransmission line designs, SCE established preferred overhead 66 kV and 115 kV subtransmission line designs in 2004. These preferred designs incorporate the most effective no-cost and low-cost magnetic field reduction design options (such as pole-head

[29] Tutor Time Learning Center, 1080 Country Club Drive, Simi Valley

[30] This is an order of magnitude estimate, prepared in advance of final engineering and prior to CPUC approval. Pension and benefits, administrative and general expenses, and allowance for funds used during construction (approximately 17 percent of project cost) are not included in this estimate.

configurations and taller poles). For overhead 66 kV subtransmission lines, SCE's preferred designs[31] are shown in Table 2:

Table 2. Preferred Overhead 66 kV Subtransmission Line Designs with Most Effective Magnetic Field Reduction Design Options Incorporated		
	66 kV Overhead Construction	
	Single Circuit Design	Double Circuit Design
Base Pole Height	70 feet	75 feet
Base Pole-head Configuration	"Triangle" or equivalent	"Double-Circuit"
Minimum Clearance	35 feet	35 feet

Please note that following magnetic field models and the calculated results of magnetic field levels are intended only for purposes of identifying the relative differences in magnetic field levels among various subtransmission line design alternatives under a specific set of modeling assumptions (see §VII-Appendix A for more detailed information about the calculation assumptions and loading conditions) and determining whether particular subtransmission design alternatives can achieve magnetic field level reductions of 15 percent or more. The calculated results are not intended to be predictors of the actual magnetic field levels at any given time or at any specific location when the project is constructed.

Section 1

The typical proposed single-circuit 66 kV overhead subtransmission design (Proposed Design) used for Section 1 is shown on Figure 2. The typical pole height for this section is 75 ft.

No-Cost Field Reduction Measures: The proposed design for Section 1 includes the following no-cost field reduction measure:

1. Using of pole heights that exceed SCE's preferred design

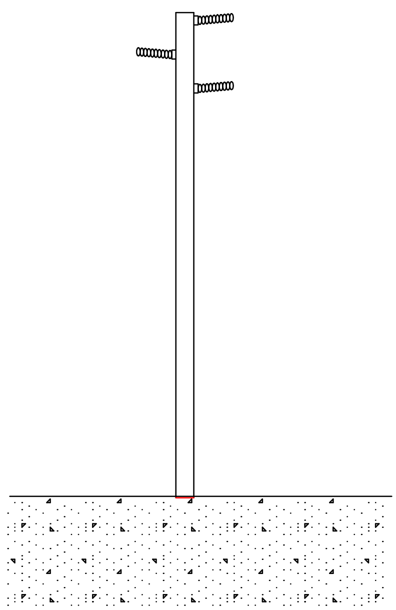
[31] Exceptions to the "preferred design" are recommended by the primary designer based on engineering & safety requirements.

2. Selecting compact pole-head configurations with reduced phase-to-phase distance

Low-Cost Field Reduction Options: This design utilizes pole heights that exceed the SCE preferred design; therefore, use of taller poles was not investigated.

Magnetic Field Calculations: Figure 3 and Table 3 show the calculated magnetic field levels for proposed design. These calculations were made using the typical pole height of 75 feet for the proposed Section 1 structures.

Figure 2. Proposed 66 kV Designs for Section 1[32]



[32] The purpose of this figure is to depict the construction design of voltages greater than 50 kV and does not included the proposed electrical facilities of voltages less than 50 kV or communication equipment.

Figure 3. A Design Comparison of Calculated Magnetic Fields Levels[33]
For Section 1 (Along Read Road Route to Sunset Valley Road)

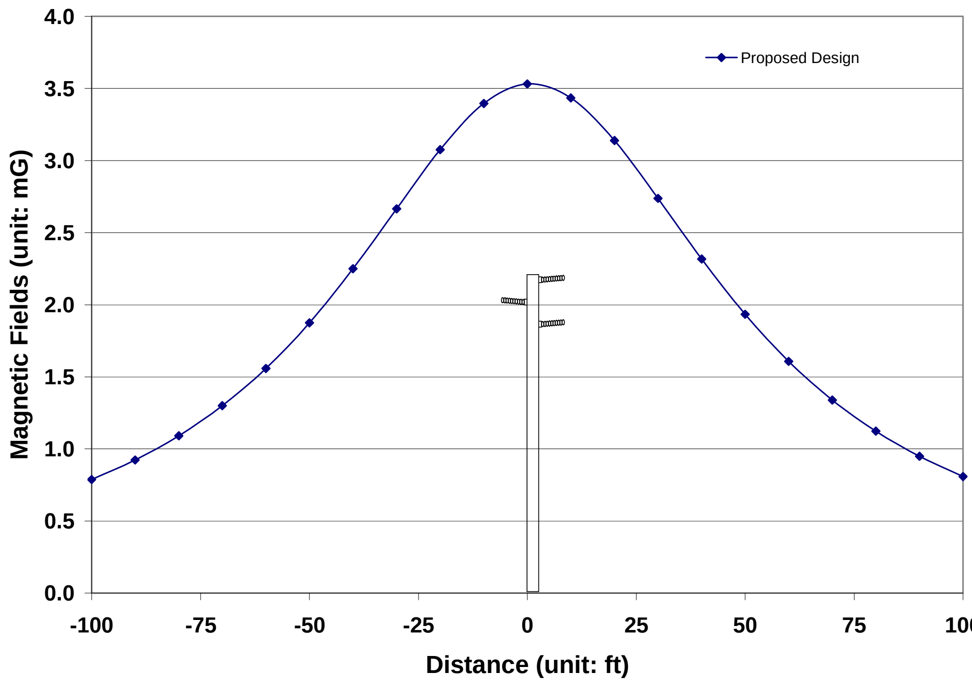


Table 3. A Comparison of Calculated Magnetic Fields[34] for Section 1 (Along Read Road Route to Sunset Valley Road)				
Design Options	10 ft. North of Center Line (mG)	% Reduction	10 ft. South of Center Line (mG)	% Reduction
Proposed Design	3.4	N/A	3.4	N/A

[33] This graph depicts calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

[34] This table lists calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

Section 2

The typical proposed single-circuit 66 kV overhead subtransmission design (Proposed Design) used for Section 2 is shown on Figure 4. The typical pole height for this section is 70 ft.

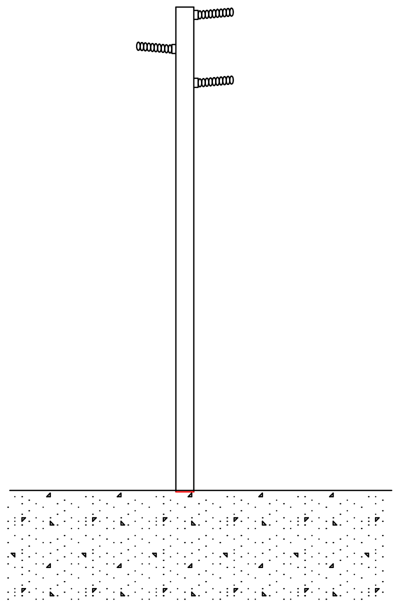
No-Cost Field Reduction Measures: The proposed design for Section 2 includes the following no-cost field reduction measure:

1. Using poles heights that meet SCE's preferred design
2. Selecting compact pole-head configurations with reduced phase-to-phase distance

Low-Cost Field Reduction Options: This design meets the SCE preferred design; therefore, low-cost measures were not investigated for Segment 2.

Magnetic Field Calculations: Figure 5 and Table 4 show the calculated magnetic field levels for the proposed design. These calculations were made using the typical pole height of 70 feet for the proposed Section 2 structures.

Figure 4. Proposed 66 kV Designs for Section 2[35]



[35] The purpose of this figure is to depict the construction design of voltages greater than 50 kV and does not included the proposed electrical facilities of voltages less than 50 kV or communication equipment.

Figure 5. A Design Comparison of Calculated Magnetic Field Levels[36]

Section 2 (Along Sunset Valley Route to Read Road)

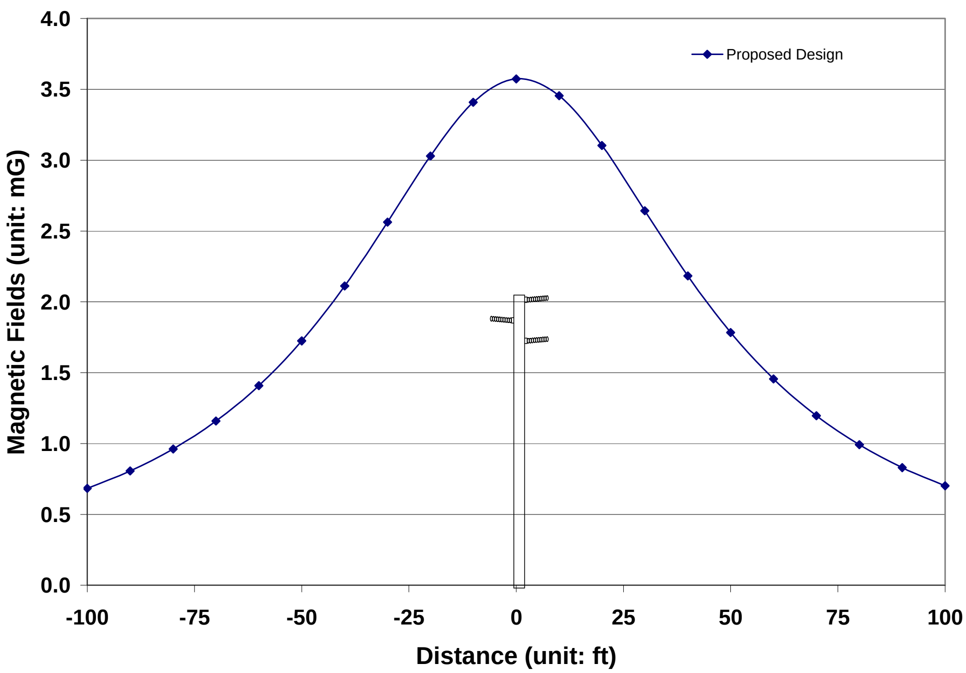


Table 4. A Comparison of Calculated Magnetic Fields[37] for Section 2 (Along Sunset Valley Route to Read Road)				
Design Options	10 ft East of Center Line (mG)	% Reduction	10 ft. West of Center Line (mG)	% Reduction
Proposed Design	3.4	N/A	3.5	N/A

[36] This graph depicts calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

[37] This table lists calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

Section 3

The typical proposed double-circuit 66 kV overhead subtransmission design (Proposed Design) for Section 3 is shown on Figure 6. The typical pole height for this section is 70 ft.

No-Cost Field Reduction Measures: The proposed design for Section 3 includes the following no-cost field reduction measure:

1. Phasing circuits to reduce the magnetic fields
2. Using double-circuit construction that reduces spacing between circuits as compared with single-circuit construction

Low-Cost Field Reduction Options: The following low-cost field reduction option was considered for the proposed design for Section 3:

1. Selecting pole heights to meet the preferred design of 75-foot engineered steel pole in residential areas along the line route

Magnetic Field Calculations: Figure 7 and Table 5 show the calculated magnetic field levels for the proposed scenario utilizing 70-foot poles and proposed with low-cost field reduction option scenario using 5 foot taller poles. The design using 5 foot taller poles, 75-foot, meets the preferred double-circuit design as listed in Table 2 and results in calculated field reductions greater than 15% compared with the proposed design without taller structures. Therefore, this design is recommended to be utilized in areas along Section 3 where there are nearby residences.

Figure 6. Proposed 66 kV Design for Section 3

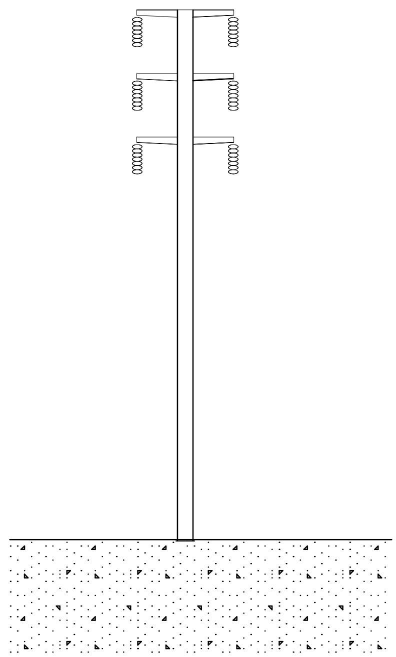


Figure 7. A Design Comparison of Calculated Magnetic Field Levels[38]

For Section 3 (Along Read Road Route from Sunset Valley Road to the Proposed Substation)

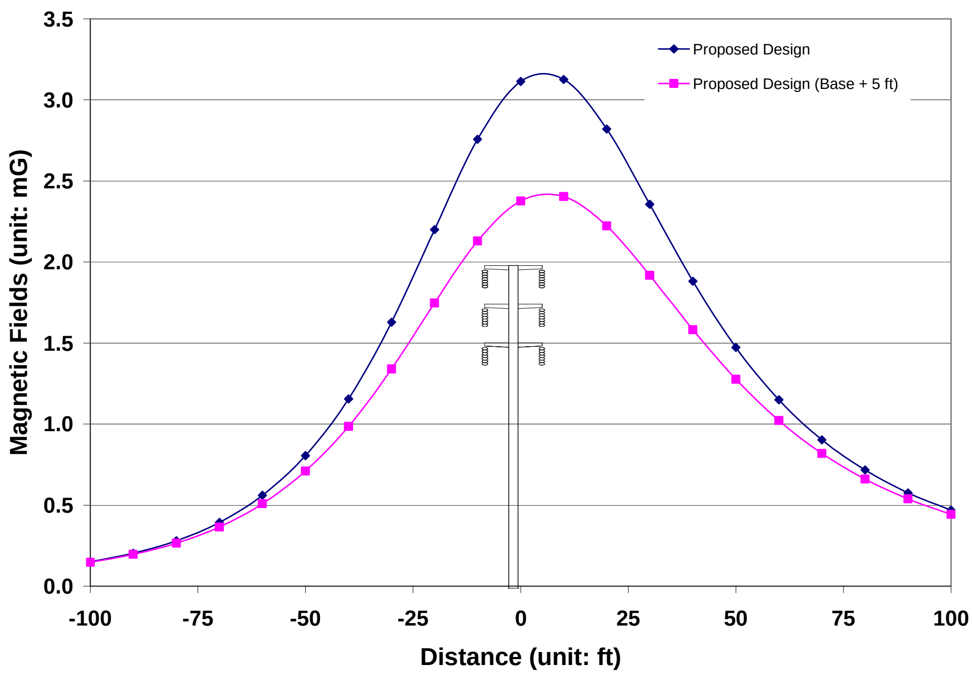


Table 5. A Comparison of Calculated Magnetic Fields[39] for Section 3 (Along Read Road Route from Sunset Valley Crossing Road to the Proposed Substation)				
Design Options	10 ft. North of Center Line (mG)	% Reduction	10 ft. South of Center Line (mG)	% Reduction
Proposed Design	2.8		3.1	
Proposed Design with Low-Cost Field Reduction (5 ft taller pole)	2.1	25	2.4	22.6

38 This graph depicts calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

39 This table lists calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

Part 2: Proposed Presidential 66 kV Substation

Generally, magnetic field values along the substation perimeter are low compared to the substation interior because of the distance from the perimeter to the energized equipment. Normally, the highest magnetic field values around the perimeter of a substation result from overhead power lines and underground duct banks entering and leaving the substation, and are not caused by substation equipment. Therefore, the magnetic field reduction design options generally applicable to a substation project are as follows:

- Site selection for a new substation;
- Setback of substation structures and major substation equipment (such as bus, transformers, and underground cable duct banks, etc.) from perimeter;
- Field reduction for subtransmission lines and distribution lines entering and exiting the substation.

The Substation Checklist, as shown on Table 6, is used for evaluating the no-cost and low-cost design options considered for the substation project, the design options adopted, and reasons that certain design options were not adopted.

Table 6. Substation Checklist for Examining No-cost and Low-cost Magnetic Field Reduction Design Options

No.	No-Cost and Low-Cost Magnetic Field Reduction Design Options Evaluated for a Substation Project	Design Options Adopted? (Yes/No)	Reason(s) if not Adopted
1	Are 66 kV rated transformer(s) 15 feet from the substation property line?	Yes	
2	Are 66 kV rated switch-racks, capacitor banks & bus 8 feet (or more) from the substation property line?	Yes	
3	Are 16 kV distribution underground cable duct banks 12 feet (or more) from the side property line?	Yes	
4	Are 66 kV rated transfer & operating buses configured with the transfer bus facing the nearest property line?	Yes	

This FMP includes only “no-cost and low-cost” magnetic field reduction design options for SCE’s Proposed Routes and Proposed Substation site. SCE’s Proponent’s Environmental Assessment (PEA) contains various alternative line routes and substation site(s). Comparable “no-cost and low-cost” magnetic field reduction options for the Proposed Project can be applied to all alternative subtransmission routes and substation sites. A revised FMP will be prepared should an alternative route be approved.

VI. FINAL RECOMMENDATIONS FOR IMPLEMENTING “NO-COST AND LOW-COST” MAGNETIC FIELD REDUCTION DESIGN OPTIONS

In accordance with the “EMF Design Guidelines”, filed with the CPUC in compliance with CPUC Decisions 93-11-013 and 06-01-042, SCE would implement the following “no-cost and low-cost” magnetic field reduction design options for this project. These recommended magnetic field reduction design options would be Proposed Project:

For Proposed 66 kV Subtransmission Line Routes Sections 1:

- Utilizing pole heights that meet the Preferred Design criteria specified in SCE’s EMF Design Guidelines in areas where there are residences near the proposed line route
- Selecting compact pole-head configurations with reduced phase-to-phase distance

For Proposed 66 kV Subtransmission Line Routes Section 2:

- Selecting compact pole-head configurations with reduced phase-to-phase distance
- Using poles heights that meet SCE’s preferred design

For Proposed 66 kV Subtransmission Line Routes Section 3:

- Utilizing 75 foot pole heights that meet the Preferred Design criteria specified in SCE's EMF Design Guidelines in areas where there are residences near the proposed line route
- Using double-circuit construction that reduces spacing between circuits as compared with single-circuit construction
- Phasing circuits to reduce the magnetic fields (BAC-CAB or equivalent):
    - Moorpark-Presidential-Thousand Oaks 66 kV - BAC (top to bottom)
    - Moorpark-Presidential-Royal 66 kV – CAB (top to bottom)

For Proposed Presidential 66 kV Substation:

- Placing major substation electric equipment (such as transformers) away from the existing substation property lines

The recommended "no-cost and low-cost" magnetic field reduction design options listed above are based upon preliminary engineering designs, and therefore, they are subject to change during the final engineering designs. If the final engineering designs are different than preliminary engineering designs, SCE, however, would implement comparable "no-cost and low-cost" magnetic field reduction design options. If the final engineering designs are significantly different (in the context of evaluating and implementing CPUC's "no-cost and low-cost" EMF Policy) than the preliminary designs, a supplemental FMP will be prepared.

SCE's plan for applying the above "no-cost and low-cost" magnetic field reduction design options uniformly for the Proposed Project is consistent with the CPUC's EMF Decisions No. 93-11-013 and No. 06-01-042, and also with recommendations made by the U.S. National Institute of Environmental Health Sciences. Furthermore, the recommendations above meet the CPUC approved EMF Design Guidelines as well as all applicable national and state safety standards for new electric facilities.

VII. APPENDIX A: TWO-DIMENSIONAL MODEL ASSUMPTIONS AND YEAR 2011 FORECASTED LOADING CONDITIONS

Magnetic Field Assumptions:

SCE' uses a computer program titled "MFields"[40] to model the magnetic field characteristics of various subtransmission designs options. All magnetic field models and the calculated results of magnetic field levels presented in this document are intended only for purposes of identifying the relative differences in magnetic field levels among various subtransmission line design alternatives under a specific set of modeling assumptions and determining whether particular subtransmission design alternatives can achieve magnetic field level reductions of 15 percent or more. The calculated results are not intended to be predictors of the actual magnetic field levels at any given time or at any specific location if and when the project is constructed.

Typical two-dimensional magnetic field modeling assumptions include:

- All subtransmission lines would be considered operating at forecasted loads, see Table 7 below and all conductors are straight and infinitely long;
- A 5 ft sag for all subtransmission designs;
- Magnetic field strength is calculated at a height of three feet above ground;
- Resultant magnetic fields are being used;
- All line currents are balanced (i.e. neutral or ground currents are not considered);
- Terrain is flat; and
- Dominant power flow directions are being used.

40 Kim, C, MFields for Excel, Version 2.0, 2007.

Table 7 Year 2011 Forecasted Loading Conditions for Proposed 66 kV Subtransmission Lines	
Circuit Name	**Current (Amp)**
Moorpark-Presidential-Thousand Oaks 66 kV	180
Moorpark-Presidential-Royal 66 kV	150

Note:

1. The power flow direction is from other substations to Presidential Substation.
2. Forecasted loading data is based upon scenarios representing load forecasts for the year 2011. The forecasting data is subject to change depending upon availability of generations, load increase, changes in load demand, and by many other factors.