

Section 4.4

Biological Resources

Do Habitat Corridors Provide Connectivity?

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Abstract: *Skeptics have questioned the empirical evidence that corridors provide landscape connectivity. Some also have suggested dangers of corridors. We reviewed published studies that empirically addressed whether corridors enhance or diminish the population viability of species in habitat patches connected by corridors. A randomized and replicated experimental design has not been used—and we argue is not required—to make inferences about the conservation value of corridors. Rather, studies can use observational or experimental analyses of parameters of target populations or movements of individual animals. Two of these approaches hold the greatest promise for progress, especially if the shortcomings of previous studies are remedied. First, experiments using demographic parameters as dependent variables—even if unreplicated—can demonstrate the demographic effects of particular corridors in particular landscapes. Such studies should measure demographic traits before and after treatment in both the treated area (corridor created or destroyed) and an untreated area (habitat patches isolated from one another). This approach is superior to observing the demographic conditions in various landscapes because of the tendency for corridor presence to be correlated with other variables, such as patch size, that can confound the analysis. Second, observations of movements by naturally dispersing animals in fragmented landscapes can demonstrate the conservation value of corridors more convincingly than can controlled experiments on animal movement. Such field observations relate directly to the type of animals (e.g., dispersing juveniles of target species) and the real landscapes that are the subject of decisions about corridor preservation. Future observational studies of animal movements should attempt to detect extra-corridor movements and focus on fragmentation-sensitive species for which corridors are likely to be proposed. Fewer than half of the 32 studies we reviewed provided persuasive data regarding the utility of corridors; other studies were inconclusive, largely due to design flaws. The evidence from well-designed studies suggests that corridors are valuable conservation tools. Those who would destroy the last remnants of natural connectivity should bear the burden of proving that corridor destruction will not harm target populations.*

Proveen Conectividad los Corredores de Hábitat?

Resumen: *Algunos escépticos han cuestionado la evidencia empírica de que los corredores proveen conectividad al paisaje. Otros han sugerido los peligros de los corredores. Revisamos estudios publicados que abordaron empíricamente si los corredores fomentan o disminuyen la viabilidad de poblaciones de especies en parches de hábitat conectados por corredores. A la fecha no se ha llevado a cabo un diseño experimental randomizado y con réplicas para realizar inferencias sobre el valor de los corredores en la conservación—y nosotros argüimos que no es necesario. En cambio, los estudios pueden emplear análisis observacional o experimental de parámetros de poblaciones de interés o movimientos individuales de animales. Dos de estas aproximaciones son muy prometedoras y pueden progresar, especialmente si las limitantes de los estudios previos son remediadas. Primero, los experimentos que usan parámetros demográficos como variables dependientes—aún si no son replicados—pueden demostrar efectos demográficos de corredores en paisajes particulares. Estos estudios deberán medir características demográficas antes y después del tratamiento, tanto en el área tratada (corredor creado o destruido) como en un área no tratada (parches de hábitat aislados unos de otros). Esta aproximación es superior a observar las condiciones demográficas en varios paisajes puesto que la presencia de un corredor tiende a estar correlacionada con otras variables, como lo es el tamaño del*

parche lo que puede confundir el análisis. Segundo, las observaciones de movimientos de animales que se desplazan normalmente en paisajes fragmentados puede demostrar el valor de los corredores en la conservación de manera mas convincente que los experimentos controlados sobre animales en movimiento. Este tipo de observaciones de campo están directamente relacionadas con el tipo de animal (e.g., juveniles de la especie de interés dispersándose) y con el tipo de paisajes que están sujetos a las decisiones de preservación de corredores. Los estudios observacionales de movimientos de animales a futuro deberán tratar de detectar movimientos extra-corredores y enfocarse a especies sensitivas a la fragmentación y para las cuales los corredores son factibles a ser propuestos. Menos de la mitad de los 32 estudios revisados provee datos persuasivos referentes a la utilidad de los corredores; otros estudios fueron inconclusos, mayormente debido a diseños defectuosos. Las evidencias de estudios bien diseñados sugieren que los corredores son herramientas valiosas de conservación. Aquellos que intentan destruir los últimos remanentes de conectividad natural deberían sustentarse demostrando que la destrucción de los corredores no afectará a poblaciones de interés.

Introduction

Conservation biologists generally agree that landscape connectivity enhances population viability for many species and that, until recently, most species lived in well-connected landscapes (Gilpin & Soulé 1986; Noss 1987; Primack 1993; Noss & Cooperrider 1994; Hunter 1996; Meffe & Carroll 1997). Because urbanization and other human activities often sever natural connections among landscapes, many conservationists have advocated the retention of habitat corridors. In part, this approach has been justified by theoretical population models (e.g., metapopulation models, Gilpin & Hanski 1991). Such models demonstrate the utility only of habitat connectivity, however, which benefits population viability via the rescue effect (Brown & Kodric-Brown 1977) or other mechanisms. Conservation value accrues to corridors only if animals in real landscapes use corridors to bring about connectivity. Simberloff et al. (1992) argued that such evidence is lacking. Simberloff and Cox (1987), Simberloff et al. (1992), and Hess (1994) also argued that corridors might promote the spread of diseases, catastrophic disturbances (such as wildfires), or exotic species into the areas connected by corridors or might lure animals into areas—including the corridors themselves—where they experience high mortality (for a review see Hobbs 1992). A central concern is that funds spent acquiring corridors of questionable or unproven value might be better spent acquiring habitat areas for imperiled species, even if such areas are isolated (Simberloff et al. 1992).

We reviewed empirical papers that appeared relevant to the question, "Do corridors enhance or diminish the population viability of target species in the habitat patches connected by corridors?" Our goals were to make suggestions for future research on these issues and to evaluate scientific evidence that corridors serve as conduits for movement in a way that justifies their use as a conservation tool or that corridors have negative effects on target species.

Methods

We gathered papers on corridors (excluding modeling exercises) by searching for the word *corridor* in titles, abstracts, and keywords in all 1980–1997 volumes of *Auk*, *Biological Conservation*, *Condor*, *Conservation Biology*, *Ecological Applications*, *Ecology*, *Journal of Mammalogy*, *Journal of Wildlife Management*, *Wildlife Society Bulletin*, *Wilson Bulletin*, and recent monographs (e.g., Saunders & Hobbs 1991). We gleaned additional citations from relevant papers.

We define *corridor* as a linear habitat, embedded in a dissimilar matrix, that connects two or more larger blocks of habitat and that is proposed for conservation on the grounds that it will enhance or maintain the viability of specific wildlife populations in the habitat blocks. We define *passage* as travel via a corridor by individual animals from one habitat patch to another. Our definition of *corridor* explicitly excludes those linear habitats—such as riparian areas in agricultural landscapes—that support breeding populations of many species but do not connect larger habitat patches (e.g., Spackman & Hughes 1995). There are important conservation issues regarding nonconnective linear habitats, but we restricted our attention to linear patches of land whose conservation value is to allow passage between more significant habitat patches.

Nicholls and Margules (1991) and Inglis and Underwood (1992) discussed the formidable difficulties involved in designing a randomized and replicated experiment to test whether corridors enhance recolonization of habitat patches after local extinction. For such an experiment to be realistic, each experimental unit is an entire landscape, and there must be several replicate landscapes for each combination of treatments. Furthermore, we suggest that the species studied must be those that require connectivity on a landscape scale—fragmentation-sensitive species such as mammals with large home ranges—and that each species be studied individually. These requirements present staggering logistical and fi-

nancial obstacles. Furthermore, to preclude confounding of corridor effects with other landscape effects, simple observation of various natural and anthropogenic landscapes is insufficient; the treatments must be applied randomly to those landscapes. The two essential "treatments" of the experiment, however, are creating and destroying corridors and causing local extinctions so that recolonization can occur. Randomly applying these treatments to replicate landscapes would be ethically questionable. Although one might argue that such an approach may be ethically acceptable for some abundant species, these are not the species for which conservation biologists design corridors, so the results would be of limited value.

Similar logistical, financial, and ethical problems would also bedevil any randomized and replicated experiment to determine the utility of corridors in enhancing population viability. Thus, it is not surprising we did not find a single paper that used a randomized and replicated experimental design and measured either recolonization rate or population viability as a dependent variable. Such a rigorous experiment may be unnecessary (cf. Hurlbert 1984), however. Even the most demanding critics of corridors concede that any habitat configuration that promotes immigration among patches will enhance population viability and likelihood of recolonization; the real issue is whether corridors allow such immigration in landscapes that would otherwise be fragmented (Simberloff et al. 1992). Thus, a researcher can shed light on the debate by conducting either experimental or observational analyses of parameters of target populations or parameters related to the movement of individual animals.

Parameters of target populations, such as immigration or individual survival rates, can be compared between habitat patches connected and unconnected by corridors or between landscapes where corridors are present or absent. Such studies should attempt to show that patch occupancy, abundance, colonization rate, immigration rate, disease rates, individual survival rate, frequency or intensity of disturbance, species richness, or occurrence of deleterious exotics increase or decrease in the presence of corridors relative to a landscape without corridors. Results can be meaningful only if they include a comparison to a landscape without corridors. Several widely cited papers (most notably MacClintock et al. 1977) are not helpful because they describe only a single landscape with corridors.

Because there is general agreement that landscape connectivity has at least the potential to enhance population viability, a study can simply attempt to show that animals use corridors in a way that provides such connectivity. Studies of parameters related to the movement of individual animals should attempt to confirm that animals (or diseases, disturbances, or exotic species) use corridors to move from one patch to another often enough to influence the population viability of the tar-

get species and that without corridors such movements would occur too rarely to influence the population.

We categorized each paper by the types of parameters it measured (population parameters, movements of individual animals, or the putative hazards of corridors) and whether the study used an observational or experimental approach. We then evaluated how each paper answered our research question of whether corridors enhance or diminish the population viability of species in habitat patches. In fairness, we note that the conservation value of corridors may not have been the research question of the investigations we reviewed.

Results and Discussion

Observational Studies Measuring Demographic Parameters

Seven studies (Table 1) measured either demographic parameters in relation to corridors or claimed to do so—six on birds and one on kangaroos. Five reported that corridors were beneficial for birds, one that corridors were not important for birds, and the seventh that corridors were not important for kangaroos. The main problem with this approach is severe risk of confounding; in addition, the dependent variable (especially in studies on birds) often was not closely tied to population viability.

Because each study in this group simply made observations in landscapes that were not designed to test the utility of corridors, all such studies risk the confounding of corridor effects with the effects of other factors that are highly correlated with corridors. For example, habitat patches lacking riparian corridors usually are more xeric, smaller, and further from large source populations than patches that abut such corridors. Patches without corridors may also be closer to homes, farms, cities, and human-subsidized predators. If patches with corridors are "better," it is difficult to determine whether the benefits are due to corridors or some other factors. Confounding is an inherent risk in any observational study because the treatments (corridors) are not randomly allocated to the experimental units. In studies for which randomization and true replication are impossible, investigators can minimize confounding in three ways. First, they should carefully select sites with and without corridors which are as similar as possible with respect to patch size, vegetation, moisture, distance to source populations, and proximity to disturbance. Second, they should forthrightly acknowledge and discuss plausible types of confounding. Third (and optionally), the investigator can collect ancillary data on movement routes of individual animals, especially on actual or potential extra-corridor movements. Such data can suggest whether observed differences are due to corridors or other factors correlated with corridors.

Table 1. Observational studies that compare patch occupancy, abundance, or other demographic parameters in habitat patches (or landscapes) with and without corridors.

<i>Study^a</i>	<i>Dependent variable</i>	<i>Result</i>	<i>Treatment of confounding factors</i>	<i>Replication</i>	<i>Data on individual travel paths</i>
Arnold et al. 1991. Distribution and abundance of kangaroo in remnants of native vegetation in the central wheatbelt of Western Australia and the role of native vegetation along road verges and fencelines as linkages	patch occupancy and abundance	corridors not important	corridors, patch size, and proximity to next patch all highly correlated	yes	no
Date et al. 1991. Frugivorous pigeons, stepping stones, and weeds in northern New South Wales	patch occupancy and abundance	corridors not important for 5 spp of pigeons	elevation, corridors, patch size, and proximity to next patch all highly correlated	yes	no
Dmowski & Kozakiewicz 1990. Influence of a shrub corridor on movements of passerine birds to a lake littoral zone	numbers of forest birds visiting littoral zone near or away from a corridor ^b	increased number of birds in vicinity of corridor and in patch with a corridor	factors not discussed; only one corridor in the study	no	no
Dunning et al. 1995. Patch isolation, corridor effects, and colonization by a resident sparrow in a managed pine woodland	colonization rate	increased short-term colonization rates in landscape with corridors	sites well matched for landscape configuration and proximity to source patch; potential confounding factors discussed at length	no	no
Haas 1995. Dispersal and use of corridors by birds in wooded patches on an agricultural landscape	immigration rate (occupancy rates not reported)	immigration 15 times greater into patches connected by corridors (two wooded creeks); immigrants did nest in recipient patch	connected and unconnected pairs were separated by similar distances; no discussion of patch size, but map suggests that size and corridors are uncorrelated	yes	no
MacClintock et al. 1977. Evidence for the value of corridors and minimization of isolation in preservation of biotic diversity ^c	occupancy and species diversity	single 35-acre parcel connected by a short corridor was similar to "mainland"	no isolated fragment was studied	no	no
Saunders & de Rebeira 1991. Values of corridors to avian populations in a fragmented landscape	"immigration" rate (actually numbers of movements among patches by banded birds)	more "migration" between patches connected by corridors than between isolated patches	corridors, patch size, and proximity to next patch all highly correlated	yes	no

^aAbbreviated title; see literature cited for complete citation.

^bAlthough not a demographic parameter, the inferred "visitation rate" might be correlated with dispersal or immigration rates, so this study (which did not assess animal travel in the single corridor) is included here.

^cAlthough this study did not compare the single connected fragment to any corridorless fragment, it is widely cited as supporting the value of corridors as conduits.

Because of how corridors and other factors are correlated in most fragmented landscapes, confounding is a less serious problem for studies that find corridors unimportant. Of the five studies claiming to show demographic benefits of corridors, only two (Dunning et al. 1995; Haas 1995) attempted to match the landscapes or patches with and without corridors with respect to po-

tentially confounding factors and then discussed such confounding at some length. Although observational studies can never completely exorcise themselves of confounding, the careful treatment of these issues in these two papers greatly increased the credibility of the results.

Demographic parameters such as patch occupancy, abundance, and reproductive success influence the via-

bility of populations in patches. Many observational studies, however, measured parameters less closely associated with the ability of the habitat patch to support animals. For instance, Haas (1995) reported that American Robins (*Turdus migratorius*) making a second nest attempt within a breeding season more often moved between patches connected by corridors than between unconnected sites. These data, however, do not suggest that the isolated patches had fewer robin nests or fewer second nest attempts than patches connected by corridors. Occupancy rates or nest density would have been a more direct measure of robin viability in the patches and probably could have been obtained with little or no extra field effort. In general, studies using short-term immigration rate must be interpreted with caution because, even if corridors help animals find suitable patches more rapidly, patches with and without corridors (if otherwise similar in size, vegetation, etc.) may have similar occupancy rates over the long term. An exception occurs in the case of species specializing in ephemeral habitat patches, such as the clearcuts used by the Bachman's Sparrows (*Aimophila aestivalis*) studied by Dunning et al. (1995). Because the clearcuts are suitable for only 4–7 years after creation, the colonization rate during the first 2 years after clearcutting was plausibly linked to viability in this case.

Although some bird species are reluctant to cross forest gaps (Bierregaard et al. 1992; Lens & Dhondt 1994; Desrochers & Hannon 1997), patch occupancy for birds is probably rarely influenced by the presence or lack of corridors a few hundred meters long. Bellamy et al. (1996) concluded similarly that, for birds, small gaps (mean 2.4 km, range 0.1–10 km) in forested landscapes did not “seriously hinder dispersal and recolonization opportunities,” and Schmiegelow et al. (1997) found that 200-m wide clearcut barriers had less impact than expected on patch occupancy by forest birds. (This latter interpretation is ours; Schmiegelow et al. felt that 200-m barriers could isolate birds and attributed the small impact to counteracting factors.)

About half of these studies were unreplicated, consisting of one landscape with corridors and one without corridors. This fact was reported by the authors, allowing readers to make their own inferences. Although replication is desirable, it cannot ameliorate the more serious problem of confounding inherent in observational studies. As long as authors carefully address potentially confounding factors, observational studies can be valuable without replication.

Experiments Measuring Demographic Parameters in Different Landscapes

We found only four experimental studies that measured demographic parameters. Three studies (Mansergh & Scotts 1989; Machtans et al. 1996; Schmiegelow et al.

1997) destroyed or created corridors in real landscapes and collected pre- and post-manipulation data on both manipulated and unmanipulated areas. A third experiment (La Polla & Barrett 1993) measured animal abundance in highly artificial 20 × 20-m patches with and without corridors.

Perhaps the most defensible study was by Mansergh and Scotts (1989), who studied two subpopulations of a rare species, the mountain pygmy-possum (*Burramys parvus*). One subpopulation inhabited an intact landscape, whereas the formerly contiguous habitat of the second subpopulation had been fragmented by a ski development and an associated road. The fragmented area exhibited skewed sex ratios and lower survival rates than the intact area. After construction of a corridor, the population structure and survival rates in the ski resort changed to those observed in the undisturbed area. The study was not replicated, consisting of a single treated and a single control landscape. Nonetheless, Stewart-Oaten et al. (1986) demonstrate that if data are collected on both treatment and control areas before and after manipulation—as was the case here—investigators can make strong inferences regarding the effects of a particular unreplicated perturbation. Thus, although Mansergh and Scotts (1989) cannot make inferences about the utility of corridors in general, their study amply demonstrates the benefits of this particular corridor. We strongly encourage future studies to take the same vein as Mansergh and Scotts (1989) because, as such well-designed—albeit unreplicated—studies accumulate, each documenting local corridor effects, a more general pattern will gradually emerge.

The study of Machtans et al. (1996) similarly collected pretreatment and post-treatment data on both control and treatment areas, but it illustrates an important design limitation. It began with two intact landscapes, and the treatment consisted of creating a corridor out of formerly intact habitat and comparing bird movement rates across a control (intact) landscape to the landscape with a corridor. Because the study did not include a landscape without corridors, it is impossible to infer how readily birds would move through matrix habitat in the absence of a corridor (although the observations of Machtans et al. indicate that when a corridor was available, practically no forest birds were seen crossing the clearcut). Future experiments should contrast landscapes containing corridors with fragmented rather than intact landscapes. This can be achieved by either creating or destroying a corridor between two otherwise distinct patches.

In another experiment on bird response to forest fragmentation, Schmiegelow et al. (1997) reported two small but statistically significant benefits of 100-m wide riparian corridors: species turnover rate was higher in totally isolated fragments than in connected patches or in control areas, and diversity depended on fragment size only for the totally isolated fragments. This study

was the most rigorous of the four in that pretreatment observations helped control for confounding (all fragments with corridors—but no isolated fragments—were adjacent to riparian areas) and because power analyses were used in the design phase to ensure adequate replication for statistical inference. Schmiegelow et al. (1997) noted, however, that the apparent benefits of corridors may have been an artifact of results from their smallest (1-ha) fragments because the effective size of each 1-ha fragment with corridors was doubled by the adjacent corridor habitat. Furthermore, the study was limited to short-term responses by the temporary nature of fragmentation (>1.5 m height growth in the first 2 years; Schmiegelow et al. 1997). This experimental design would be improved and made more relevant to conservation issues by altering it so that the area of habitat in the corridor has minimal influence on the dependent variable measured in the smallest habitat patch, by making longer-term observations (necessarily involving more permanent fragmentation, such as by urban or agricultural activities), and by use of nonvolant focal species.

The more artificial experiment of La Polla and Barrett (1993) did not address the utility of corridors as a conservation tool. Through seeding they created uniform but artificial 20×20 -m habitat patches that were connected or unconnected by 10-m-long corridors. They found higher numbers of voles in patches connected by corridors and attributed this difference in abundance to corridors. Nevertheless, rates of movement through their putative barriers (among “isolated” treatments and even among replicate sites) were comparable to those via corridors. In any event, the species (vole), corridor length (10 m), patch size (20×20 m), and matrix habitat (strips maintained in a mowed and tilled condition) suggest little relevance to real conservation problems and decisions. We see little prospect for elucidating the conservation value of corridors from experiments in settings so dissimilar to landscapes of conservation interest.

Observational Studies Measuring Movement of Individual Animals in Real Landscapes

If proponents and skeptics of corridors can agree on the value of connectivity in at least some situations, then it is not necessary to demonstrate the demographic effects of corridors. Instead, the issue is simply to document that animals will use corridors in a way that provides connectivity and that connectivity would be insufficient without the corridor. We found several studies (e.g., Catterall et al. 1991; Pevett 1991; Desrochers & Hannon 1997) that describe animal movements with respect to habitat edges, roads, suburbs, and domestic dogs, and other studies (Garrett & Franklin 1988) that anecdotally describe animal use of linear habitats. Some of these authors attempted to infer from these observations how animals might move through matrix or corridor lands.

Although these studies can provide valuable understanding of the mechanisms underlying the use and avoidance of corridors and matrix, we excluded such studies as being too indirect to our question. We similarly excluded studies (e.g., Forsys & Humphrey 1996) that document dispersal movements between habitat patches in fragmented landscapes but do not relate such movements to habitat corridors.

We considered in detail 17 observational studies (Table 2) that documented the presence or movements of nondisplaced animals (except for Reufenacht & Knight 1995) in landscapes that included corridors. Four of the 17 studies (Table 2, numbers 2, 4, 10, and 11) simply documented animal presence in corridors or the presence of individual animals in both habitat patches and corridors, without addressing the issue of whether animals made passages via the corridor from one habitat patch to another. Another six studies (Table 2, numbers 3, 5, 6, 9, 16, and 17) documented both presence and residence (i.e., probable breeding individuals) in the corridor. Of these, Vermeulen (1994) also documented movement rates, and Downes et al. (1997a) also compared corridor residents to forest-patch residents with respect to sex ratio, body mass, and reproductive potential. The occurrence of a resident population in a corridor—especially if residence occurs throughout its entire length—suggests that such corridors also would facilitate passage between patches. Maintaining resident populations of animals in wide corridors might be especially important when the distance between core populations is long, as is the case with grizzly bears (*Ursus arctos horribilis*) in much of the Rocky Mountains (Noss et al. 1996). Although territorial interactions between corridor residents and potential dispersers could inhibit dispersal by an individual from an adjacent patch, the corridor would still provide demographic benefits to the patches if there were modest immigration to and emigration from the corridor.

Reufenacht and Knight (1995) used a novel measure of corridor use—the number of midpoint crossings by displaced mice released in the corridor. They did not, however, report lengths of the corridors (aspen stringers), whether the stringers connected to any larger patches, where mice were released relative to the midpoints, or mouse travel distances. Hence, valid inferences from this study are limited.

Only 6 of the 17 studies (Table 2, numbers 1, 7, 8, 13, 14, and 15) provided strong evidence for passages by individual animals via corridors. Although all 6 suggested that such passages occur often enough to benefit the populations that interact via the corridor, only Suckling (1984) and Beier (1995) specifically reported on corridor passages by dispersing juveniles; both of these also reported the number of corridor transitions and the fraction of dispersers using corridors. Beier (1993, 1995) explicitly related this to the number of corridor passages

Table 2. Observations of animal movements with respect to potential corridors in landscapes not under control of the investigator.

<i>Study^a</i>	<i>Type of corridor use documented; measure of use</i>	<i>Documentation for (lack of) movement through matrix</i>
1. Beier 1995. Dispersal of juvenile cougars in fragmented habitat	juvenile dispersal; fraction of dispersers making passages ^b and number of passages per corridor	radio-tagged animals never crossed urban matrix
2. Bennett et al. 1994. Corridor use and the elements of corridor quality: chipmunks and fencerows in a farmland mosaic	presence; number of captures in fencerows	not addressed
3. Bennett 1990. Habitat corridors and the conservation of small mammals in a fragmented forest environment	presence, residence, and movements between patch and corridor; number of marked animals caught in both patch and corridor	not addressed, but deemed improbable
4. Bentley & Catterall 1997. Use of brushland corridors and linear remnants by birds in southeastern Queensland Australia	presence; number of birds detected in corridor and in intact habitat	not addressed
5. Downes et al. 1997a. Use of corridors by mammals in fragmented Australian eucalypt forests	presence and residence; relative abundance, sex ratio, and body mass in corridor, patches, and matrix	nine native species did not use matrix (pasture), based on same sampling procedure used for corridor and patch
6. Henderson et al. 1985. Patchy environments and species survival: chipmunks in an agricultural mosaic	presence and residence; number of marked animals caught in both patch and corridor	not addressed; some animals moved via matrix
7. Heuer 1995. Wildlife corridors around developed areas in Banff National Park (wolf, lynx, and cougar; winter only)	passages ^b via corridor to other patches; number of passages per corridor (winter only)	deep snows and cliffs probably preclude movement outside of corridors
8. Johnsingh et al. 1990. Conservation status of the Chila-Motichur corridor for elephant movement in India	passage ^b via corridor to other patches; not quantified (implied that passage was frequent)	not addressed
9. Lindenmayer et al. 1993. Presence and abundance of arboreal marsupials in wildlife corridors within logged forest ^c	presence and residence; abundance of animals in linear habitats	not addressed
10. Lindenmayer et al. 1994. Patterns of use and microhabitat requirements of mountain brushtail possum in wildlife corridors	presence; number of detections in corridor	not addressed
11. Mock et al. 1992. Baldwin Otay Ranch wildlife corridor studies (deer, bobcat, and cougar)	presence; number of detections in corridor	not addressed; urban matrix likely impenetrable to bobcat and cougar
12. Ruefenacht & Knight 1995. Influences of corridor continuity and width on survival and movement of deermice	travel across midpoint of corridor (aspen stringers in sagebrush matrix) by displaced mouse; number of midpoint crossings	not addressed
13. Suckling 1984. Population ecology of the sugar glider in a system of habitat fragments	juvenile dispersal; fraction of dispersers using corridor for at least part of dispersal	at least 5 of 15 dispersals involved extra-corridor movement
14. Sutcliffe & Thomas 1996. Open corridors appear to facilitate dispersal by ringlet butterflies between woodland clearings	passage ^b via corridor to other patches; number of marked insects caught in both patch and corridor	indirect evidence suggests that less than 2% of movement occurs outside corridors
15. Tewes 1994. Habitat connectivity: importance to ocelot management and conservation	passage ^b via corridor to other patches; not quantified (implied that passage was frequent)	not addressed
16. Vermeulen 1994. Corridor function of a road verge for dispersal of stenotopic heathland ground beetles (nonvolant)	residence and movement; numbers of recaptures at various distances	apparently no movement via matrix, using same procedures as in corridor
17. Wegner & Merriam 1979. Movements by birds and small mammals between a wood and adjoining farmland habitats	presence and residence; number of marked animals caught in both patch and corridor	not addressed; some animals necessarily moved via matrix

^aAbbreviated title; see literature cited for complete citation; focal species listed if not in the title.

^bA passage is when an animal enters a corridor from a habitat patch and travels to a habitat patch at other end of the corridor.

^cThis study focused on the value of linear strips as habitat, not as conduits for movement, but it has been cited as supporting the value of corridors as conduits.

needed to enhance population viability. The greatest deficiency in such studies is that few attempted to document movements between patches via matrix land. In several studies (e.g., Wegner & Merriam 1979; Suckling

1984; Henderson et al. 1985), such extra-corridor movements clearly occurred, but the potential for such movements to connect habitat patches was not discussed or explicitly compared to corridor movements. Although

several studies argued that extra-corridor movements were unlikely due to habitat unsuitability, only Beier (1995) documented this. Based on 181 overnight tracking sessions, Beier showed that the urban matrix land in his study was impermeable to the interpatch movements of cougars (*Puma concolor*).

Seven studies (Table 2, numbers 2, 4, 8, 9, 10, 12, and 15) did not attempt to document or even discuss the possibility of movements through a supposedly "hostile matrix." Other studies explicitly acknowledged the possibility of such movements but did not discuss the implications for population viability. For instance, Sutcliffe and Thomas (1996) showed that marked butterflies moved more often among habitat patches connected by corridors than among unconnected patches, and they presented indirect evidence that about 98% of movements are via these corridors. Nonetheless, might the 2% of butterfly movements through hostile habitat be sufficient to ensure the survival of isolated populations? And, if there were no corridors, might not some of the 98% find extra-corridor routes? Finally, several of the studies documented the movements of eastern chipmunks (*Tamias striatus*; Wegner & Merriam 1979; Henderson et al. 1985; Bennett et al. 1994) or other species that are unlikely to be the focus for corridor design—or even reasonable surrogates for species that are the focus—because they are relatively adaptable to anthropogenic habitats and tolerant of fragmentation.

Despite the shortcomings of many of these observational studies, the preponderance of evidence is that corridors almost certainly facilitate travel by many species. In the future this line of investigation can provide strong evidence for the utility of corridors. These studies should be improved in two ways. First, strong effort should be put into documenting actual travel paths, with equal emphasis on documenting both intra- and extra-corridor movement between patches. If extra-corridor movements do occur, their frequency relative to passages via corridors should be described quantitatively, and the implications for population viability should be discussed explicitly. Second, study species should be those most relevant to the design and implementation of corridors on real landscapes. Generally speaking, these are species that are area-dependent or fragmentation-sensitive, because they either have limited mobility or suffer high mortality moving between patches of suitable habitat.

Although lack of randomization—with its attendant potential for confounding—was a major drawback for observational studies of demographic parameters, this is not a serious issue in observational studies of animal movements because the experimental units are either individual animals or individual corridors. It is difficult to imagine that the selection of a travel path through a corridor or matrix would be correlated with an extraneous and potentially confounding factor.

Experiments on Movements of Individual Animals

We found four studies in which movements of individual animals were measured in landscapes under experimental control (Table 3). For several reasons, the results of these experiments have little or no relevance to the conservation value of corridors. First, the voles, fruit flies, mice, and salamanders in these experiments are neither the sort of species for which corridors are designed nor are they appropriate surrogates for such species. Second, all four studies used displaced animals as "simulated dispersers," usually by releasing them either directly into a corridor or into minuscule "patches" (3 × 3-m patch in Rosenberg 1994; a half-pint bottle in Forney & Gilpin 1989). These displaced animals and the environments in which they are released are at best poor indicators of how real dispersers would behave. The artificial corridors available to the animals have scant resemblance to the real landscapes across which animals must disperse. Finally, the lengths of corridors studied were 1 mm (Forney & Gilpin 1989), 40 m (Rosenberg 1994), and 300 m (Andreassen et al. 1996), and unstated (but clearly several hundred meters; Merriam & Lenoue 1990). Only Andreassen et al. (1996) explicitly compared the corridor length to the home-range diameter of the focal species (30 m), thus making the case that this distance may be relevant to dispersal movements.

We are skeptical of the arguments for "experimental model systems" (Ims et al. 1993; Wolff et al. 1997), especially when the results of studies are likely to be interpreted as lessons for conservation and land-use planning. In particular, experiments in highly controlled landscapes do not yield meaningful inferences about the conservation value of corridors in real landscapes. Nevertheless, elements of these experiments could be included in observational studies. For instance, Andreassen et al. (1996) found that movement was not inhibited by simulated competitors (caged voles) and predators (fox scats) in the corridors. Such treatments could be applied in real landscapes as well, either with true replication or in a before-after-control-impact-pair design (Stewart-Oaten et al. 1986), to yield valuable suggestions about the utility of corridors.

Studies Relevant to Negative Impacts of Corridors

Several authors have speculated on the negative impacts and other disadvantages of corridors (Noss 1987; Simberloff & Cox 1987; Simberloff et al. 1992; Hess 1994). We found only three studies with relevant results. Downes et al. (1997b) conducted the only study explicitly designed to examine this issue: they found that exotic black rats (*Rattus rattus*) were abundant in corridors and that their abundance might affect the utility of the corridor for the native bush rat (*Rattus fuscipes*). The authors noted that black rats were matrix residents and

Table 3. Observations of animal movements with respect to potential corridors in landscapes under the experimental control of the investigator.

<i>Study^a</i>	<i>Type of corridor use documented; measure of use</i>	<i>Documentation for (lack of) movement through matrix</i>
Andreassen et al. 1996. Optimal width of movement corridors for root voles	optimal width travel through 300-m-long artificial corridor by displaced voles; maximum distance, speed, and number of complete corridor transits	not addressed
Forney & Gilpin 1989. Spatial structure and population extinction: a study with <i>Drosophila</i>	transits via pinholes allowing movement between half-pint plastic bottles ("patches"); not quantified (flies not individually marked)	not addressed (no matrix available) ^b
Merriam & Lenoue 1990. Corridor use by small mammals: field measurements for three types of <i>Peromyscus leucopus</i>	presence in fencerow corridors by displaced radio-tagged mice released in farm fencerows; percentage of time traveling for 48 h, and total distance traveled in 48 h	not addressed; no corridorless landscape studied
Rosenberg 1994. Efficacy of biological corridors (for immigration movements by salamander)	travel through 40-m-long artificial corridor by displaced salamanders (released into 3 × 3-m patch); number of complete corridor transits	as many passages via matrix as via corridor

^aAbbreviated title; see literature cited for complete citation.

^bThus, this study demonstrated only that connectivity—not necessarily via corridors—enhances population persistence.

did not use the corridors for inter-patch movement and that the bush rat would have essentially no prospect for inter-patch dispersal in the absence of corridors. Stoner (1996) found that mantled howling monkeys (*Alouatta palliata*) confined to linear habitats did have higher parasite loads than monkeys in large habitat blocks. The "corridor" site, however, was an area where the linear habitat was the only suitable habitat available, and Stoner wisely avoided making any inferences about the risks of movement corridors. Seabrook and Dettmann (1996) documented that exotic and poisonous cane toads (*Bufo marinus*) were more dense on "corridors" (roads and vehicle tracks) and probably used them to disperse. The corridors in this study (dirt roads) are certainly not the sort of wildlife movement routes that conservationists are trying to create. It has been widely observed that many pest species, including exotics and pathogens, disperse along disturbed habitats such as roads and roadsides (Noss & Cooperrider 1994). Furthermore, as was the case for most studies in Table 2, Seabrook and Dettmann (1996) provided no evidence of how fast the toad might spread through the matrix lands. In this regard, Bennett (1990) found that the exotic rodents in his study area were least influenced by lack of connectivity, being more abundant than the six native species in the smallest and most isolated patches. Hence, empirical evidence of negative impacts from corridors designed or preserved for conservation purposes has not yet emerged.

Conclusions

Generalizations about the biological value of corridors will remain elusive because of the species-specific nature of the problem. Indeed, there is no general answer to the question "Do corridors provide connectivity?"

The question only makes sense in terms of a particular focal species and landscape. Nonetheless, we conclude that evidence from well-designed studies generally supports the utility of corridors as a conservation tool. Almost all studies on corridors suggest that they provide benefits to or are used by animals in real landscapes. Because most studies suffer from design limitations, only about 12 studies allow meaningful inferences of conservation value, 10 of which offer persuasive evidence that corridors provide sufficient connectivity to improve the viability of populations in habitats connected by corridors. No study has yet demonstrated negative impacts from conservation corridors. We are encouraged that the number and rigor of studies on these issues are increasing.

In comparing the approaches considered in this paper—experimental or observational analyses of target populations or individual animals—we suggest that progress will most rapidly proceed with one or both of two approaches. First, experiments using demographic parameters as dependent variables—even if unreplicated—can demonstrate the demographic effects of particular corridors in particular landscapes. Such studies should measure demographic traits before and after treatment in both the treated area (where a corridor was created or destroyed) and an untreated area (where habitat patches apparently are isolated from each other). Second, observations of movements by naturally dispersing animals in already fragmented landscapes can demonstrate the conservation value of corridors if efforts are made to document actual travel routes in both corridors and matrix land. Because corridor presence tends to be correlated and confounded with other variables, such as patch size and presence of riparian habitat, observations of demographic conditions in various landscapes is problematic, but careful selection of sites can reduce this risk.

We were surprised that most studies using birds as a focal species involved corridors and barriers that were small relative to their movement ability. We suspect that birds were selected at least in part because they are relatively easy to census, and we recognize that landscape scale is often beyond the control of the investigator. We urge greater attention to species with limited mobility and low population density, and, whenever possible, we urge observation on landscape scales relevant both to the focal species and to real conservation decisions.

The two approaches we advocate also can be used to evaluate proposed alternatives to corridors, such as "stepping stones" or managing "the entire landscape... as a matrix supporting the entire biotic community" (Simberloff et al. 1992). Controlled and replicated experiments on animal movement in artificial corridors have scant utility because they have little relevance to the kinds of landscapes and species for which decisions on conservation corridors will be made. Extrapolation across dissimilar species and spatial scales is generally unfounded. On the other hand, greatly lacking in the literature are studies of the community- or ecosystem-level effects of corridors. For example, rigorous studies of the effects of corridors on disturbance risk and spread, exotic species invasions, predation rates, and species richness or composition are absent.

Corridor skeptics have objected to the financial cost of corridors (Simberloff & Cox 1987; Simberloff et al. 1992). Because conservation funds are limited, each project should be considered carefully in terms of costs and benefits, including the alternative uses for the dollars that might be spent on corridors. There are certainly cases in which conservation dollars would be better spent acquiring high-quality but isolated patches of habitat for imperiled species, rather than acquiring corridors of dubious value. Many conservation projects are expensive, however, so this criticism has no unique relevance to corridor projects, which can be far cheaper than some alternatives. Furthermore, the more costly corridors are expensive precisely because they occur near large and growing human populations; the additional cost should be considered in light of proximity of the benefits—semblances of intact ecosystems, recreation—to those who ultimately pay for them.

Skeptics have correctly pointed out that the scientific evidence in support of corridors as a conservation tool has been weak. Developers and other opponents of conservation, however, frequently misrepresent this healthy spirit of inquiry and scientific self-criticism as a "disagreement among the experts." Thus, they are able to persuade planning agencies that habitat loss and fragmentation should proceed unhindered and that conservationists must bear the burden of proof for preserving each remaining corridor. Our review has shown that evidence from well-designed studies supports the utility of corridors as a conservation tool. All else being equal, and

in the absence of complete information, it is safe to assume that a connected landscape is preferable to a fragmented landscape. Natural landscapes are generally more connected than landscapes altered by humans, and corridors are essentially a strategy to retain or enhance some of this natural connectivity (Noss 1987). Therefore, those who would destroy the last remnants of natural connectivity should bear the burden of proving that corridor destruction will not harm target populations.

Acknowledgments

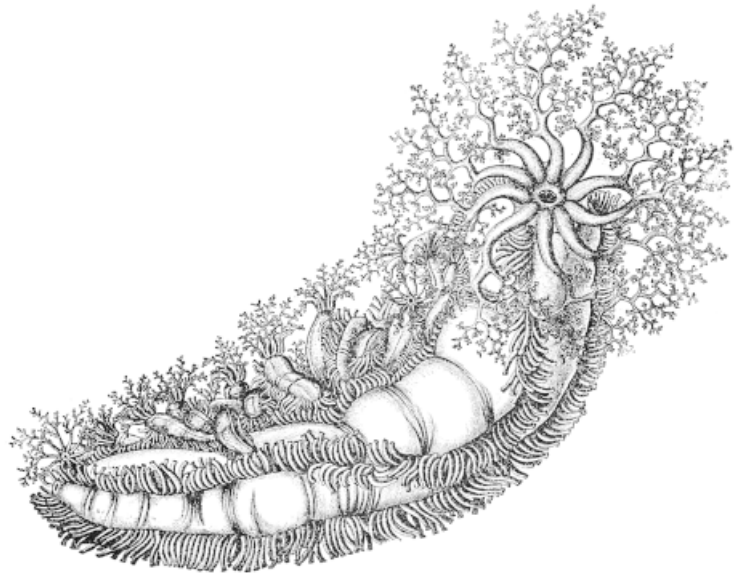
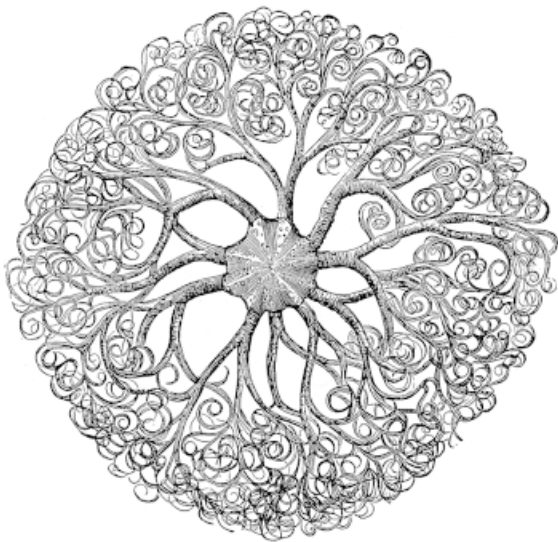
We thank the investigators who led each of the studies we reviewed; we sincerely tried to treat each of you with respect and fairness. We recognize that some of the studies were not designed to test our hypotheses, and, despite our criticisms, we found useful information in each paper. C. S. Machtans reviewed an earlier draft of the manuscript.

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October 14, 2010

Mr. Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, G01 Quad 3A
Rosemead, California 91770

VIA EMAIL
Andrew.Keller@sce.com

Subject: Results of Special Status Plant Surveys for the Lakeview Substation and Transmission Line Project, Riverside County, California

Dear Mr. Keller:

This Letter Report presents the findings of focused special status plant surveys conducted for the Lakeview Substation and Transmission Line Project (hereafter referred to as the "Project site"), located in Riverside County, California (Exhibit 1). The Project site is located on the U.S. Geological Survey's (USGS') Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Project site is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route runs from the Moval Substation (on Moreno Beach Drive in the City of Moreno Valley) to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Hills to the Ramona Expressway. The Project includes a Proposed Substation Site and an Alternative Substation Site, a Proposed Subtransmission Source Line Route (Segments 1 and 2), a Proposed Telecommunications Route (New Cable to Moval and Proposed Overhead Routes 1 and 2), and an Alternative Subtransmission Source Line Route (Segment 3). A 50-foot buffer is also included on either side of all the Subtransmission Source Line Routes and the Proposed Telecommunications Routes (Exhibit 2).

METHODS

Botanical surveys were floristic in nature and consistent with the protocols created by the California Department of Fish and Game (CDFG) (CDFG 2009). Reference populations were monitored for annual and difficult-to-detect target species to ensure that the surveys were comprehensive. Known reference populations for all special status species with potential to occur on the Project site were visited prior to survey visits to determine appropriate timing of surveys. Table 1 lists these reference population visits. Selected photographs of the reference populations are shown in Attachment A.



TABLE 1
REFERENCE POPULATION VISITS FOR SPECIAL STATUS PLANT SPECIES

Species	Flowering Visits
<i>Abronia villosa</i> var. <i>aurita</i> Chaparral sand verbenas	May 7, 2009 May 4, 2010
<i>Atriplex coronata</i> var. <i>notatior</i> San Jacinto Valley crownscale	May 18, 2009 May 4, 2010
<i>Atriplex serenana</i> var. <i>dauidsonii</i> Davidson's saltscale	May 18, 2009 May 4, 2010
<i>Brodiaea filifolia</i> Thread-leaved brodiaea	May 18, 2009 May 14, 2010
<i>Centromadia pungens</i> ssp. <i>laevis</i> Smooth tarplant	May 18 and June 2, 2009 May 4, 2010
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i> Coulter's goldfields	April 7, 2009 April 1, 2010
<i>Navarretia fossalis</i> Moran's navarretia	May 7, 2009 May 5, 2010
<i>Sidalcea neomexicana</i> Salt Spring checkerbloom	May 12, 2009
<i>Chorizanthe parryi</i> var. <i>parryi</i> Parry's spineflower	May 5, 2009 April 27, 2010
<i>Chorizanthe polygonoides</i> var. <i>longispina</i> Long-spined spineflower	May 14, 2010

Although reference populations and regional rainfall amounts were monitored to ensure the scientific adequacy of these focused surveys, there is always a minimal potential for false negative survey results as species could possibly be present on a site but may not be detectable at the time of the surveys.

Prior to the field surveys, a literature review was conducted to identify special status plants known from the Project site vicinity. This included a review of the USGS Perris, Lakeview, Romoland, Winchester, Sunnymead and El Casco 7.5-minute quadrangles in the CDFG's California Natural Diversity Database (CDFG 2010) and the California Native Plant Society's (CNPS's) Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2010).

Special status plant surveys were conducted on April 7, May 18, and June 2 and 3, 2009, and on April 1 and 28, May 5 and 6, and June 10, 2010. These surveys were conducted by different teams of biologists, which included BonTerra Consulting Senior Botanists Sandra Leatherman and Jeff Crain; Senior Biologist Amber Oneal; Biologists Allison Rudalevige and Jennifer Pareti; and Consulting Botanist David Bramlet. The dates each Biologist was present and the area surveyed are included in Table 2. The total number of person-hours spent was 172 hours. Meandering transects were used to search the Project site. All plant species observed were recorded in field notes. Plant species were identified in the field or collected for later identification. Plants were identified to the taxonomic level necessary to determine whether or not they are a special status species. Plants were identified using taxonomic keys, descriptions, and illustrations in Hickman (1993), Munz (1974), Abrams (1923, 1944, 1951), and Abrams and Ferris (1960). Taxonomy and nomenclature follows Hickman (1993), the CNPS (2010), and current scientific journals for scientific and common names.

TABLE 2
SPECIAL STATUS PLANT SURVEYORS BY DATE

Survey Date	Surveyors	Area Surveyed
April 7, 2009	Jeff Crain, Allison Rudalevige	Proposed Substation, Alternative Substation, Proposed Subtransmission Source Line Route, Segment 2, and Alternative Subtransmission Source Line Route, Segment 3
May 18, 2009	Jeff Crain, David Bramlet	Proposed Subtransmission Source Line Route, Segment 2; Alternative Subtransmission Source Line Route, Segment 3
June 2, 2009	Jeff Crain	Proposed Substation, Alternative Substation, Proposed Subtransmission Source Line Route, Segment 2, and Alternative Subtransmission Source Line Route, Segment 3
June 3, 2009	Jeff Crain	Proposed Substation, Alternative Substation, Proposed Subtransmission Source Line Route, Segment 2, and Alternative Subtransmission Source Line Route, Segment 3
April 1, 2010	Jeff Crain, Allison Rudalevige, Sandy Leatherman, Jennifer Pareti	Proposed Subtransmission Source Line Route, Segment 1, and Proposed Telecommunications Route
April 28, 2010	Jeff Crain, Sandy Leatherman, Amber Oneal	Proposed Subtransmission Source Line Route, Segment 1, and Proposed Telecommunications Route
May 5, 2010	Jeff Crain, Sandy Leatherman, Amber Oneal	Proposed Subtransmission Source Line Route, Segment 1, and Proposed Telecommunications Route
May 6, 2010	Jeff Crain, Sandy Leatherman, Amber Oneal	Proposed Subtransmission Source Line Route, Segment 1, and Proposed Telecommunications Route
June 10, 2010	Jeff Crain, Allison Rudalevige, Sandy Leatherman, Jennifer Pareti	Proposed Subtransmission Source Line Route, Segment 1, and Proposed Telecommunications Route

SITE DESCRIPTION

Vegetation types and other areas mapped on the Project site include alkali grassland, annual grassland, alkali scrub playa, disturbed alkali scrub playa, alkali wetland, disturbed mule fat scrub, Riversidean sage scrub, disturbed Riversidean sage scrub, southern willow scrub, ruderal, agriculture, ornamental, detention basin, irrigation ditch, disturbed, and developed (Exhibit 3). The prevalent soil types within the Project site include Domino fine sandy loam; Domino fine sandy loam, saline-alkali; Domino silt loam; Domino silt loam, saline-alkali; Exeter sandy loam; Exeter sandy loam, deep; Gorgonio loamy sand; Greenfield sandy loam; Hanford coarse sandy loam; Metz loamy fine sand; Metz loamy sand; Pachappa fine sandy loam; Placentia fine sandy loam; Ramona sandy loam; Riverwash; Rockland; San Emigdio fine sandy loam, San Emigdio loam; Terrace escarpments; Willows silty clay, saline-alkali; Willows silty clay, strongly saline-alkali; and Willows silty clay, deep, strongly saline-alkali (USDA NRCS 2007) (Exhibit 4).

SURVEY RESULTS

Table 3 identifies the special status plants with potential to occur within the Project site and the survey results. A list of all plants observed within the Project site during focused botanical surveys can be found in Attachment B.

TABLE 3
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROPOSED PROJECT

Species	Status			Potential to Occur on Each Site and Focused Survey Results							
	USFWS	CDFG	CNPS	Proposed Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Proposed Telecommunications Route (New Cable to Moval)	Proposed Telecommunications Overhead Route 1	Proposed Telecommunications Overhead Route 2	Alternative Substation Site	Alternative Subtransmission Source Line Route, Segment 3
Chaparral sand-verbena (<i>Abronia villosa</i> var. <i>aurita</i>)	—	—	1B.1	N	N	N	NOS	N	N	N	N
Munz's Onion (<i>Allium munzii</i>)	FE	ST	1B.1	N	N	N	NOS	N	N	N	N
San Jacinto Valley crownscale (<i>Atriplex coronata</i> var. <i>notatior</i>)	FE	—	1B.1	N	O (1,999)	NOS	NOS	O (1,999)	N	N	O (532)
South Coast saltscale (<i>Atriplex pacifica</i>)	—	—	1B.2	N	NOS	NOS	NOS	NOS	N	N	NOS
Parish's brittlescale (<i>Atriplex parishii</i>)	—	—	1B.1	N	NOS	N	NOS	NOS	N	N	NOS
Davidson's saltscale (<i>Atriplex serenana</i> var. <i>davidsonii</i>)	—	—	1B.2	N	NOS	NOS	NOS	NOS	N	N	NOS
Thread-leaved brodiaea (<i>Brodiaea filifolia</i>)	FT	SE	1B.1	N	NOS	N	NOS	NOS	N	N	NOS

TABLE 3 (Continued)
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROPOSED PROJECT

Species	Status			Potential to Occur on Each Site and Focused Survey Results							
	USFWS	CDFG	CNPS	Proposed Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Proposed Telecommunications Route (New Cable to Moval)	Proposed Telecommunications Overhead Route 1	Proposed Telecommunications Overhead Route 2	Alternative Substation Site	Alternative Subtransmission Source Line Route, Segment 3
Intermediate mariposa lily (<i>Calochortus weedii</i> var. <i>intermedius</i>)	—	—	1B.2	N	N	N	NOS	N	N	N	N
Smooth tarplant (<i>Centromadia pungens</i> ssp. <i>laevis</i>)	—	—	1B.1	N	O (239)	O (65)	NOS	O (239)	N	N	NOS
Parry's spineflower (<i>Chorizanthe parryi</i> var. <i>parryi</i>)	—	—	1B.1	N	NOS	NOS	NOS	NOS	N	N	NOS
Long-spined spineflower (<i>Chorizanthe polygonoides</i> var. <i>longispina</i>)	—	—	1B.2	N	NOS	N	NOS	NOS	N	N	N
Slender-horned spineflower (<i>Dodecahema leptoceras</i>)	FE	SE	1B.1	N	N	N	N	N	N	N	N
Vernal barley (<i>Hordeum intercedens</i>)	—	—	3.2	N	O (1,500)	O (150)	NOS	O (1,500)	N	N	O (9,200)
Coulter's goldfields (<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>)	—	—	1B.1	N	NOS	O (1)	NOS	NOS	N	N	O (6,250)

TABLE 3 (Continued)
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROPOSED PROJECT

Species	Status			Potential to Occur on Each Site and Focused Survey Results							
	USFWS	CDFG	CNPS	Proposed Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Proposed Telecommunications Route (New Cable to Moval)	Proposed Telecommunications Overhead Route 1	Proposed Telecommunications Overhead Route 2	Alternative Substation Site	Alternative Subtransmission Source Line Route, Segment 3
Robinson's pepper-grass (<i>Lepidium virginicum</i> var. <i>robinsonii</i>)	—	—	1B.2	N	N	N	NOS	N	N	N	N
Mud nama (<i>Nama stenocarpum</i>)	—	—	2.2	N	N	N	N	N	N	N	N
Moran's navarretia (<i>Navarretia fossalis</i>)	FT	—	1B.1	N	NOS	NOS	N	NOS	N	N	NOS
California Orcutt grass (<i>Orcuttia californica</i>)	FE	SE	1B.1	N	N	N	N	N	N	N	NOS
Salt Spring checkerbloom (<i>Sidalcea neomexicana</i>)	—	—	2.2	N	NOS	NOS	N	NOS	N	N	NOS
Wright's trichocoronis (<i>Trichocoronis wrightii</i> var. <i>wrightii</i>)	—	—	2.1	N	NOS	NOS	NOS	NOS	N	N	NOS
Status: FT – Federally-Threatened FE – Federally-Endangered SE – State Endangered ST – State Threatened				CNPS List Categories 1B – Plants Rare, Threatened, or Endangered in California and Elsewhere 2 – Plants Rare, Threatened, or Endangered in California But More Common Elsewhere 3 – Plants About Which We Need More Information (Review List)			x.1 - Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat) x.2 - Fairly Endangered in California (20–80% of occurrences threatened)		Potential to Occur: O – Observed (Number Observed in Parenthesis) NOS – Not Observed but Suitable Habitat Present N – No Potential to Occur; No suitable Habitat		

Three of the special status plant species in Table 3 were observed during the focused surveys including San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*), smooth tarplant (*Centromadia pungens* ssp. *laevis*), and Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*). Details of these three observed species are discussed below. Representative photographs of the populations observed on site are located in Attachment A and further occurrence information is listed in Table 4. In addition to these species, vernal barley (*Hordeum intercedens*), a CNPS List 3 species was found throughout the Project site. List 3 species are those that require further research to determine the status of the species. Impacts to List 3 species do not commonly require mitigation. Completed forms detailing the observations of special status plant species for submittal to the CNDDB are located in Attachment C.

San Jacinto Valley Crownscale

San Jacinto Valley crownscale is a Federally Endangered and CNPS List 1B.1 species. It typically blooms April through August. This annual herb occurs in playas, mesic valley and foothill grasslands, and alkaline vernal pools. Historically this species is known from Kern and Riverside Counties (CNPS 2010).

A total of 532 individuals were observed during the 2009 surveys; 46 percent were flowering, and 54 percent were fruiting. All 532 individuals were found along the Alternative Subtransmission Source Line Route, Segment 3 (Exhibit 5a). A total of 1,999 individuals were observed during the 2010 surveys; 100 percent were flowering. All 1,999 individuals were found along the Proposed Subtransmission Source Line Route, Segment 1. Generally this species was found in small depressions in alkaline, clay soils. Common associated species included Mojave silver scale (*Artiplex argentea* ssp. *mohavensis*), garden beet (*Beta vulgaris*), alkali weed (*Cressa truxillensis*), vernal barley, Mediterranean barley (*Hordeum murinum* var. *gussoneanum*), foxtail barley (*Hordeum murinum* var. *leporinum*), Coulter's goldfields, and bush seepweed (*Suaeda moquinii*).

Smooth Tarplant

Smooth tarplant is a CNPS List 1B.1 species. It typically blooms April through September. This annual herb occurs in chenopod scrub, meadows and seeps, playas, riparian woodland, and valley and foothill grasslands. Historically this species is known from Riverside, San Bernardino, and San Diego Counties (CNPS 2010).

A total of 65 individuals were observed during the 2009 surveys; 100 percent were flowering. All 65 individuals were found along the Proposed Subtransmission Source Line Route, Segment 2 (Exhibit 5b). A total of 239 individuals were observed during the 2010 surveys; 20 percent were vegetative, and 80 percent were flowering. All of the 239 individuals were observed along the Proposed Subtransmission Source Line Route, Segment 1. Generally this species was found in annual and alkali grasslands. Common associates included Mediterranean barley, five-hook bassia (*Bassia hyssopifolia*), red-stemmed filaree (*Erodium cicutarium*), and little-seed canary grass (*Phalaris minor*).

Coulter's goldfields

Coulter's goldfields is a CNPS List 1B.1 species. It typically blooms February through June. This annual herb occurs in marshes and swamps, playas, and vernal pools. Historically this species is known from Colusa, Kern, Los Angeles, Merced, Orange, Riverside, Santa Barbara, San Luis

Obispo, Tulare, San Bernardino, Ventura and San Diego Counties, as well as Santa Rosa Island and parts of Baja California (CNPS 2010).

A total of 6,251 individuals were observed during the 2009 surveys; 43 percent were flowering, and 57 percent were fruiting. Of the 6,251 individuals, 6,250 were observed along the Alternative Subtransmission Source Line Route, Segment 3, and 1 individual was observed along the Proposed Subtransmission Source Line Route, Segment 2 (Exhibit 5c). No additional individuals were observed during the 2010 surveys. Generally this species was found in small depressions in alkaline, clay soils. Common associates included Mojave silver scale, garden beet, alkali weed, vernal barley, Mediterranean barley, foxtail barley, San Jacinto crownscale, and bush seepweed.

TABLE 4
SPECIAL STATUS PLANT SPECIES POPULATIONS OBSERVED ONSITE

Species	Location Number	Number of Plants Observed
<i>Atriplex coronata</i> var. <i>notator</i>	ATRCORE01	57
	ATRCORE02	7
	ATRCORE03	11
	ATRCORE04	2
	ATRCORE05	6
	ATRCORE06	17
	ATRCORE07	28
	ATRCORE08	268
	ATRCORE09	13
	ATRCORE10	68
	ATRCORE11	53
	ATRCORE12	2
	ATCOS101	63
	ATCOS102	1936
<i>Centromadia pungens</i> ssp. <i>laevis</i>	CENPUNS01	65
	CEPUS101	4
	CEPUS102	49
	CEPUS103	8
	CEPUS104	160
	CEPUS105	17
	CEPUS106	1
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	LASCOUE01	1500
	LASCOUE02	2500
	LASCOUE03	1000
	LASCOUE04	500
	LASCOUE05	750
	LASCOUS01	1

CONCLUSION

Three special status plants were found during the focused surveys including San Jacinto Valley crownscale, smooth tarplant, and Coulter's goldfields. San Jacinto Valley crownscale is a Federally Endangered species. Any impact to this species would be significant and complete avoidance is recommended. If impacts are anticipated, consultation with the U.S. Fish and Wildlife Service (USFWS) would be required, in addition to implementation of a USFWS-approved conceptual mitigation plan.

Smooth tarplant and Coulter's goldfields are CNPS List 1B species. Based on the overall species distribution and the listing status, impacts on the observed populations are considered significant. If impacts to either species are anticipated, a conceptual mitigation plan would be required to reduce the impacts to a less than significant level.

If you have any comments or questions, please call Jeff Crain at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING



Jeff Crain
Project Botanist

Enclosures: Exhibit 1 – Regional Location
Exhibit 2 – Local Vicinity
Exhibit 3 – Vegetation Types
Exhibit 4 – Soil Types
Exhibit 5a, 5b, and 5c – Special Status Plant Species Locations
Attachment A – Selected Reference Population Photos
Attachment B – Plant Compendium
Attachment C – CNDDB Forms

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Regional Location

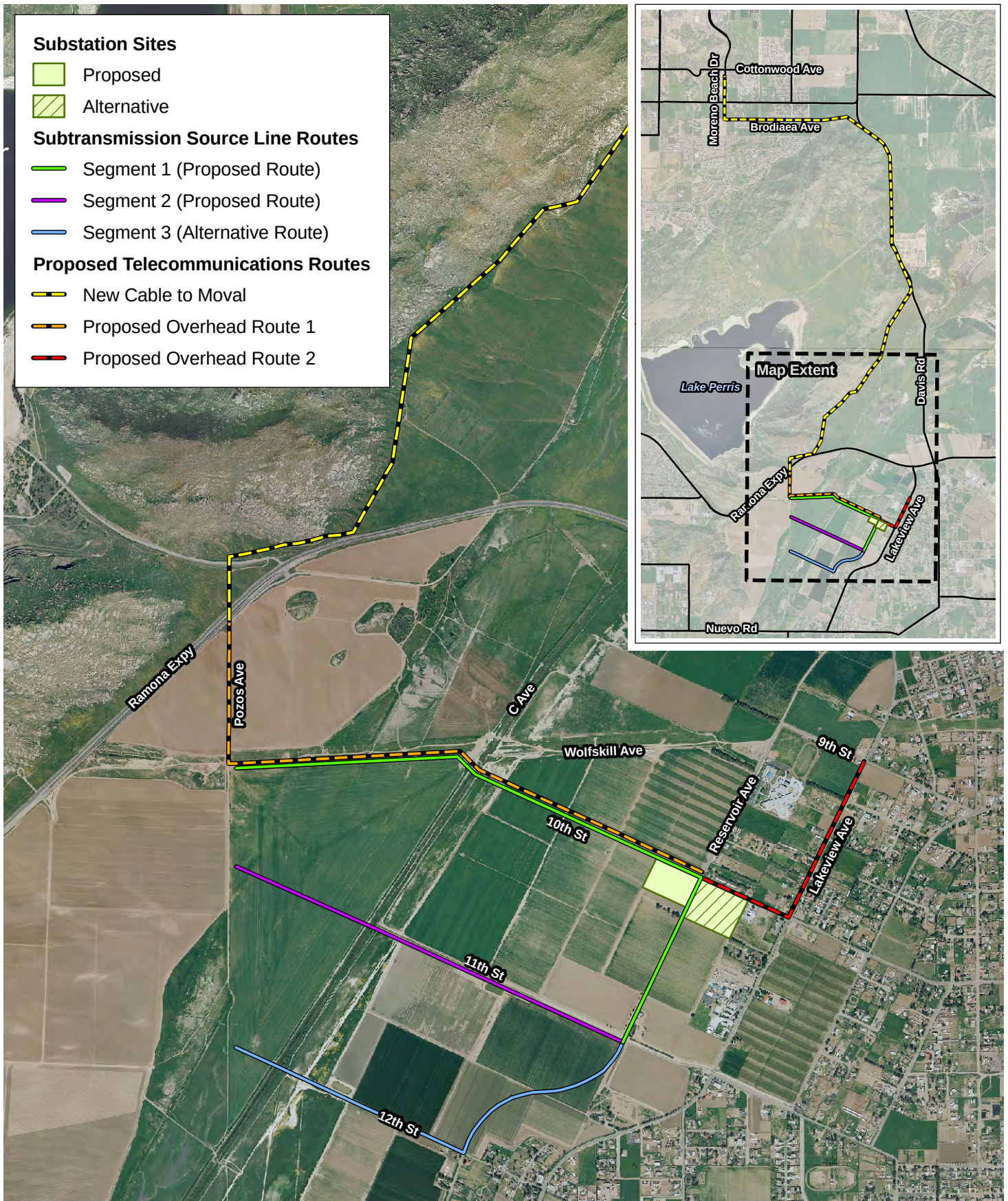
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Exhibit 1

Bonterra
CONSULTING



Local Vicinity

Lakeview Substation and Transmission Line Project

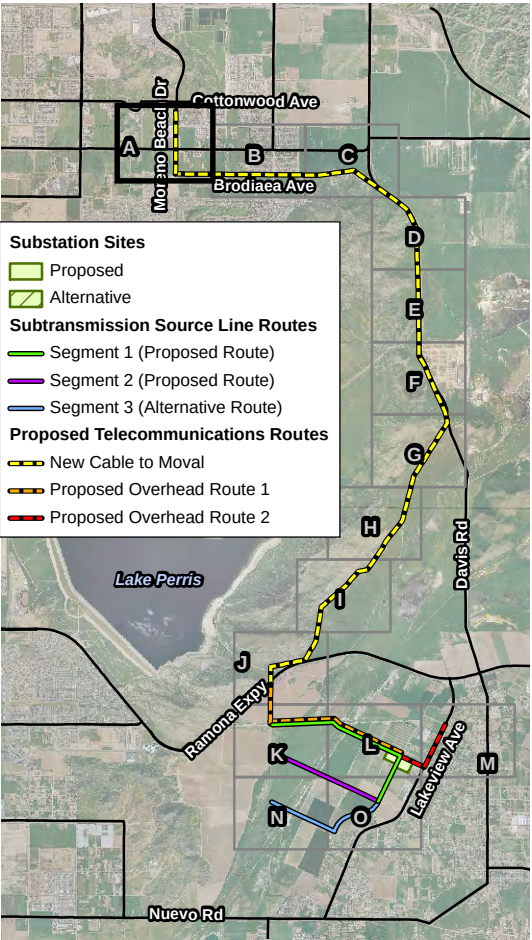


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Feet

Exhibit 2

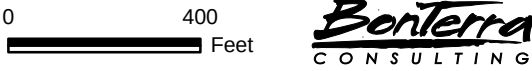
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CONSULTING

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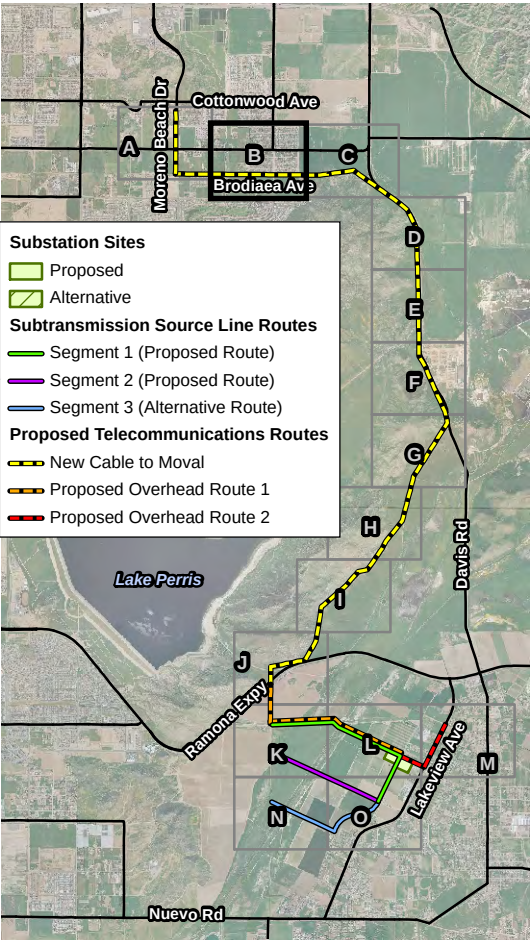


Vegetation Types Exhibit 3A

Lakeview Substation and Transmission Line Project



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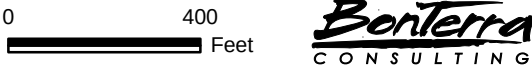


- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

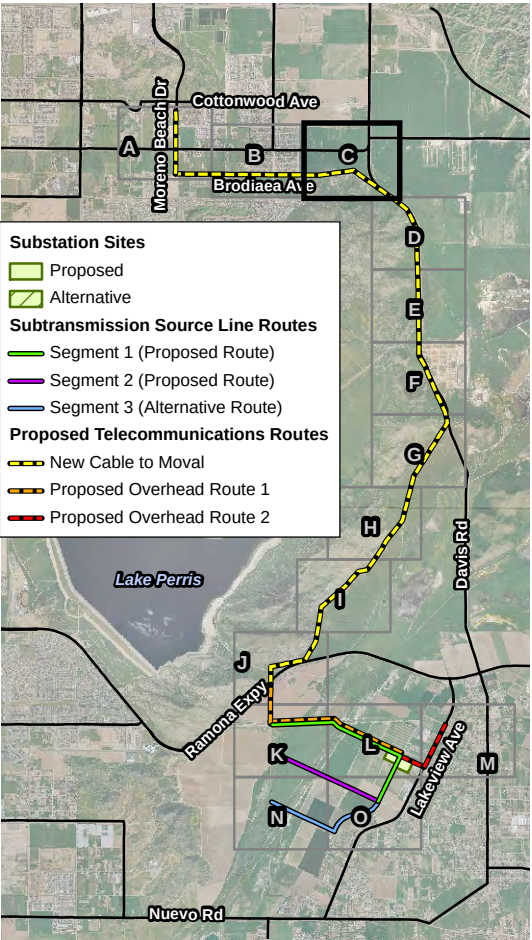
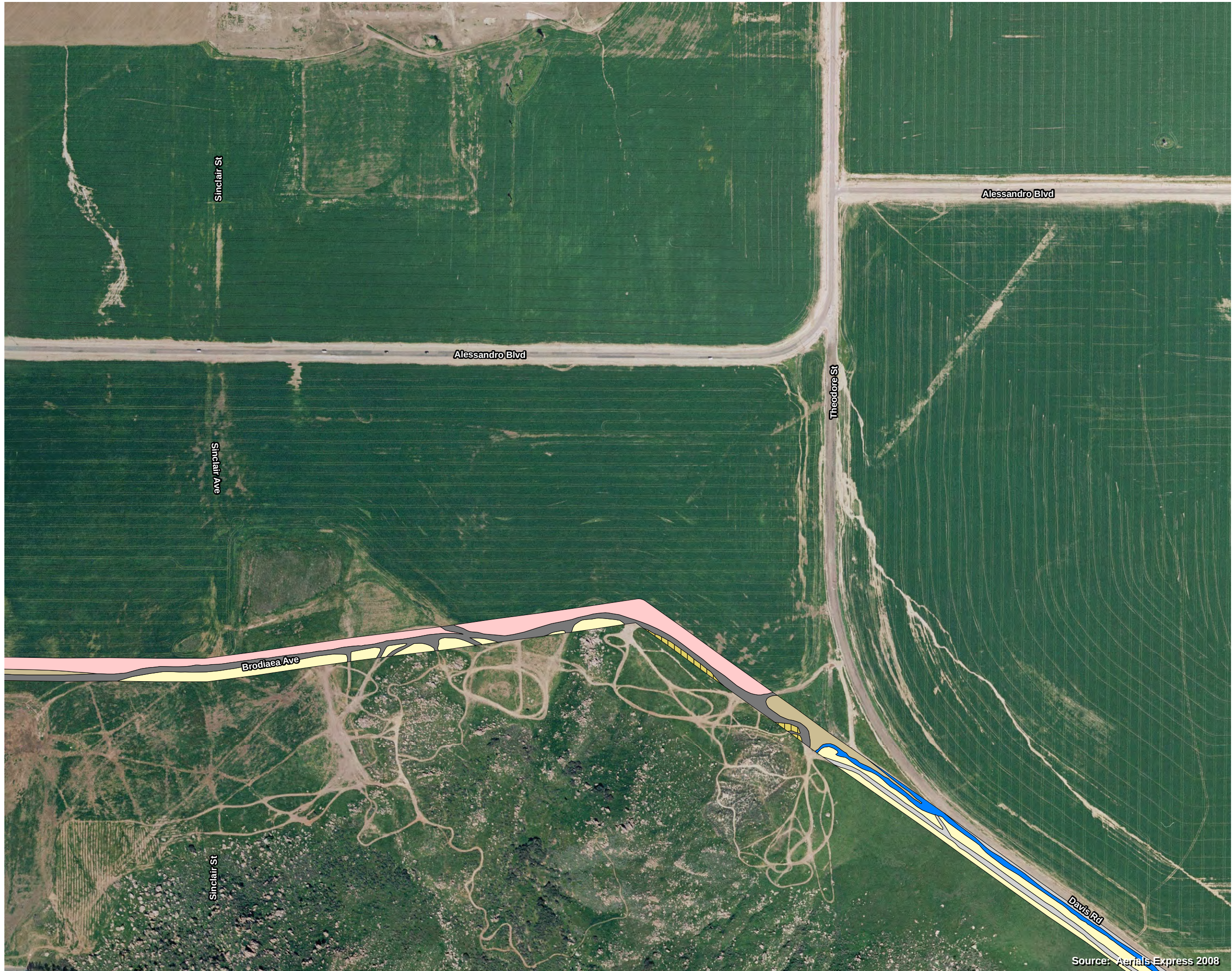
Vegetation Types Exhibit 3B

Lakeview Substation and Transmission Line Project



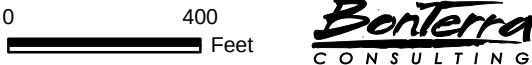
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Vegetation Types **Exhibit 3C**

Lakeview Substation and
Transmission Line Project

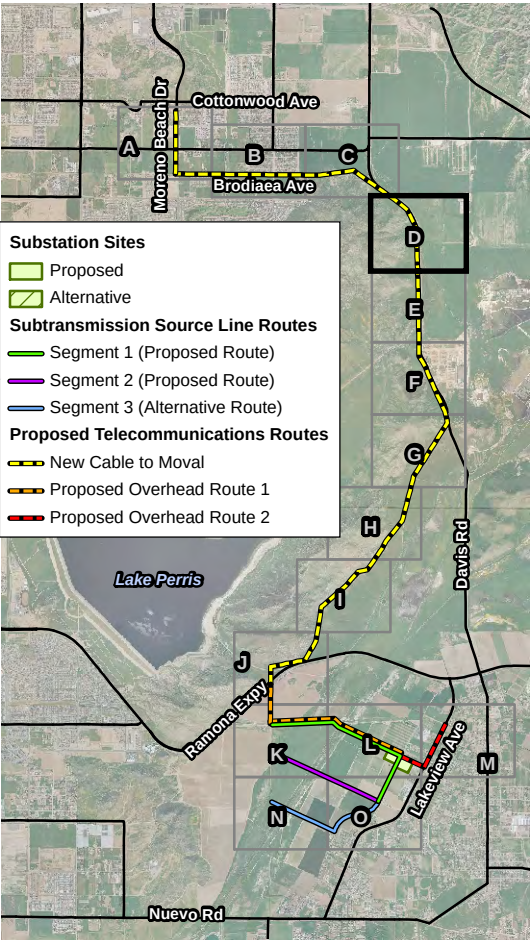


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- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

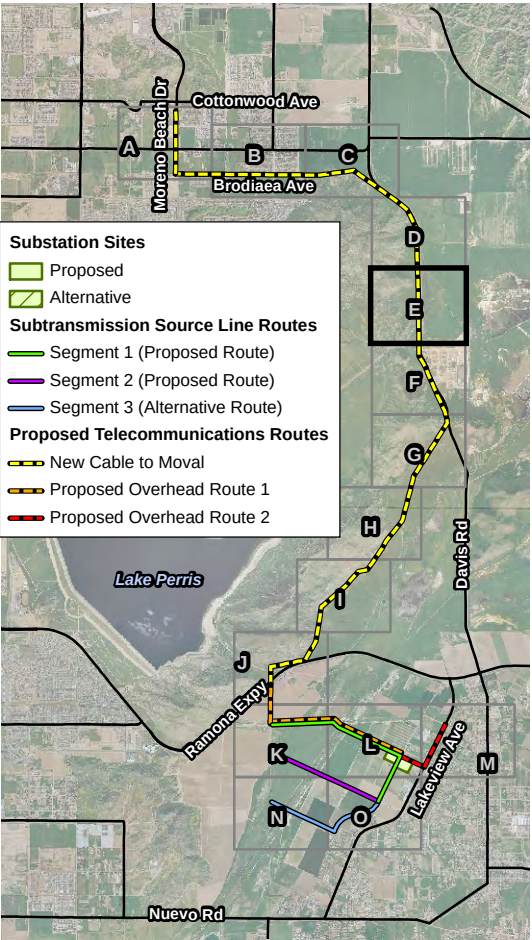
- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

Vegetation Types Exhibit 3D

Lakeview Substation and
Transmission Line Project

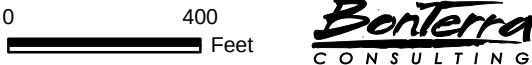


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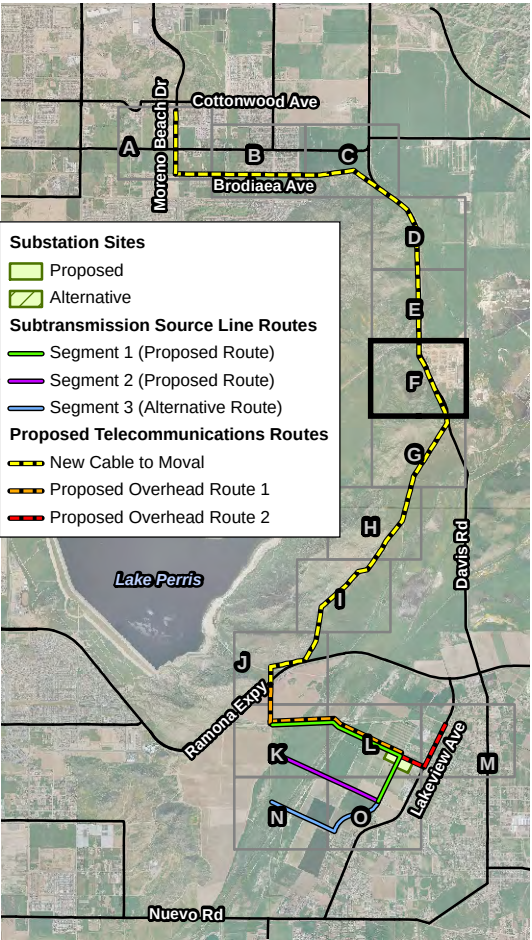


Vegetation Types Exhibit 3E

Lakeview Substation and Transmission Line Project

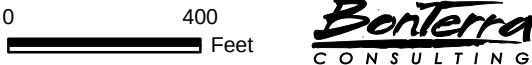


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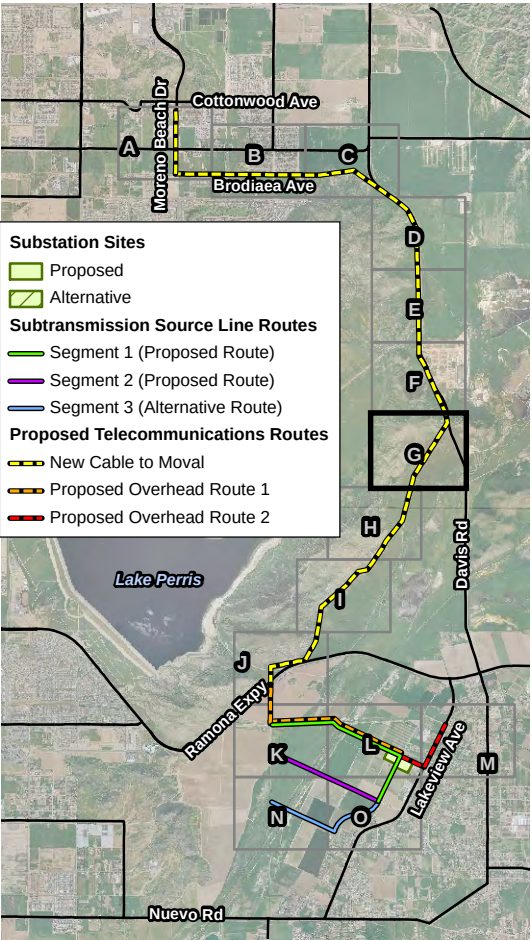


Vegetation Types **Exhibit 3F**

*Lakeview Substation and
Transmission Line Project*

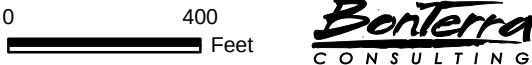


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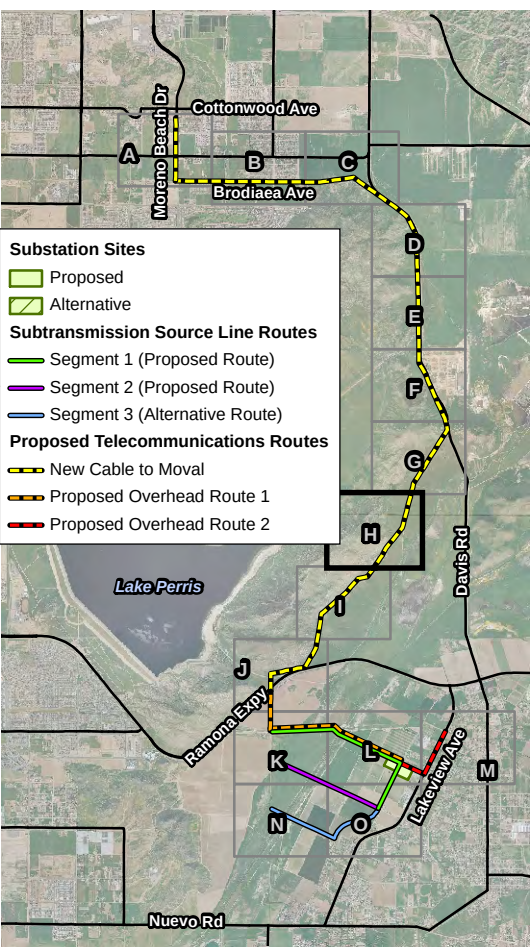
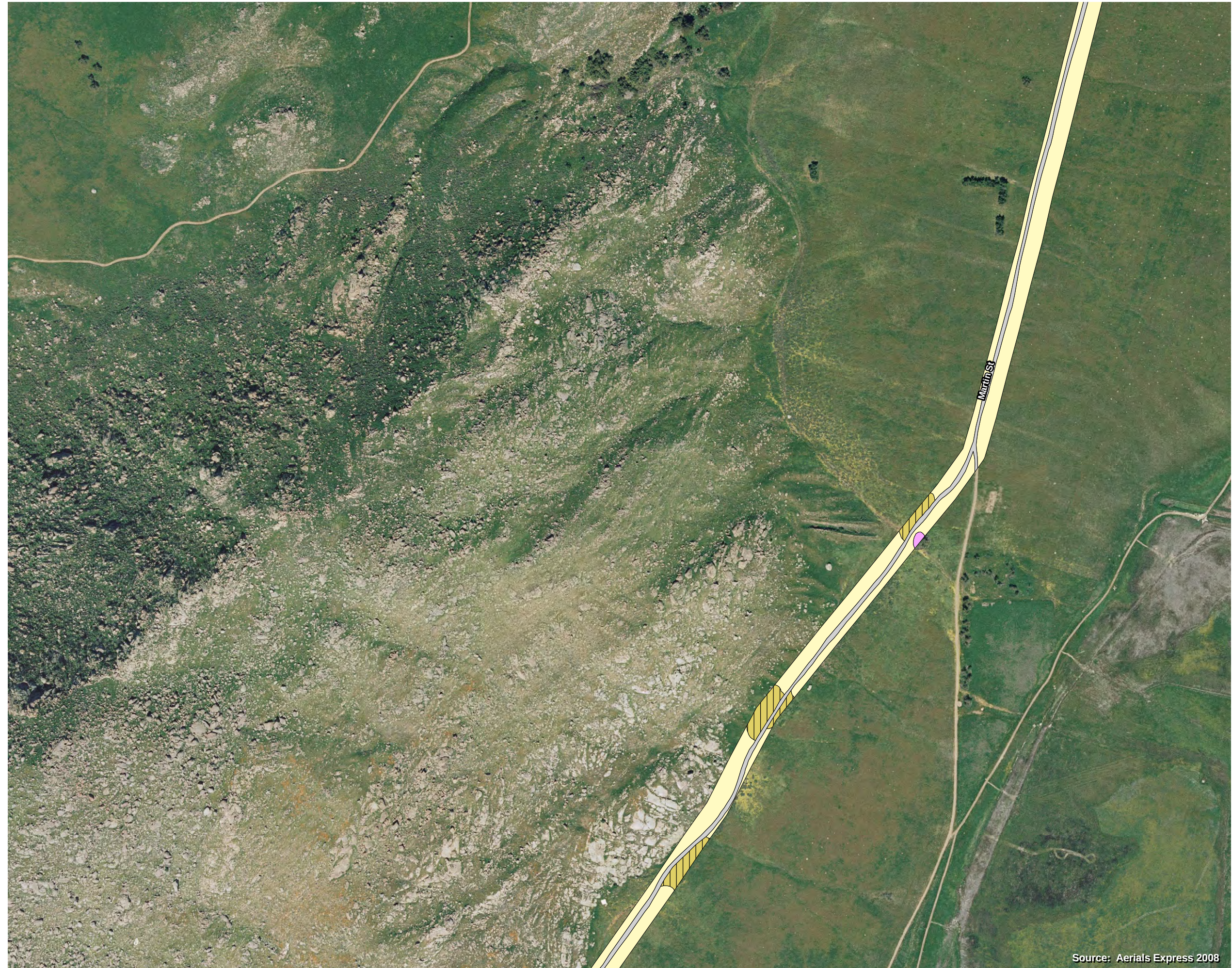


Vegetation Types Exhibit 3G

Lakeview Substation and Transmission Line Project



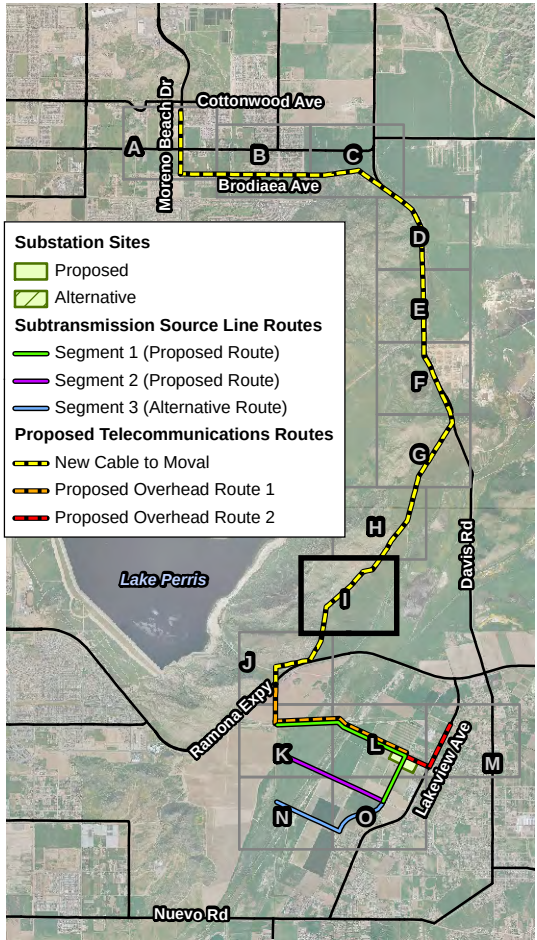
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Source: Aerials Express 2008



- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

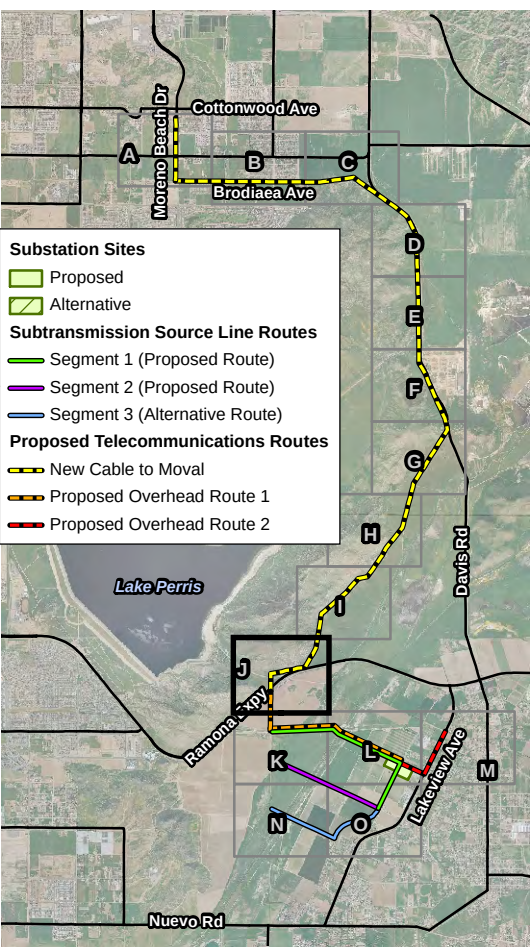
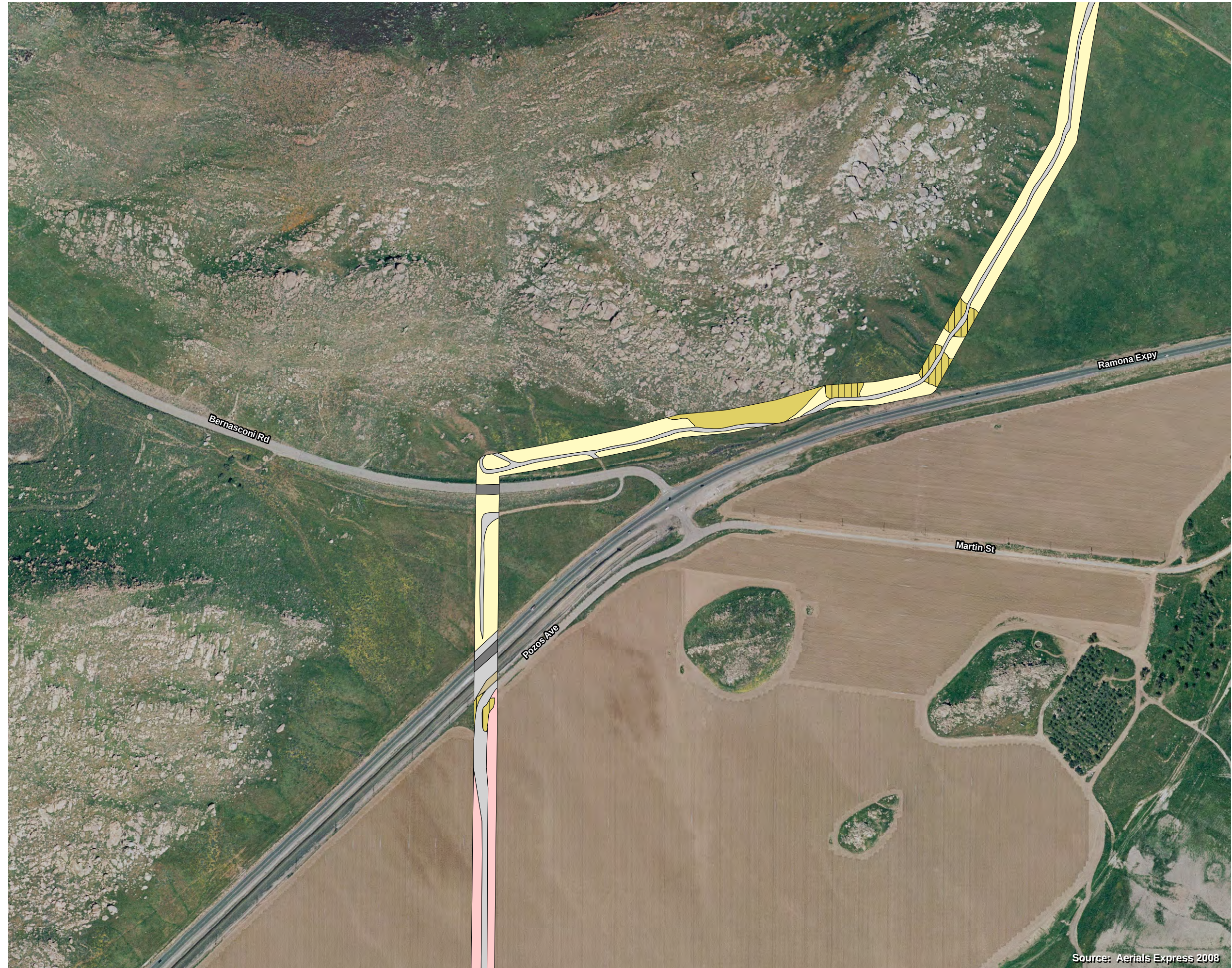
Vegetation Types

Exhibit 31

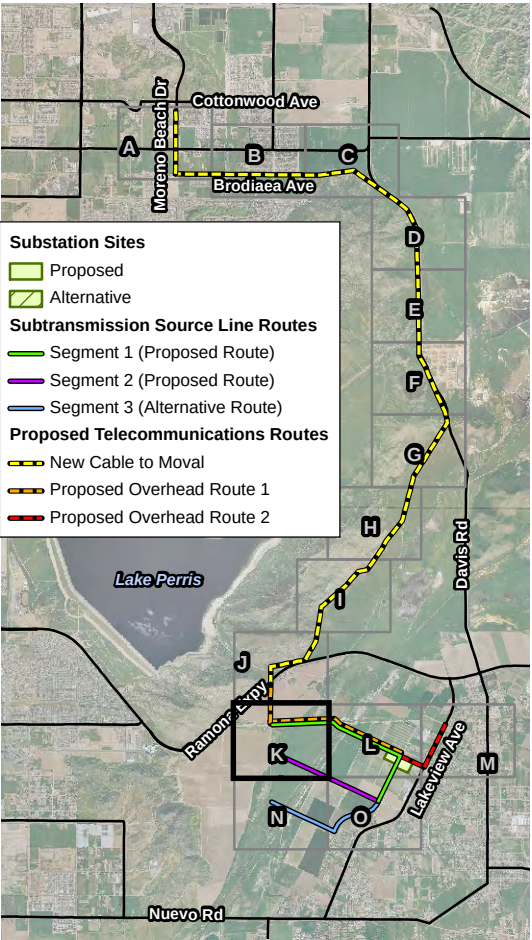
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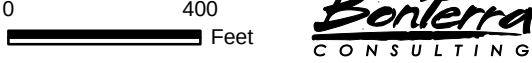


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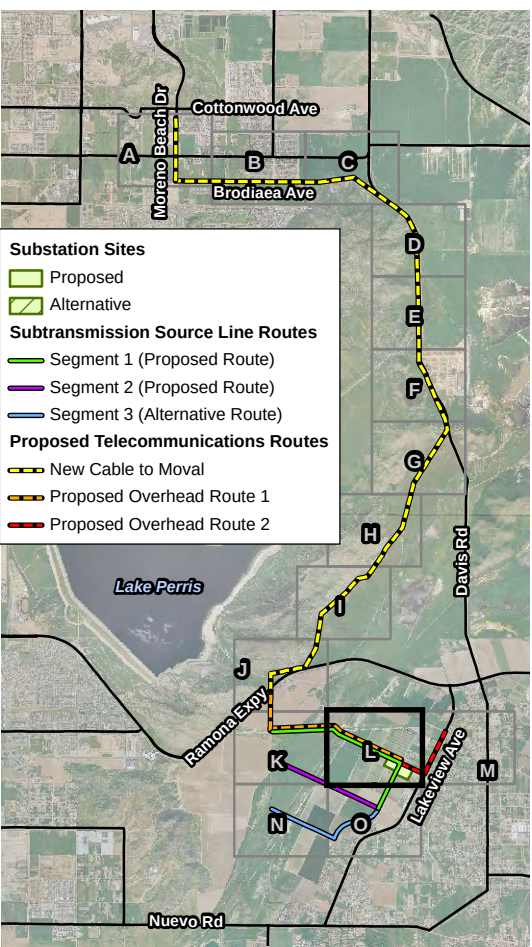


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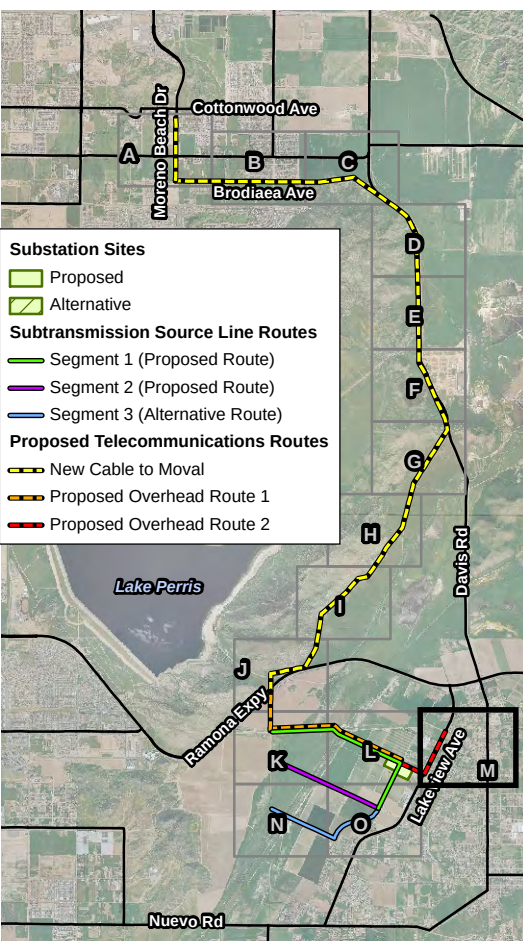
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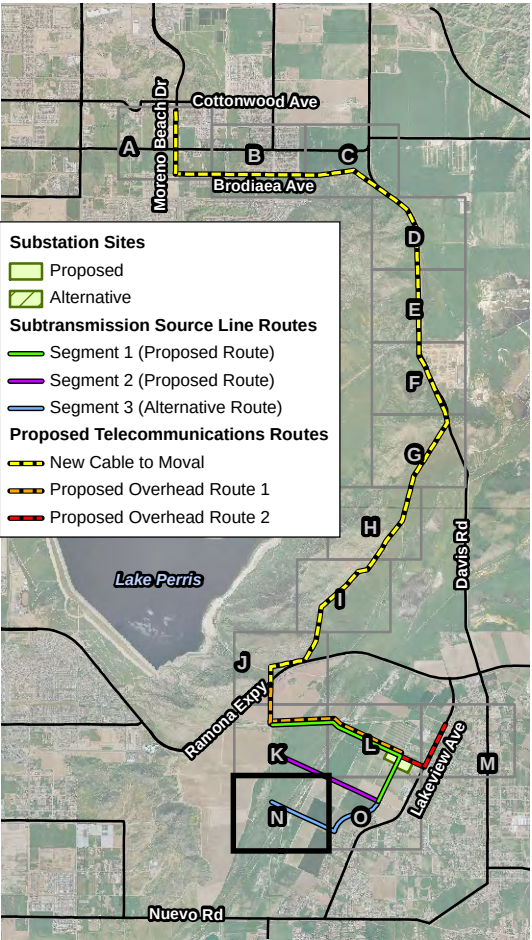


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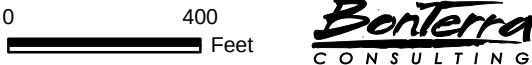
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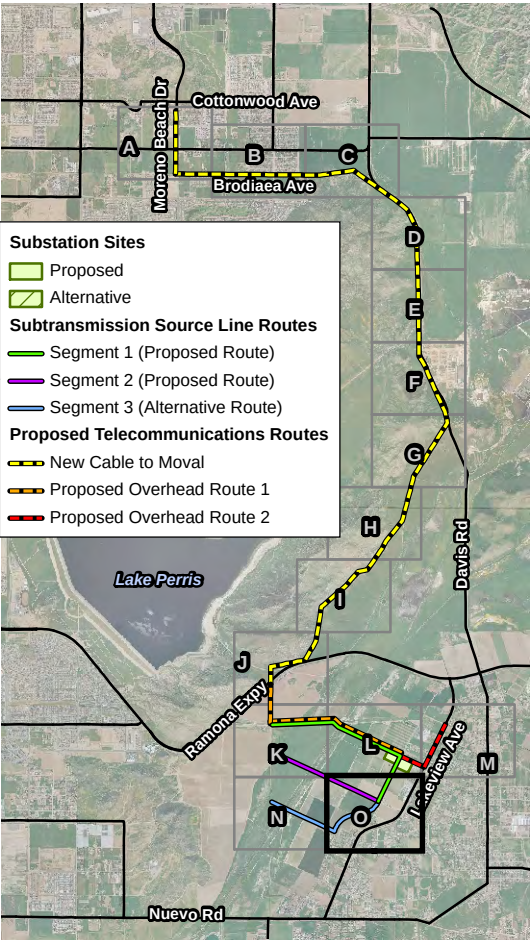
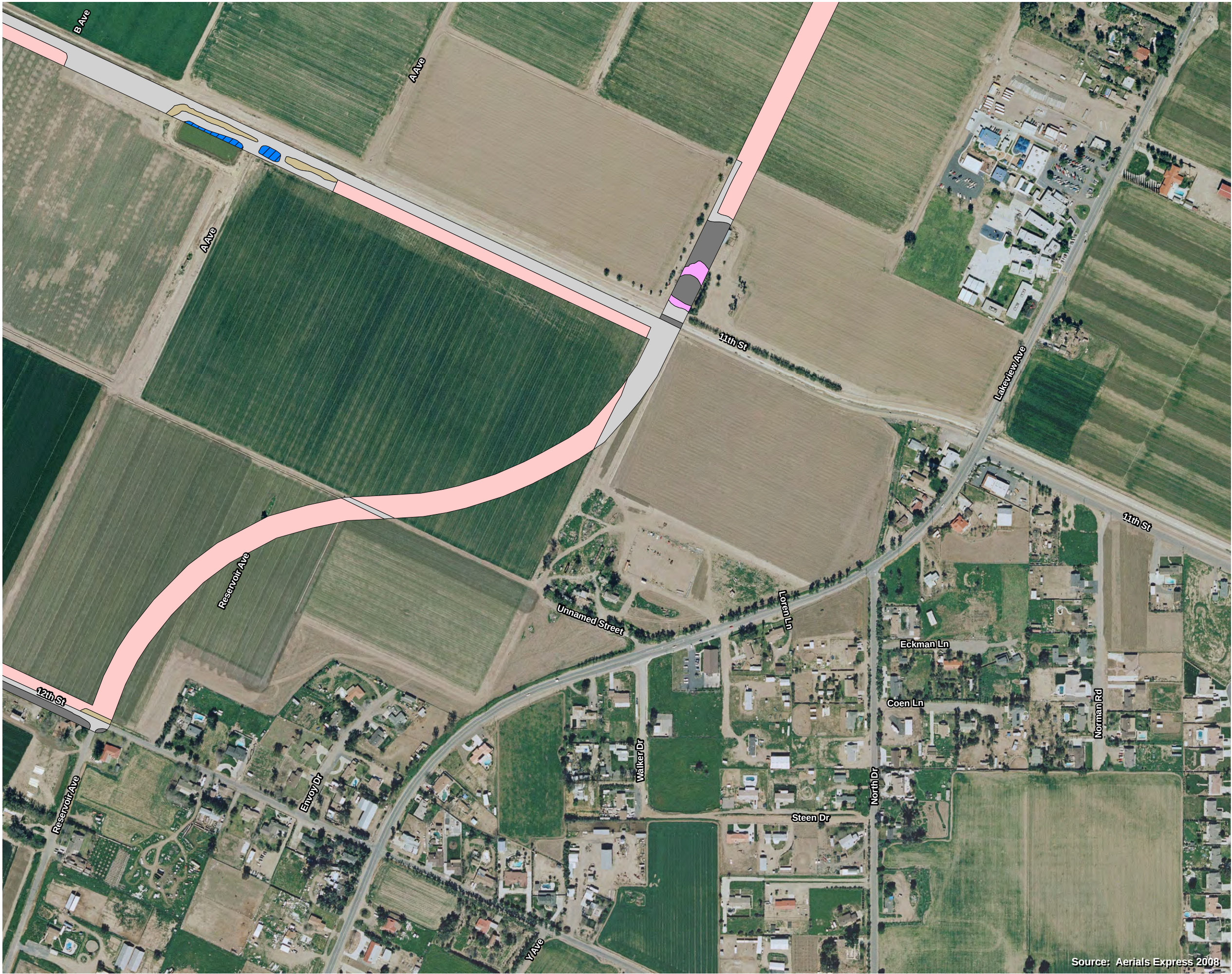
Vegetation Types **Exhibit 3N**

*Lakeview Substation and
Transmission Line Project*



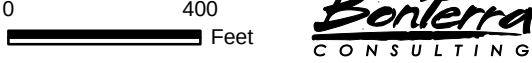
Source: Aerials Express 2008

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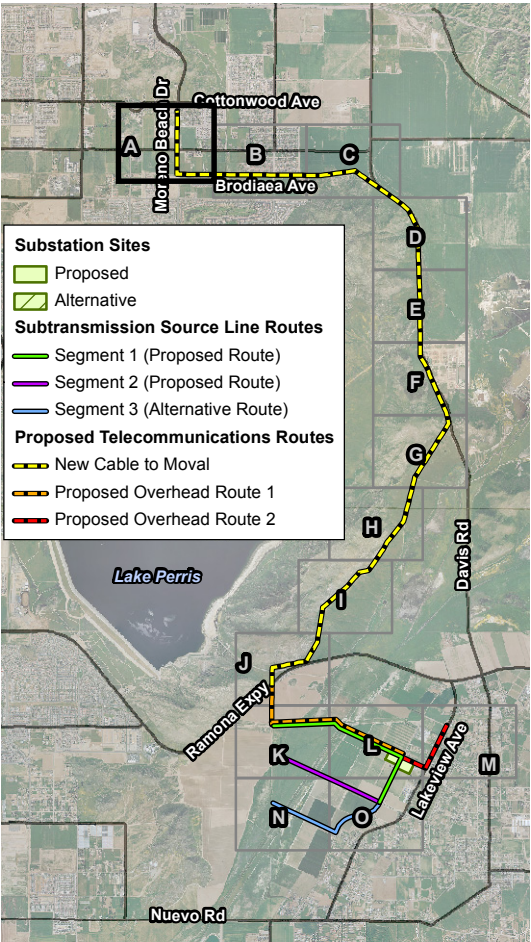
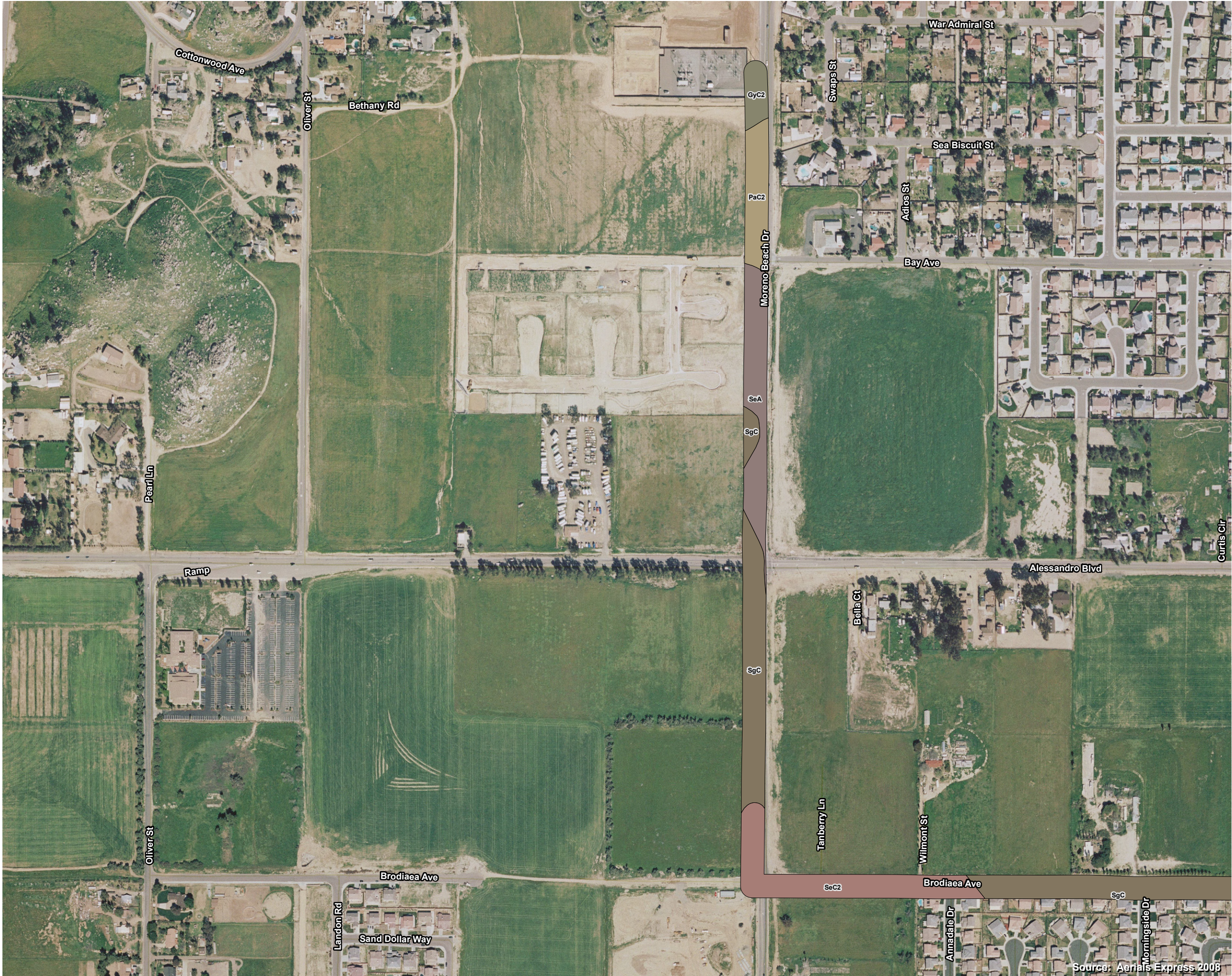


Vegetation Types **Exhibit 30**

Lakeview Substation and
Transmission Line Project



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Soil Types	
GyC2, Greenfield sandy loam 2 to 8 percent slopes, eroded	
PaC2, Pachappa fine sandy loam 2 to 8 percent slopes, eroded	
SeA, San Emigdio fine sandy loam 0 to 2 percent slopes	
SeC2, San Emigdio fine sandy loam 2 to 8 percent slopes, eroded	
SgC, San Emigdio loam 2 to 8 percent slopes	

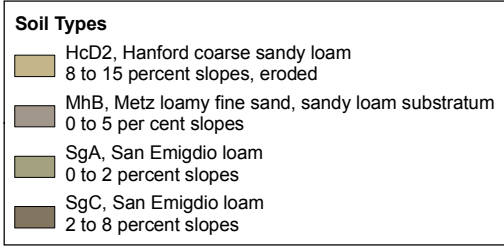
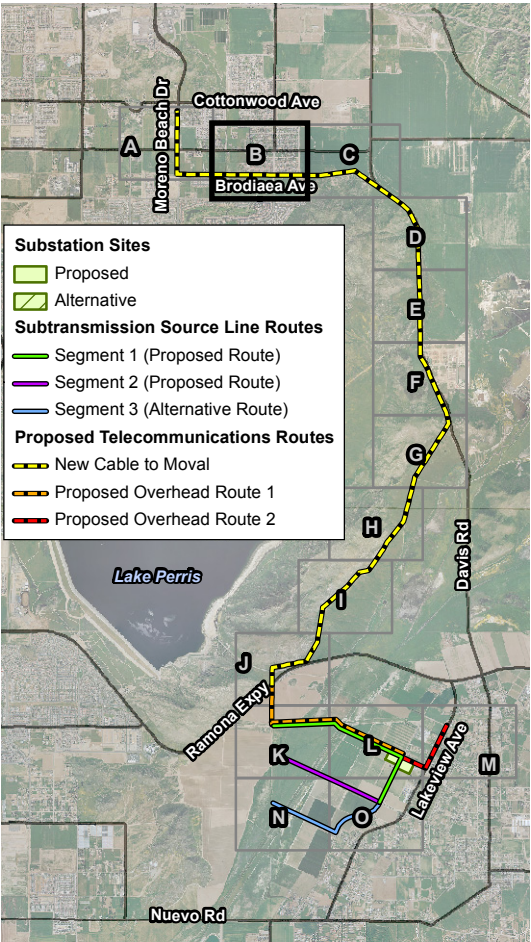
Soil Types Exhibit 4A

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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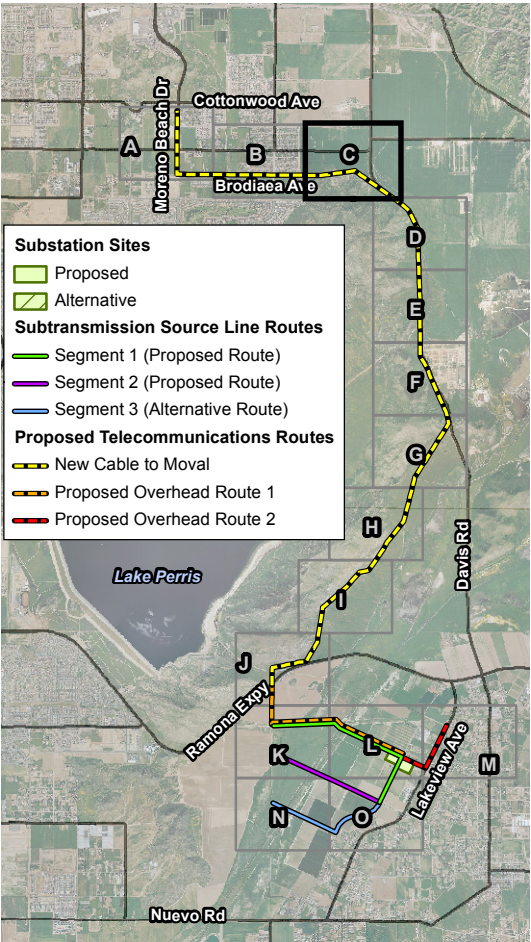
Soil Types Exhibit 4B

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Soil Types**
- GhC, Gorgonio loamy sand
0 to 8 percent slopes
 - GyC2, Greenfield sandy loam
2 to 8 percent slopes, eroded
 - HcC, Hanford coarse sandy loam
2 to 8 percent slopes
 - HcD2, Hanford coarse sandy loam
8 to 15 percent slopes, eroded
 - MdC, Metz loamy sand
2 to 8 percent slopes
 - RfF, Rockland
 - SgC, San Emigdio loam
2 to 8 percent slopes

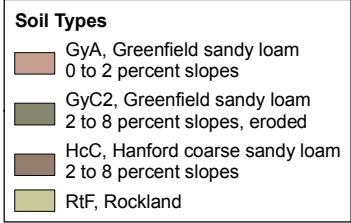
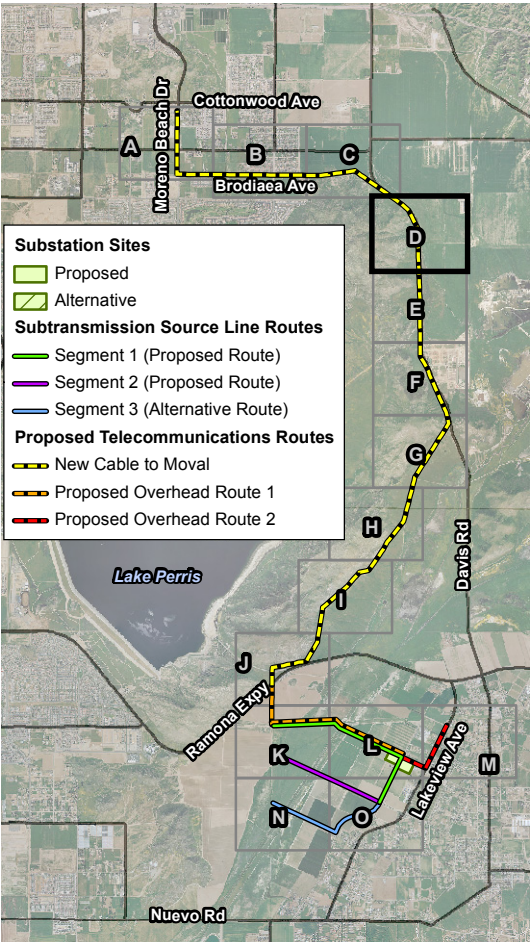
Soil Types Exhibit 4C

Lakeview Substation and
Transmission Line Project



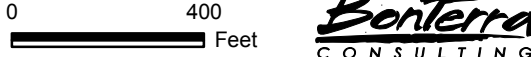
Source: Aerials Express 2008

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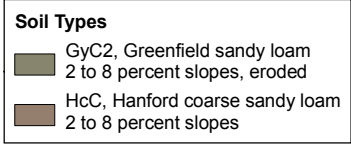
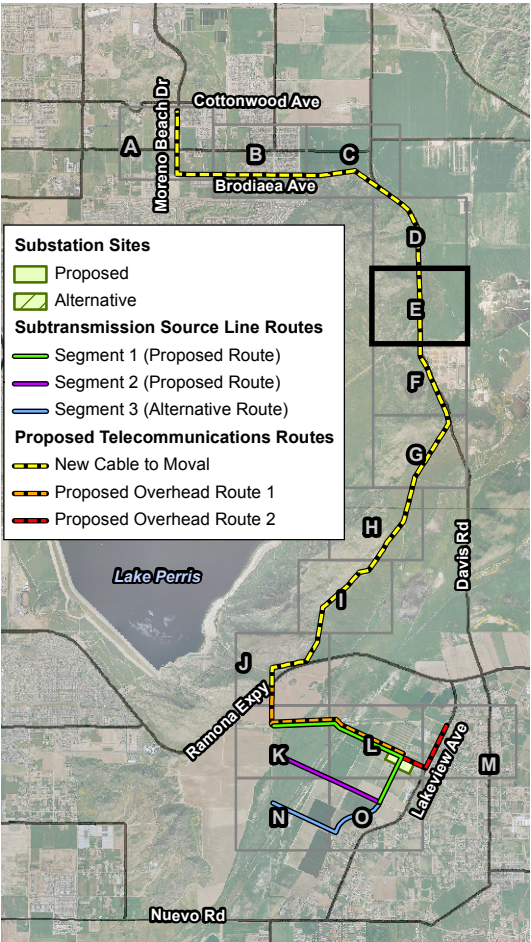
Soil Types Exhibit 4D

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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Soil Types **Exhibit 4E**

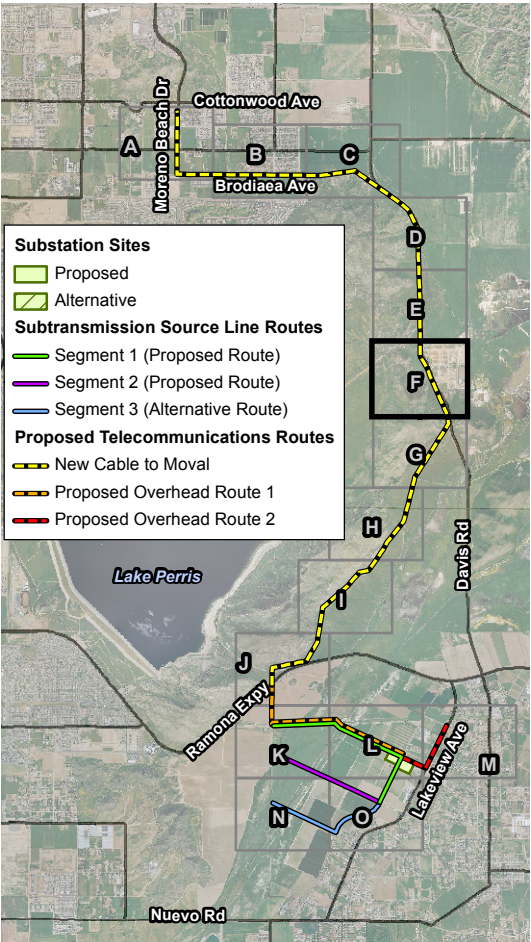
*Lakeview Substation and
Transmission Line Project*



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Source: Aerials Express 2008



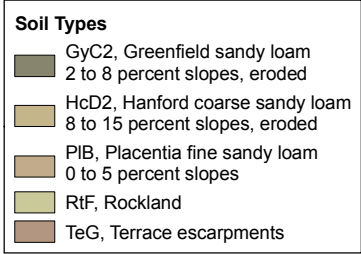
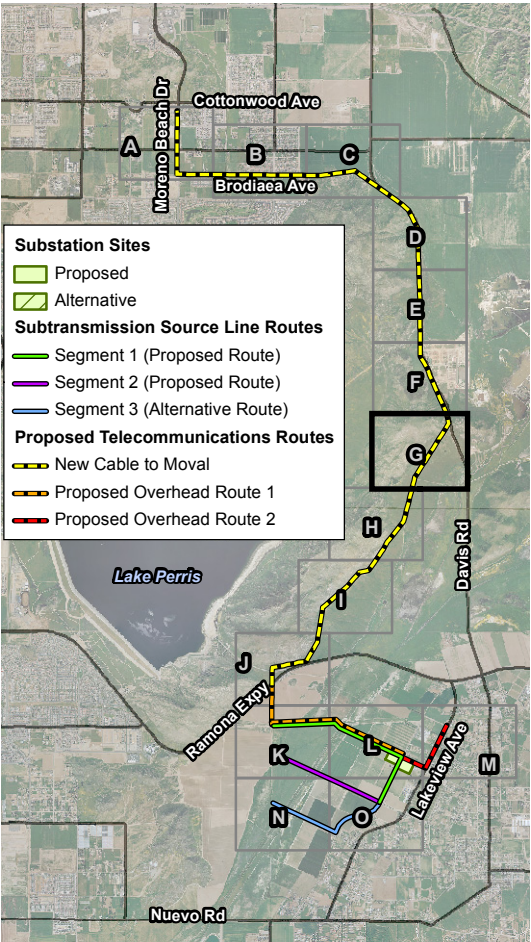
Soil Types	
	GIC, Gorgonio loamy sand, deep 2 to 8 percent slopes
	HcC, Hanford coarse sandy loam 2 to 8 percent slopes
	HcD2, Hanford coarse sandy loam 8 to 15 percent slopes, eroded
	RIF, Rockland
	TeG, Terrace escarpments

Soil Types Exhibit 4F

Lakeview Substation and Transmission Line Project



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Soil Types **Exhibit 4G**

*Lakeview Substation and
Transmission Line Project*

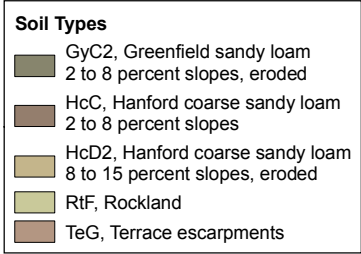
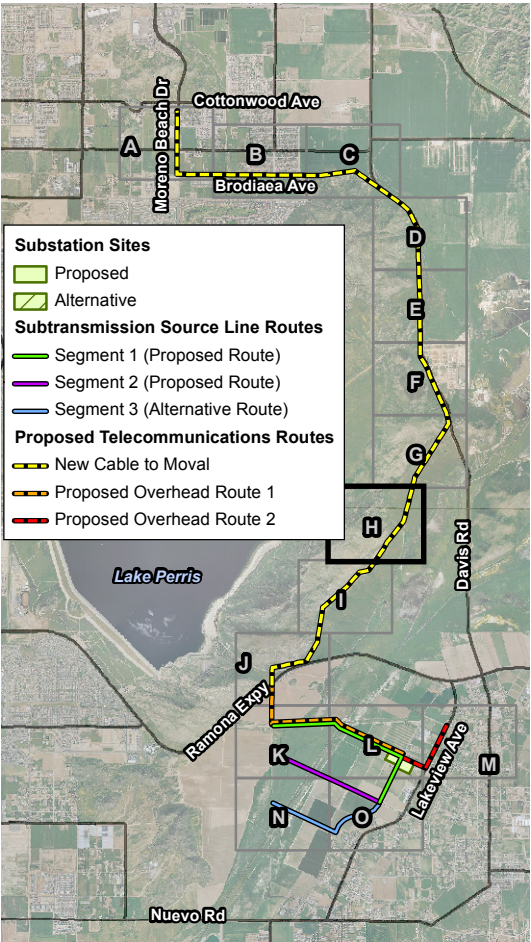


Source: Aerials Express 2008

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Source: Aerials Express 2008

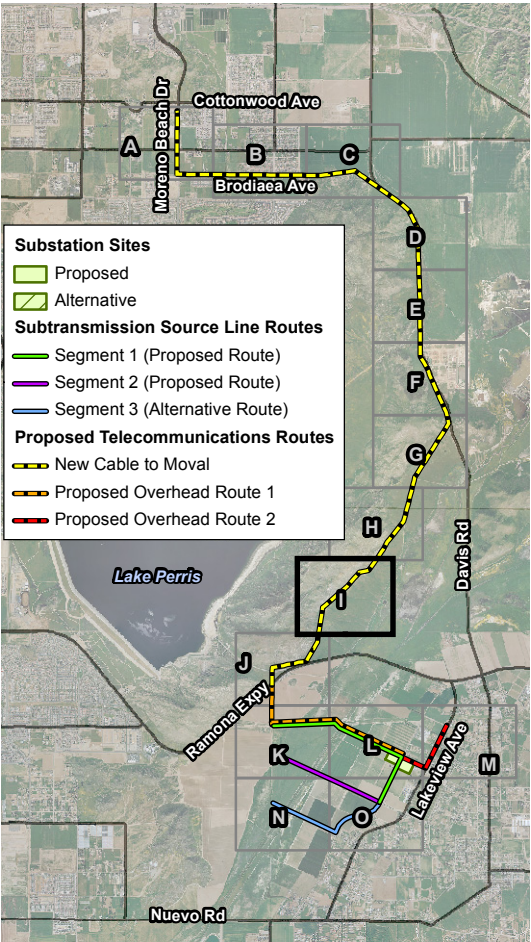


Soil Types **Exhibit 4H**

*Lakeview Substation and
Transmission Line Project*



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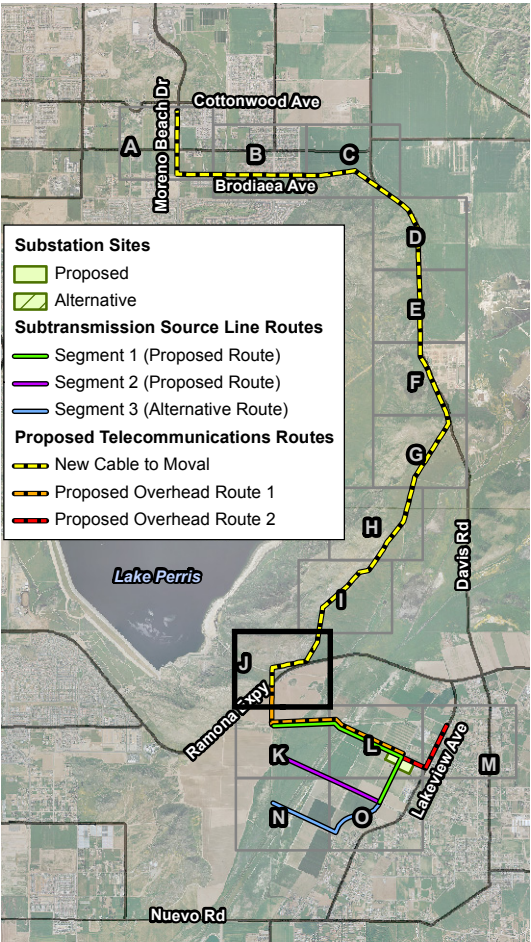
Soil Types	
	HcD2, Hanford coarse sandy loam 8 to 15 percent slopes, eroded
	RtF, Rockland
	TeG, Terrace escarpments

Soil Types Exhibit 4I

Lakeview Substation and
Transmission Line Project



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Soil Types	
EnC2, Exeter sandy loam 2 to 8 percent slopes, eroded	
HcC, Hanford coarse sandy loam 2 to 8 percent slopes	
HcD2, Hanford coarse sandy loam 8 to 15 percent slopes, eroded	
RfF, Rockland	
TeG, Terrace escarpments	

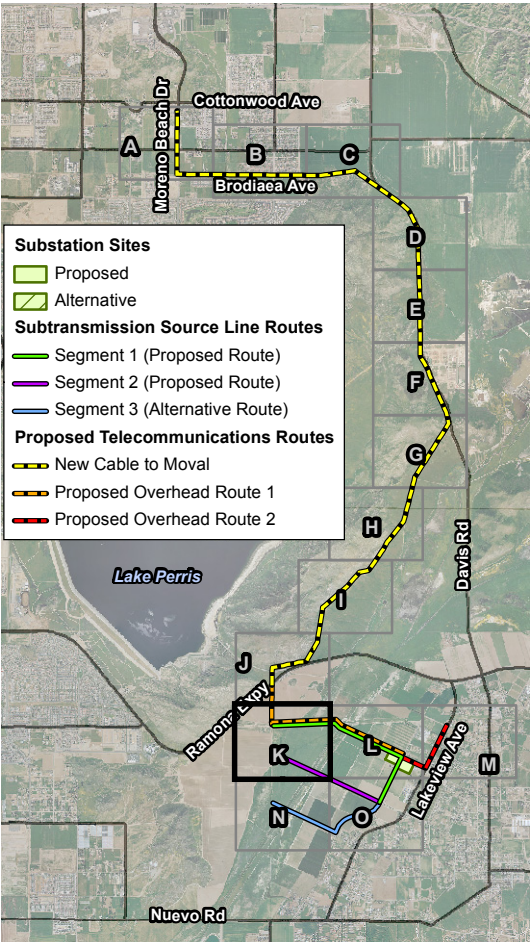
Soil Types Exhibit 4J

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Soil Types**
- Dv, Domino silt loam, saline-alkali
 - HcC, Hanford coarse sandy loam 2 to 8 percent slopes
 - RsC, Riverwash
 - Wf, Willows silty clay
 - Wg, Willows silty clay, saline-alkali
 - Wh, Willows silty clay, strongly saline-alkali
 - Wn, Willows silty clay, deep, strongly saline-alkali

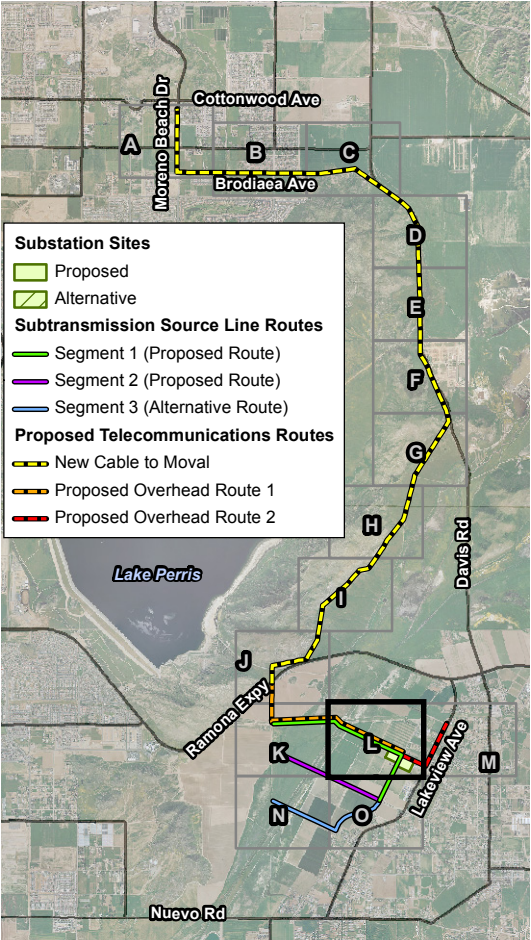
Soil Types Exhibit 4K

Lakeview Substation and Transmission Line Project



Source: Aerials Express 2008

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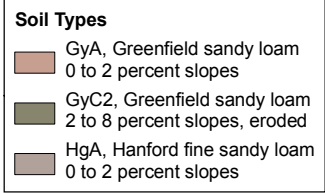
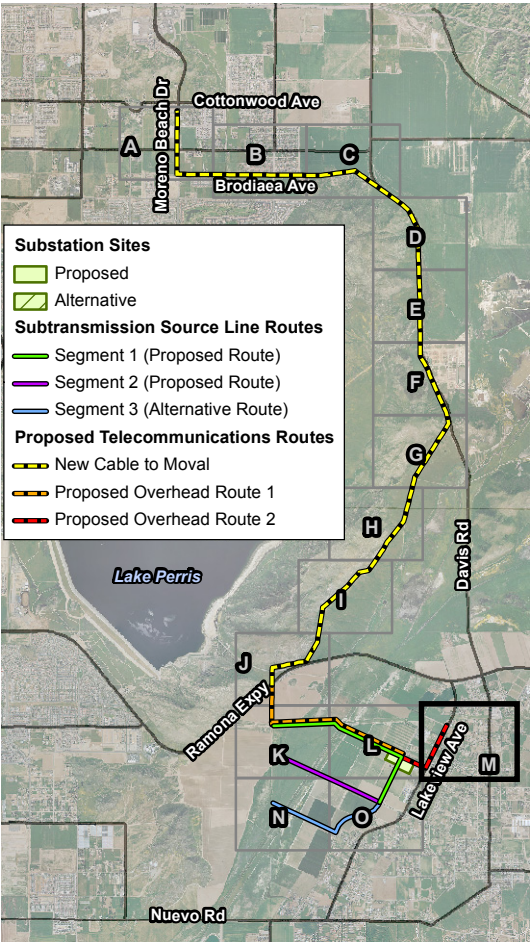
Soil Types	
	Dt, Domino fine sandy loam, saline-alkali
	Du, Domino silt loam
	Dv, Domino silt loam, saline-alkali
	EpC2, Exeter sandy loam, deep, 2 to 8 percent slopes, eroded
	GyA, Greenfield sandy loam 0 to 2 percent slopes
	HcC, Hanford coarse sandy loam 2 to 8 percent slopes
	PaA, Pachappa fine sandy loam 0 to 2 percent slopes
	PaC2, Pachappa fine sandy loam 2 to 8 percent slopes, eroded
	RaA, Ramona sandy loam 0 to 2 percent slopes
	RsC, Riverwash
	Wg, Willows silty clay, saline-alkali
	Wh, Willows silty clay, strongly saline-alkali
	Wn, Willows silty clay, deep, strongly saline-alkali

Soil Types Exhibit 4L

Lakeview Substation and Transmission Line Project



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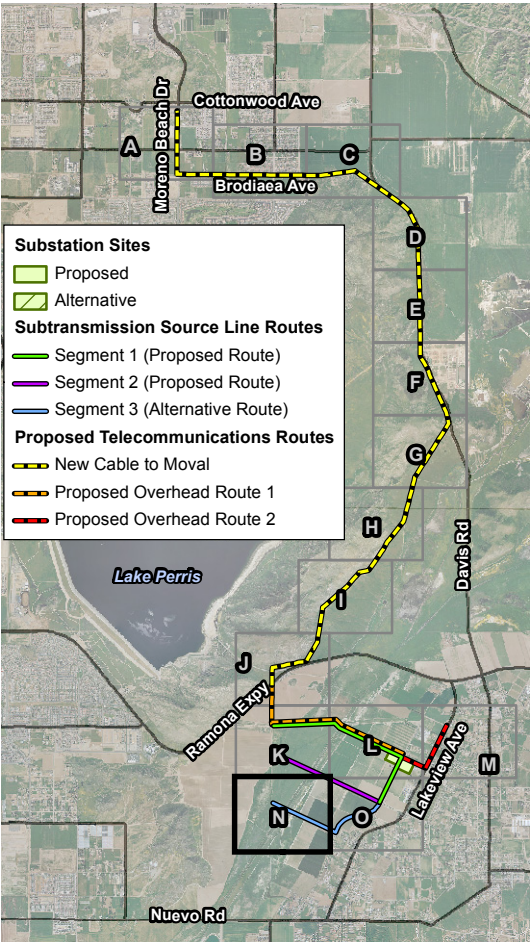
Soil Types **Exhibit 4M**

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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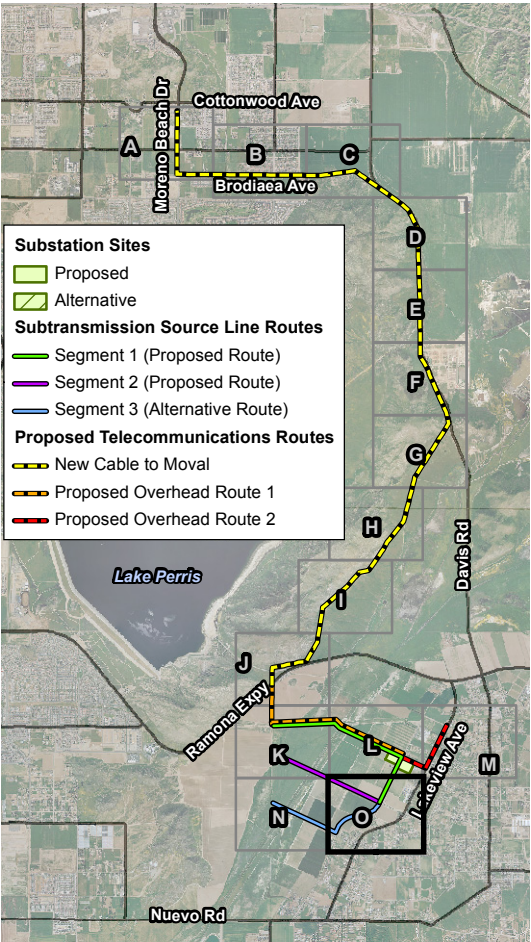
Soil Types	
Dv, Domino silt loam, saline-alkali	
EpA, Exeter sandy loam, deep 0 to 2 percent slopes	
GyC2, Greenfield sandy loam 2 to 8 percent slopes, eroded	
RsC, Riverwash	
Wf, Willows silty clay	
Wg, Willows silty clay, saline-alkali	
Wn, Willows silty clay, deep, strongly saline-alkali	

Soil Types Exhibit 4N

Lakeview Substation and
Transmission Line Project



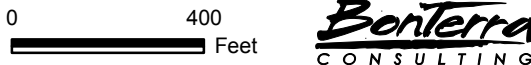
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Soil Types	
Dv	Domino silt loam, saline-alkali
EpA	Exeter sandy loam, deep 0 to 2 percent slopes
Gyc2	Greenfield sandy loam 2 to 8 percent slopes, eroded
PaA	Pachappa fine sandy loam 0 to 2 percent slopes
RaA	Ramona sandy loam 0 to 2 percent slopes
Wh	Willows silty clay, strongly saline-alkali

Soil Types Exhibit 40

Lakeview Substation and
Transmission Line Project



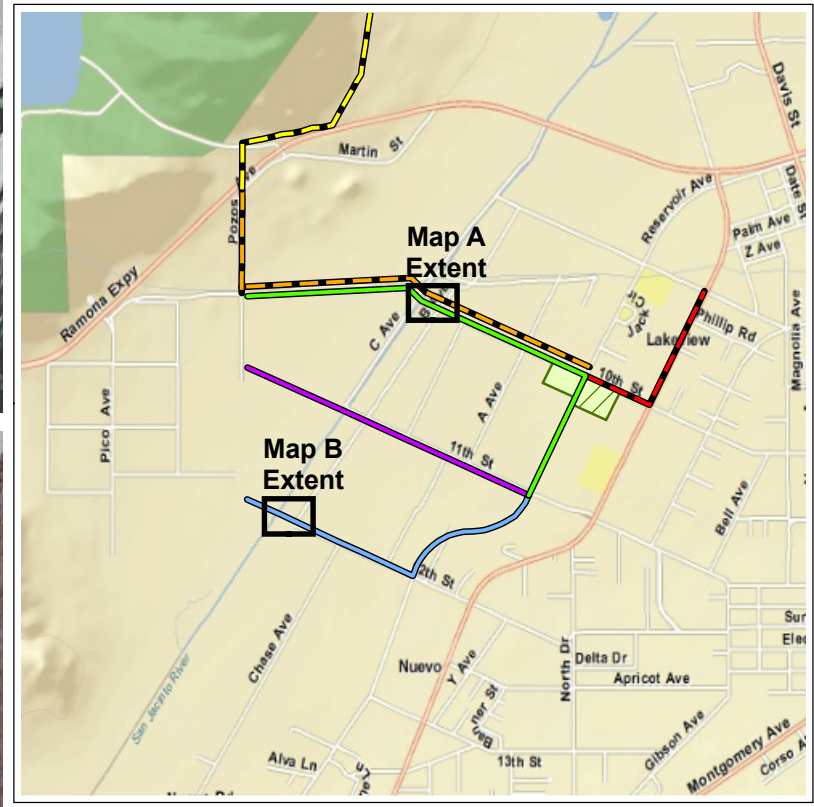
Bonterra
CONSULTING

Source: Aerials Express 2008



MAP A

MAP B



- San Jacinto Valley Crowscale Point
- San Jacinto Valley Crowscale
- Substation Sites**
 - Proposed
 - Alternative
- Subtransmission Source Line Routes**
 - Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
 - New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

San Jacinto Valley Crowscale

Lakeview Substation and Transmission Line Project

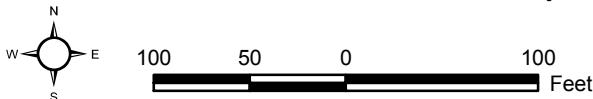


Exhibit 5A

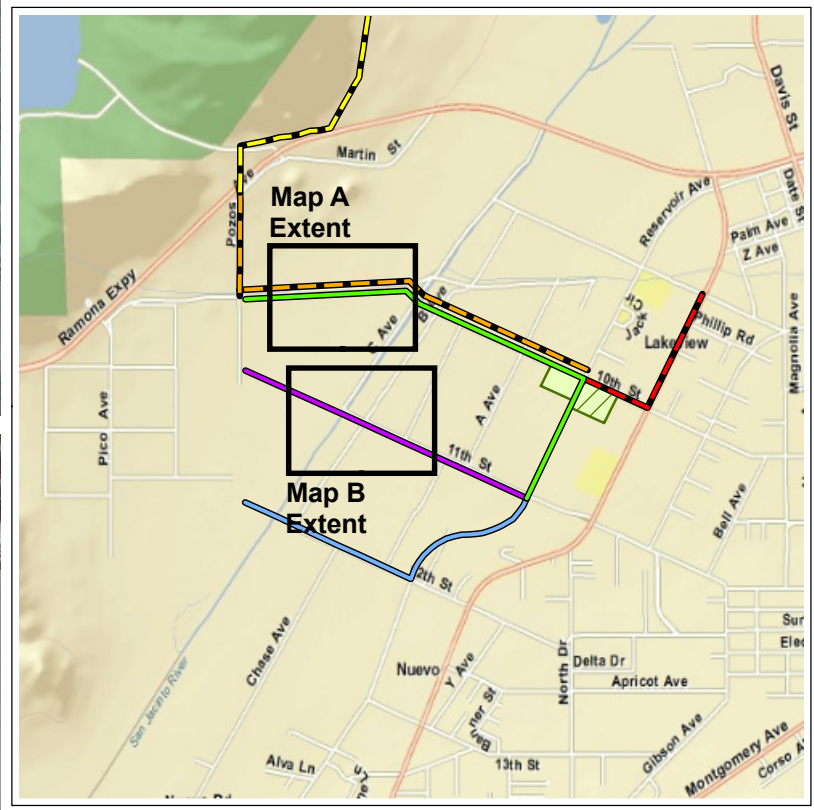
Bonterra
CONSULTING

(Rev 10/13/10 JFG) R:\Projects\Edison\J025\Graphics\PlantEx5a_SJVC_11x17.pdf



MAP A

MAP B



Smooth Tarplant

Substation Sites

Proposed

Alternative

Subtransmission Source Line Routes

Segment 1 (Proposed Route)

Segment 2 (Proposed Route)

Segment 3 (Alternative Route)

Proposed Telecommunications Routes

New Cable to Moval

Proposed Overhead Route 1

Proposed Overhead Route 2

Smooth Tarplant

Lakeview Substation and Transmission Line Project

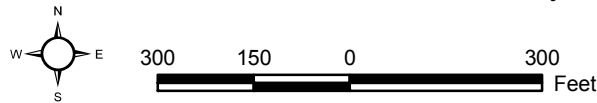


Exhibit 5B

Bonterra
CONSULTING

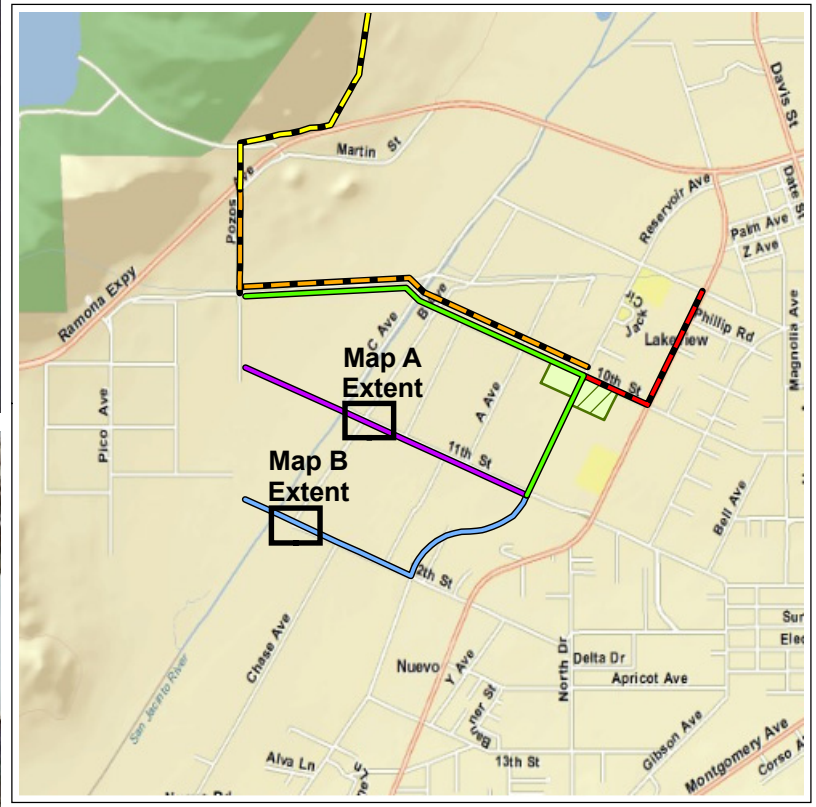
(Rev 10/13/10 JFG) PAS\Projects\Edison\J025\Graphics\Plant\Ex2_tarplant.pdf

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MAP A

MAP B



- Coulter's goldfields
- Substation Sites**
 - Proposed
 - Alternative
- Subtransmission Source Line Routes**
 - Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
 - New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

Coulter's Goldfields

Lakeview Substation and Transmission Line Project

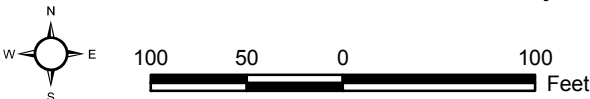


Exhibit 5C



ATTACHMENT A
SELECTED REFERENCE POPULATION PHOTOS



Abronia villosa var. *aurita* at the base of Bernasconi Mountains.



Atriplex coronata var. *notatior* at San Jacinto Wildlife.

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Selected Reference Population Photos

Appendix A1

Lakeview Substation and Transmission Line Project

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(Rev 101310 sje) R:\Projects\Edison\J025\Graphics\Plant_Report\EXappA1_sp.pdf



Atriplex serenana var. *davidsonii* at San Jacinto Wildlife Reserve.



Brodiaea filifolia at San Jacinto Wildlife Area.

Selected Reference Population Photos

Lakeview Substation and Transmission Line Project

Appendix A2

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(Rev 101310 sje) R:\Projects\Edison\J025\Graphics\Plant_Report\EXappA2_sp2.pdf



Centromadia pungens ssp. *laevis* at San Jacinto Wildlife Area.



Lasthenia glabrata ssp. *coulteri* at Lakeview.

Selected Reference Population Photos

Lakeview Substation and Transmission Line Project

Appendix A3

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(Rev 101310 sje) R:\Projects\Edison\J025\Graphics\Plant_Report\EXappA3_sp3.pdf



Navarretia fossalis in San Jacinto River near Neuvo Road Crossing.



Sidalcea neomexicana at Rancho Mission Viejo.

Selected Reference Population Photos

Lakeview Substation and Transmission Line Project

Appendix A4

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(Rev 101310 sje) R:\Projects\Edison\J025\Graphics\Plant_Report\EXappA4_sp4.pdf



Chorizanthe parryi var. *parryi* at Mentone.

Selected Reference Population Photos

Appendix A5

Lakeview Substation and Transmission Line Project

ATTACHMENT B
PLANT COMPENDIUM

PLANTS OBSERVED WITHIN THE PROJECT SITE DURING FOCUSED BOTANICAL SURVEYS

FLOWERING PLANTS
CLASS DICOTYLEDONES (DICOTS)
AIZOACEAE - FIG-MARIGOLD FAMILY
<i>Mesembryanthemum nodiflorum</i> * slender-leaved iceplant
ANACARDIACEAE - SUMAC FAMILY
<i>Malosma laurina</i> laurel sumac
<i>Rhus ovata</i> sugar bush
APOCYNACEAE - DOGBANE FAMILY
<i>Nerium oleander</i> * oleander
ASTERACEAE (COMPOSITAE) - SUNFLOWER FAMILY
<i>Ambrosia acanthicarpa</i> annual bursage
<i>Ambrosia psilostachya</i> western ragweed
<i>Artemisia californica</i> California sagebrush
<i>Artemisia dracunculus</i> tarragon
<i>Baccharis salicifolia</i> mule fat
<i>Centromadia pungens</i> ssp. <i>laevis</i> smooth tarplant
<i>Chamomilla suaveolens</i> * common pineapple weed
<i>Cirsium vulgare</i> * bull thistle
<i>Conyza canadensis</i> common horseweed
<i>Cotula australis</i> * brass buttons
<i>Encelia farinosa</i> brittlebush
<i>Eriophyllum confertiflorum</i> golden yarrow
<i>Helianthus annuus</i> western sunflower
<i>Heterotheca grandiflora</i> telegraph weed
<i>Isocoma menziesii</i> var. <i>vernonioides</i> coastal goldenbush
<i>Lactuca serriola</i> * prickly lettuce
<i>Lasthenia californica</i> California goldfields
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i> Coulter's goldfields
<i>Lepidospartum squamatum</i> scale-broom

**PLANTS OBSERVED WITHIN THE PROJECT SITE
DURING FOCUSED BOTANICAL SURVEYS
(Continued)**

FLOWERING PLANTS
<i>Lessingia filaginifolia</i> California aster
<i>Malacothrix saxatilis</i> cliff malacothrix
<i>Oncosiphon piluliferum</i> * stink net
<i>Psilocarphus brevissimus</i> woolly marbles
<i>Rafinesquia californica</i> California chicory
<i>Sonchus asper</i> * prickly sow-thistle
<i>Sonchus oleraceus</i> * common sow-thistle
<i>BIGNONIACEAE</i> - BIGNONIA FAMILY
<i>Chilopsis linearis</i> ssp. <i>arcuata</i> desert willow
<i>BORAGINACEAE</i> - BORAGE FAMILY
<i>Amsinckia menziesii</i> var. <i>intermedia</i> common fiddleneck
<i>Heliotropium curassavicum</i> salt heliotrope/alkali heliotrope
<i>Pectocarya linearis</i> ssp. <i>ferocula</i> slender pectocarya
<i>Plagiobothrys leptocladus</i> Wirestem popcorn flower
<i>BRASSICACEAE (CRUCIFERAE)</i> - MUSTARD FAMILY
<i>Brassica nigra</i> * black mustard
<i>Hirschfeldia incana</i> * shortpod mustard
<i>Lepidium dictyotum</i> var. <i>acutidens</i> sharp-tooth peppergrass
<i>Lepidium dictyotum</i> var. <i>dictyotum</i> alkali peppergrass
<i>Raphanus sativus</i> * wild radish
<i>Sinapis arvensis</i> * field charlock
<i>Sisymbrium irio</i> * London rocket
<i>Spergularia bocconeii</i> * Boccone's sand spurrey
<i>Spergularia marina</i> salt-marsh sand spurrey
<i>CAPRIFOLIACEAE</i> - HONEYSUCKLE FAMILY
<i>Sambucus mexicana</i> blue elderberry

**PLANTS OBSERVED WITHIN THE PROJECT SITE
DURING FOCUSED BOTANICAL SURVEYS
(Continued)**

FLOWERING PLANTS
<i>CHENOPODIACEAE</i> - GOOSEFOOT FAMILY
<i>Atriplex argentea</i> ssp. <i>mohavensis</i> Mojave silver scale
<i>Atriplex coronata</i> var. <i>notatior</i> San Jacinto Valley crownscale
<i>Atriplex suberecta</i> * small saltbush
<i>Bassia hyssopifolia</i> five-hook bassia
<i>Beta vulgaris</i> * garden beet
<i>Chenopodium album</i> * lamb's quarters
<i>Kochia scoparia</i> Summer cypress
<i>Monolepis nuttalliana</i> Nuttall's monolepis
<i>Salicornia subterminalis</i> Parish's pickleweed
<i>Salsola tragus</i> * Russian thistle
<i>Suaeda moquinii</i> bush seepweed
<i>CONVOLVULACEAE</i> - MORNING-GLORY FAMILY
<i>Calystegia macrostegia</i> morning-glory
<i>Cressa truxillensis</i> alkali weed
<i>CRASSULACEAE</i> - STONECROP FAMILY
<i>Crassula connata</i> pigmy-weed
<i>EUPHORBIACEAE</i> - SPURGE FAMILY
<i>Croton californicus</i> California croton
<i>Eremocarpus setigerus</i> doveweed/turkey mullein
<i>Ricinus communis</i> * castor bean
<i>FABACEAE (LEGUMINOSAE)</i> - LEGUME FAMILY
<i>Lotus scoparius</i> deerweed/California broom
<i>Lupinus bicolor</i> miniature lupine
<i>Medicago polymorpha</i> * California burclover
<i>Melilotus indica</i> * sourclover
<i>FRANKENIACEAE</i> - ALKALI HEATH FAMILY
<i>Frankenia salina</i> alkali heath

**PLANTS OBSERVED WITHIN THE PROJECT SITE
DURING FOCUSED BOTANICAL SURVEYS
(Continued)**

FLOWERING PLANTS
GERANIACEAE - GERANIUM FAMILY
<i>Erodium cicutarium</i> * red-stemmed filaree
HYDROPHYLLACEAE - WATERLEAF FAMILY
<i>Eucrypta chrysanthemifolia</i> common eucrypta
<i>Phacelia cicutaria</i> caterpillar phacelia
LAMIACEAE (LABIATAE) - MINT FAMILY
<i>Marrubium vulgare</i> * common horehound
<i>Salvia apiana</i> white sage
<i>Salvia columbariae</i> chia
LOASACEAE - STICK-LEAF FAMILY
<i>Mentzelia laevicaulis</i> stick-leaf
LYTHRACEAE - LOOSESTRIFE FAMILY
<i>Lythrum hyssopifolium</i> * grass poly
MALVACEAE - MALLOW FAMILY
<i>Malacothamnus fasciculatus</i> chaparral bushmallow
<i>Malva parviflora</i> * cheeseweed
<i>Malvella leprosa</i> alkali mallow
MYRTACEAE - MYRTLE FAMILY
<i>Eucalyptus camaldulensis</i> * river red gum
NYCTAGINACEAE - FOUR-O'CLOCK FAMILY
<i>Abronia villosa</i> var. <i>aurita</i> chaparral sand-verbena
OLEACEAE - OLIVE FAMILY
<i>Olea europaea</i> * olive
ONAGRACEAE - EVENING PRIMROSE FAMILY
<i>Camissonia californica</i> mustard-like evening primrose
<i>Camissonia campestris</i> ssp. <i>campestris</i> sun cups
PLANTAGINACEAE - PLANTAIN FAMILY
<i>Plantago elongata</i> California alkali plantain
PLUMBAGINACEAE - LEADWORT FAMILY
<i>Limonium sinuatum</i> * winged sea-lavender

**PLANTS OBSERVED WITHIN THE PROJECT SITE
DURING FOCUSED BOTANICAL SURVEYS
(Continued)**

FLOWERING PLANTS
<i>POLYGONACEAE</i> - BUCKWHEAT FAMILY
<i>Eriogonum fasciculatum</i> var. <i>foliolosum</i> interior flat-topped buckwheat
<i>Polygonum arenastrum</i> * common knotweed
<i>Polygonum argyrocoleon</i> * Persian knotweed
<i>Rumex crispus</i> * curly dock
<i>Rumex maritimus</i> golden dock
<i>ROSACEAE</i> - ROSE FAMILY
<i>Adenostoma fasciculatum</i> chamise
<i>SALICACEAE</i> - WILLOW FAMILY
<i>Salix gooddingii</i> black willow
<i>SCROPHULARIACEAE</i> - FIGWORT FAMILY
<i>Mimulus guttatus</i> seep monkeyflower
<i>Veronica peregrina</i> ssp. <i>xalapensis</i> purslane speedwell
<i>SOLANACEAE</i> - NIGHTSHADE FAMILY
<i>Datura wrightii</i> jimson weed
<i>Nicotiana glauca</i> * tree tobacco
<i>Nicotiana quadrivalvis</i> Wallace's tobacco
CLASS MONOCOTYLEDONES (MONOCOTS)
<i>ARECACEAE (PALMAE)</i> - PALM FAMILY
<i>Phoenix canariensis</i> * Canary Island date palm
<i>Washingtonia robusta</i> * Mexican fan palm
<i>CYPERACEAE</i> - SEDGE FAMILY
<i>Eleocharis macrostachya</i> perennial spike rush
<i>Scirpus californicus</i> California bulrush
<i>POACEAE [GRAMINEAE]</i> - GRASS FAMILY
<i>Avena fatua</i> * wild oat
<i>Bromus diandrus</i> * ripgut grass
<i>Bromus inermis</i> ssp. <i>inermis</i> * smooth brome
<i>Bromus madritensis</i> ssp. <i>rubens</i> * foxtail chess

**PLANTS OBSERVED WITHIN THE PROJECT SITE
DURING FOCUSED BOTANICAL SURVEYS
(Continued)**

FLOWERING PLANTS	
<i>Bromus tectorum</i> *	cheat grass
<i>Cryptis schoenoides</i> *	swamp timothy
<i>Distichlis spicata</i>	salt grass
<i>Hordeum intercedens</i>	vernal barley
<i>Hordeum marinum</i> var. <i>gussoneanum</i> *	Mediterranean barley
<i>Hordeum murinum</i> var. <i>leporinum</i> *	foxtail barley
<i>Hordeum vulgare</i> *	cultivated barley
<i>Lamarckia aurea</i> *	goldentop grass
<i>Lolium perenne</i> *	perennial ryegrass
<i>Phalaris minor</i> *	little-seed canary grass
<i>Phalaris paradoxa</i> *	paradox canary grass
<i>Polypogon monspeliensis</i> *	annual beard grass
<i>Schismus barbatus</i> *	Mediterranean schismus
<i>Triticum aestivum</i> *	cereal wheat
<i>Vulpia myuros</i> *	foxtail fescue
* introduced species	

ATTACHMENT C

CNDDB FORMS

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notator*

Common Name: San Jacinto Valley crowscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 68 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1426 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485862 3741952

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in island of disturbed alkali scrub/playa north of 12th St. and east of B Ave. in Nuevo. Associates: Hordeum murinum var. leporinum, Hordeum intercedens, Oncosiphon piluliferum, Suaeda moquinii, Lasthenia glabrata ssp. coulteri, Bromus madritensis ssp. rubens, Sisymbrium irio

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 268 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside

Landowner / Mgr.: SCE ROW

Quad Name: Perris

Elevation: 1424 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐

Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐

GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐

Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485853 3741948

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in disturbed alkali scrub/playa adjacent to southwest corner of 12th St. and B Ave. in Nuevo. Associates: Suaeda moquinii, Oncosiphon piluliferum, Hordeum marinum var. gussoneanum, Sisymbrium irio, Lepidium dictyotum, Lasthenia glabrata ssp. coulteri

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____
Total No. Individuals 13 Subsequent Visit? ☒ yes ☐ no
Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____
Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain
Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626
E-mail Address: JCrain@bonterraconsulting.com
Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW
Quad Name: Perris Elevation: 1428 ft
T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐
T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐
Source of Coordinates (GPS, topo. map & type): GPS
GPS Make & Model Garmin GPSMap 60SX
Horizontal Accuracy _____ meters/feet
DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐
Coordinates: 485834 3741964

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in disturbed alkali scrub/playa north of 12th St. and west of B Ave. in Nuevo. Associates: Suaeda moquinii, Oncosiphon piluliferum, Hordeum marinum var. gussoneanum, Sisymbrium irio, Lepidium dictyotum, Mesembryanthemum nodiflorum, Lasthenia glabrata ssp. coulteri

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 28 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1426 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485861 3741978

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in island of disturbed alkali scrub/playa north of 12th St. and east of B Ave. in Nuevo. Associates: Hordeum murinum var. leporinum, Lepidium dictyotum var. acutidens, Suaeda moquinii, Mesembryanthemum nodiflorum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 17 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1426 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485867 3741964

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in island of disturbed alkali scrub/playa north of 12th St. and east of B Ave. in Nuevo. Associates: Hordeum intercedens, Hordeum murinum var. leporinum, Lepidium dictyotum var. acutidens, Suaeda moquinii, Mesembryanthemum nodiflorum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notator*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 2 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1424 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485909 3741944

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In the middle of a dirt road at the northeast corner of 12th St. and B Ave. in Nuevo. Associates: Sisymbrium irio, Bassia hyssopifolia, Atriplex argentea ssp. mohavensis, Hordeum marinum var. gussoneanum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Plants are in the middle of an existing dirt road that is currently in use

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 6 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1427 ft

T _____ R _____ Sec _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485939 3741933

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Along the edge of a dirt road in alkali grassland at the northeast corner of 12th St. and B Ave. in Nuevo. Associates: Sisymbrium irio, Hordeum marinum var. gussoneanum, Suaeda moquinii, Erodium cicutarium

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

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Department of Fish and Game
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Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 11 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1426 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485904 3741926

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in island of disturbed alkali scrub/playa north of 12th St. and east of B Ave. in Nuevo. Associates: *Hordeum murinum* var. *leporinum*, *Lasthenia glabrata* ssp. *coulteri*, *Atriplex argentea* ssp. *mohavensis*, *Beta vulgaris*, *Cressa truxillensis*, *Hordeum marinum* var. *gussoneanum*, *Suaeda moquinii*, *Sisymbrium irio*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 1936 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 100% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1424 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 486747 3743337

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In large shallow depression in island of disturbed alkali scrub/playa north of B Ave.. in Nuevo. Associates: Sueada moquinii, Cressa truxillensis, Sisymbrium irio, Hordeum marinum ssp. gussoneanum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____
Total No. Individuals 63 Subsequent Visit? ☒ yes ☐ no
Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____
Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain
Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626
E-mail Address: JCrain@bonterraconsulting.com
Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 100% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW
Quad Name: Perris Elevation: 1418 ft
T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐
T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐
Source of Coordinates (GPS, topo. map & type): GPS
GPS Make & Model Garmin GPSMap 60SX
Horizontal Accuracy _____ meters/feet
DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐
Coordinates: 486775 3743323

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in island of disturbed alkali scrub/playa north of B Ave.. in Nuevo. Associates: Sueada moquinii, Cressa truxillensis, Sisymbrium irio, Hordeum marinum ssp. gussoneanum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 2 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1426 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485849 3741984

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in island of disturbed alkali scrub/playa north of 12th St. and east of B Ave. in Nuevo. Associates: *Hordeum murinum* var. *leporinum*, *Lepidium dictyotum* var. *acutidens*, *Suaeda moquinii*, *Mesembryanthemum nodiflorum*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 57 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1426 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485912 3741929

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in island of disturbed alkali scrub/playa north of 12th St. and east of B Ave. in Nuevo. Associates: *Hordeum murinum* var. *leporinum*, *Suaeda moquinii*, *Lepidium dictyotum* var. *dictyotum*, *Spergularia marina*, *Atriplex argentea* spp. *mohavensis*, *Hordeum intercedens*, *Hordeum marinum* var. *gussoneanum*, *Cressa truxillensis*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 7 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1433 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485920 3741945

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Alkali grassland island at the northeast corner of 12th St. and B Ave. in Nuevo. Associates: *Kochia scoparia*, *Hordeum marinum* var. *gussoneanum*, *Atriplex argentea* ssp. *mohavensis*, *Suaeda moquinii*, *Erodium cicutarium*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Plant / animal ☐ Slide ☐ Print ☒ Digital
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Atriplex coronata* var. *notatior*

Common Name: San Jacinto Valley crownscale

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 53 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 50% flowering 50% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1429 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485835 3741971

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

In small depression in disturbed alkali scrub/playa north of 12th St. and west of B Ave. in Nuevo. Associates: Suaeda moquinii, Oncosiphon piluliferum, Hordeum marinum var. gussoneanum, Sisymbrium irio, Lepidium dictyotum, Mesembryanthemum nodiflorum, Lasthenia glabrata ssp. coulteri

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: Off-road traffic

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Centromadia pungens ssp. laevis*

Common Name: smooth tarplant

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 1 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 100% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Lakeview Elevation: 1434 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485841 3743409

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Non-native grassland on west of the san Jacinto River in Nuevo. Associates: Amsinckia menziesii, Hordeum murinum, Hordeum marinum ssp. gussoneanum, Oncosiphon piluliferum.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: off road vehicle use

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Centromadia pungens ssp. laevis*

Common Name: smooth tarplant

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 17 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 100% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Lakeview Elevation: 1435 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485889 3743418

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Non-native grassland on west of the san Jacinto River in Nuevo. Associates: Amsinckia menziesii, Hordeum murinum, Hordeum marinum ssp. gussoneanum, Oncosiphon piluliferum.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: off road vehicle use

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Centromadia pungens ssp. laevis*

Common Name: smooth tarplant

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 160 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 20% vegetative 80% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Lakeview Elevation: 1435 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 486051 3743409

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Non-native grassland on west of the san Jacinto River in Nuevo. Associates: Hordeum murinum, Amsinckia menziesii, Oncosiphon piluliferum, Melilotus indica.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: off road vehicle use

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Centromadia pungens ssp. laevis*

Common Name: smooth tarplant

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 8 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 20% vegetative 80% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Lakeview Elevation: 1437 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 486074 3743417

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Non-native grassland on west of the san Jacinto River in Nuevo. Associates: Amsinckia menziesii, Atriplex argentea var. mohavensis, Hordeum murinum, Melilotus indica.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: off road vehicle use

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Centromadia pungens ssp. laevis*

Common Name: smooth tarplant

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 49 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 20% vegetative 80% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Lakeview Elevation: 1437 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 486280 3743424

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Non-native grassland on west of the san Jacinto River in Nuevo. Associates: Atriplex argentea var. mohavensis, Melilotus indica, Erodium cicutarium, Hordeum murinum, Amsinckia menziesii.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: off road vehicle use

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/04/2010

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Centromadia pungens ssp. laevis*

Common Name: smooth tarplant

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 4 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 100% vegetative 0% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Lakeview Elevation: 1434 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 486497 3743431

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Non-native grassland on west of the san Jacinto River in Nuevo. Associates: *Hordeum intercedens*, *Lasthenia californica*, *Phalaris minor*, *Medicago polymorpha*, *Franeria salina*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats: off road vehicle use

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 05/18/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Centromadia pungens ssp. laevis*

Common Name: smooth tarplant

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 65 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 100% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1429 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 486313 3742590

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Disturbed alkali scrub/playa adjacent to southwest corner of intersection of 11th Street and B Avenue in Nuevo. Associates: Hordeum marinum var. gussoneanum, Bassia hyssopifolia, Erodium cicutarium, Phalaris minor

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Area is subject to disturbance by vehicles traveling along existing dirt roads. Tire tracks are evident.

Threats: Off-road vehicles

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 04/07/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lasthenia glabrata ssp. coulteri*

Common Name: Coulter's goldfields

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 1500 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 70% flowering 30% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1445 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485991 3741895

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Alkali grassland depression adjacent to the southeast corner of the intersection of 12th St. and B Ave. in Nuevo. Associates: Hordeum marinum var. gussoneanum, Suaeda moquinii, Kochia scoparia, Sysimbrium irio, Hordeum intercedens

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Area is subject to disturbance by vehicles traveling along existing dirt roads. Tire tracks are evident.

Threats: Off-road vehicles

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☒

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 04/07/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lasthenia glabrata ssp. coulteri*

Common Name: Coulter's goldfields

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 1 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 100% flowering 0% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1420 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 486366 3742584

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Single plant in irrigation ditch along south side of 9th St. in Nuevo. Associates: Sisymbrium irio, Polypogon argyrocoleon, Chenopodium album

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Ditch is regularly cleaned, very sparse vegetation present

Threats: Cleaning activities in ditch

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☒

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

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Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 04/07/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lasthenia glabrata ssp. coulteri*

Common Name: Coulter's goldfields

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 750 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 40% flowering 60% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1435 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485847 3741958

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Alkali scrub/playa depression adjacent to the northwest corner of the intersection of 12th St. and B Ave. in Nuevo. Associates: Suaeda moquinii, Oncosiphon piluliferum, Hordeum marinum var. gussoneanum, Sisymbrium irio, Lepidium dictyotum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Area is subject to disturbance by vehicles traveling along existing dirt roads. Tire tracks are evident.

Threats: Off-road vehicles

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☒

May we obtain duplicates at our expense? yes ☒ no ☐

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Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 04/07/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lasthenia glabrata ssp. coulteri*

Common Name: Coulter's goldfields

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 500 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk. Yes, Occ. # _____

Collection? If yes: _____ Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 80% flowering 20% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1435 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485873 3741950

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Alkali scrub/playa depression adjacent to the northwest corner of the intersection of 12th St. and B Ave. in Nuevo. Associates: Suaeda moquinii, Oncosiphon piluliferum, Hordeum marinum var. gussoneanum, Sisymbrium irio, Lepidium dictyotum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Area is subject to disturbance by vehicles traveling along existing dirt roads. Tire tracks are evident.

Threats: Off-road vehicles

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☒

May we obtain duplicates at our expense? yes ☒ no ☐

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 04/07/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lasthenia glabrata ssp. coulteri*

Common Name: Coulter's goldfields

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 1000 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number Museum / Herbarium

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 70% flowering 30% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1435 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485867 3741938

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Alkali scrub/playa depression adjacent to the northwest corner of the intersection of 12th St. and B Ave. in Nuevo. Associates: Suaeda moquinii, Oncosiphon piluliferum, Hordeum marinum var. gussoneanum, Sisymbrium irio, Lepidium dictyotum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Area is subject to disturbance by vehicles traveling along existing dirt roads. Tire tracks are evident.

Threats: Off-road vehicles

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jcpson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☒

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 04/07/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lasthenia glabrata ssp. coulteri*

Common Name: Coulter's goldfields

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 2500 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 10% flowering 90% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1445 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485946 3741917

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Alkali scrub/playa depression adjacent to the southeast corner of the intersection of 12th St. and B Ave. in Nuevo. Associates: Suaeda moquinii, Atriplex argentea ssp. mohavensis, Hordeum marinum var. gussoneanum, Sisymbrium irio, Lepidium dictyotum

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Area is subject to disturbance by vehicles traveling along existing dirt roads. Tire tracks are evident.

Threats: Off-road vehicles

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☒

May we obtain duplicates at our expense? yes ☒ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 04/07/2009

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lasthenia glabrata ssp. coulteri*

Common Name: Coulter's goldfields

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 1500 Subsequent Visit? ☒ yes ☐ no

Is this an existing NDDDB occurrence? ☐ no ☒ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Jeffrey Crain

Address: 151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626

E-mail Address: JCrain@bonterraconsulting.com

Phone: (714) 444-9199

Plant Information

Phenology: 0% vegetative 70% flowering 30% fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Riverside Landowner / Mgr.: SCE ROW

Quad Name: Perris Elevation: 1445 ft

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin GPSMap 60SX

DATUM: NAD27 ☐ NAD83 ☒ WGS84 ☐ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐

Coordinates: 485991 3741895

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Alkali grassland depression adjacent to the southeast corner of the intersection of 12th St. and B Ave. in Nuevo. Associates: *Hordeum marinum* var. *gussoneanum*, *Suaeda moquinii*, *Kochia scoparia*, *Sysimbrium irio*, *Hordeum intercedens*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances: Area is subject to disturbance by vehicles traveling along existing dirt roads. Tire tracks are evident.

Threats: Off-road vehicles

Comments:

Determination: (check one or more, and fill in blanks)

- ☒ Keyed (cite reference): Jepson
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

Slide Print Digital
Plant / animal ☐ ☐ ☒
Habitat ☐ ☐ ☒
Diagnostic feature ☐ ☐ ☒

May we obtain duplicates at our expense? yes ☒ no ☐

October 13, 2010

Mr. Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, G01, Quad 3A
Rosemead, California 91770

VIA EMAIL
andrew.keller@sce.com

Subject: Results of Focused Burrowing Owl Surveys for the Lakeview Substation and Transmission Line Project in Riverside County, California

Dear Mr. Keller:

This Letter Report presents the results of focused surveys for the western burrowing owl (*Athene cunicularia hypugaea*) on the Lakeview Substation and Transmission Line Project (hereafter referred to as "the Project site") located in Riverside County, California (Exhibit 1). The purpose of the surveys was to determine the presence or absence of the western burrowing owl during its nesting period (generally March 1 to August 31) on or immediately adjacent to the Project site. The surveys were completed in accordance with guidelines provided in the California Burrowing Owl Consortium (CBOC) survey protocol for this species (CBOC 1993) and in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP).

Project Description and Location

The Project's purpose is to construct a new substation and a new transmission line segment to connect the substation to Southern California Edison's (SCE's) existing telecommunication system. The Project site consists of the following: the Proposed Substation Site, the Alternative Substation Site, the Proposed Subtransmission Source Line Route (Segments 1 and 2), the Alternative Subtransmission Source Line Route (Segments 1 and 3), the Proposed Telecommunications Route (New Cable to Moval), the Proposed Overhead Route 1, and the Proposed Overhead Route 2. A 50-foot buffer is also included on either side of all the Subtransmission Source Line Routes and the Proposed Telecommunications Route (Exhibit 2).

The Project site is located on the U.S. Geological Survey's (USGS's) Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Project site is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route runs from the Moval Substation (on Moreno Beach Drive in the City of Moreno Valley) to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Hills to the Ramona Expressway.

Land uses in the immediate vicinity of the Project site are agricultural and residential. Open space is present in the Bernasconi Hills in the northwestern portion of the Project site and the Lakeview Mountains to the southeast of the Project site. Topography in the Project vicinity is mostly flat in the northern portion of the Project and varied in the southern portion, with the elevation ranging from approximately 1,400 feet to 2,200 feet above mean sea level (msl).



Vegetation types and other areas mapped on the Project site include alkali grassland, annual grassland, alkali scrub playa, disturbed alkali scrub playa, alkali wetland, disturbed mule fat scrub, Riversidean sage scrub, disturbed Riversidean sage scrub, southern willow scrub, ruderal, agriculture, ornamental, detention basin, irrigation ditch, disturbed, and developed. The focused surveys for the western burrowing owl were conducted throughout the Project site within all suitable habitats (i.e., annual grassland, ruderal, agriculture, detention basin, irrigation ditch, and disturbed areas).

Background

The western burrowing owl is a grassland specialist distributed throughout western North America, where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. Burrowing owls use a wide variety of arid and semi-arid environments, with well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground (Haug et al. 1993; Dechant et al. 2003). Burrowing owls in Florida excavate their own burrows, but western burrowing owls are dependant upon the presence of burrowing mammals, whose burrows are used for roosting and nesting (Haug et al. 1993). The presence or absence of colonial mammal burrows (e.g., California ground squirrels [*Spermophilus beecheyi*]) is often a major factor that limits the presence or absence of burrowing owls. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities, such as buried and non-functioning drain pipes, stand pipes, and dry culverts. Burrowing mammals may burrow beneath rocks; debris; or large, heavy objects such as abandoned cars, concrete blocks, or concrete pads. Large, hard objects at burrow entrances stabilize the entrance from collapse, and may inhibit excavation by predators.

Burrowing owls often use “satellite”, or non-nesting burrows, moving chicks into them from the nesting burrow presumably to reduce the risk of predation (Desmond and Savidge 1998) and possibly to avoid nest parasites (Dechant et al. 2003). One pair may use up to ten satellite burrows (James and Seabloom 1968). Individual burrowing owls have a moderate to high site fidelity to previously used burrow complexes and often use the same burrows for nesting year after year.

The western burrowing owl was once abundant and widely distributed within coastal Southern California, but it has declined precipitously in Los Angeles, Orange, San Diego, Riverside, and San Bernardino Counties. A recent petition was submitted to list the California population of the western burrowing owl as an Endangered or Threatened species (Center for Biological Diversity et al. 2003). The California Department of Fish and Game (CDFG) declined to list the burrowing owl as either Threatened or Endangered in consideration of its overall population throughout the state. The western burrowing owl is considered locally rare in Southern California and is considered a California Species of Special Concern.

Survey Methodology

Surveys on the Project site followed a methodology based on guidelines provided in the CBOC survey protocol for this species and in the Western Riverside County MSHCP (Riverside County 2006). The Western Riverside County MSHCP survey instructions are the most current protocol described for the species. The guidelines outline a survey methodology that has been officially approved by the CDFG and the U.S. Fish and Wildlife Service (USFWS). Surveys for the burrowing owl are conducted during the breeding season, which extends from March 1 to August 31. These surveys are done in three phases: (1) habitat assessment; (2) burrow surveys; and (3) focused owl surveys.

Habitat Assessment

The first step, habitat assessment, identifies whether the Project site provides potential habitat for the species. This determination is made by a Biologist that is knowledgeable in burrowing owl habitat, ecology, and identification. The Biologist conducts the assessment by walking the Project site (including an approximate 500-foot buffer area, if it is accessible) to visually inspect the Project site and assess its potential for burrowing owls.

BonTerra Consulting Biologist Lindsay Messett conducted the habitat assessment on August 13, 2010. The assessment was conducted by walking and/or driving the Project site to visually inspect it and assess its potential for burrowing owls.

Burrow Survey

The second step, burrow survey, identifies suitable burrow(s) and location(s) of occupied burrow(s). A qualified Biologist conducts the burrow survey by walking through suitable habitat within the Project site via transects spaced no more than approximately 100 feet apart in order to ensure 100 percent visual coverage of the ground surface. If no potentially active burrows are detected, then no focused owl surveys are required. The burrow survey was conducted concurrently with the habitat assessment by Ms. Messett on August 13, 2010. Ms. Messett walked transects at regularly spaced intervals to achieve 100 percent visual coverage of all potential habitat within the Project site. Any natural or man-made cavities large enough to allow a burrowing owl to enter were inspected for evidence of occupation. Evidence of occupation may include prey remains, cast pellets, white-wash, feathers, and observations of owls adjacent to burrows. The burrow survey was not conducted within five days of rain, which could have washed away potential sign. Surveys beyond private property boundaries were sometimes limited to what could be observed with binoculars unless authorization to access the area was obtained.

Focused Burrowing Owl Surveys

If owls or potentially occupied burrows or cavities are located during the burrow survey, then crepuscular (dawn or dusk) focused burrowing owl surveys are required. Focused surveys were conducted within several portions of the Project site where burrowing owls had a potential to occur based on the results of the habitat assessment and burrow survey. These surveys were conducted from either one hour before sunrise to two hours after, or from two hours before sunset to one hour after. These surveys are conducted only with sufficient light to follow burrowing owl flights. Focused crepuscular surveys were conducted by Ms. Messett on August 16, 17, 18, and 19, 2010. All potential habitat within the Project site was surveyed to achieve 100 percent visual coverage of the area. Binoculars were used to inspect holes; crevices; and potential perches such as rocks, fence posts, and other elevated structures for the presence of owls while listening for owl calls. Representative site photographs are included as Exhibit 3.

Survey Results

Suitable habitat for burrowing owl is present throughout the Project site. The majority of suitable habitat (i.e., flat, open areas) is located along the Proposed Telecommunications Route. The California ground squirrel and its associated burrows were observed scattered throughout this area. Rock and debris piles were also located throughout the Project site and surveyed. Although there are historical records of burrowing owls in the immediate vicinity of the Project site and suitable habitat is present throughout the Project site, no burrowing owls or owl sign

(e.g., cast pellets, white-wash, feathers, prey remains) were observed on the Project site during the focused surveys. Survey times and weather conditions are summarized in Table 1 below.

TABLE 1
SUMMARY OF BURROWING OWL SURVEYS

Survey Number	Date	Time (Start/End)	Surveyors	Weather Conditions			Results
				Temperature (°F) (Start/End)	Wind (mph) (Start/End)	Cloud Cover (%) (Start/End)	
Burrow Survey	August 13, 2010	0700/1400	Messett	57/90	0-0/0-1	Clear/Clear	Suitable burrows and areas with white-wash observed
Crepuscular Survey 1	August 16, 2010	0535/1040	Messett	64/89	0-0/0-1	Clear/Clear	No burrowing owls observed
Crepuscular Survey 2	August 17, 2010	0500/0950	Messett	68/88	0-0/0-1	Clear/Clear	No burrowing owls observed
Crepuscular Survey 3	August 18, 2010	0515/1055	Messett	72/91	0-2/0-3	Clear/Clear	No burrowing owls observed
Crepuscular Survey 4	August 19, 2010	0520/1045	Messett	66/88	0-1/0-2	Clear/Clear	No burrowing owls observed
°F: degrees Fahrenheit; mph: miles per hour							

A list of wildlife species observed during the burrowing owl surveys is provided in Attachment A of this Letter Report. The list includes two special status species: loggerhead shrike (*Lanius ludovicianus*) and rufous-crowned sparrow (*Aimophila ruficeps canescens*).

Loggerhead shrike is a California Species of Special Concern (SSC); nesting individuals are protected. Shrikes inhabit open habitats with short vegetation such as pastures, agricultural fields, riparian areas, and open woodlands (Yosef 1996). They can often be found perched on fences and posts from which prey items (e.g., large insects, small mammals, and lizards) can be seen. This species was widely distributed across North America but has declined throughout most of its range in recent decades (Yosef 1996). It was considered to be a fairly common year-round resident in Southern California (Garrett and Dunn 1981), but has recently shown declines in its California population (Small 1994; Hamilton and Willick 1996). Suitable habitat for this species is present throughout the Project site; this species was observed along the Proposed Subtransmission Source Line Route, Segment 1 and the Proposed Telecommunications Route.

Southern California rufous-crowned sparrow is a CDFG Watch List species. In coastal Southern California, rufous-crowned sparrows are considered fairly common in scrub vegetation types and other habitats with grasses and widely spaced, low shrubs. They also prefer slopes with rock outcroppings (Garrett and Dunn 1981). This subspecies is present throughout the year in Southern California, but is threatened by loss of habitat due to development. Southern California rufous-crowned sparrows were observed and/or detected through vocalization along the Proposed Telecommunications Route.

Recommendations

The County of Riverside requires pre-construction surveys prior to any ground disturbance for development on the Project site. As stated in the County of Riverside's Burrowing Owl Survey Instructions, "All project sites containing burrows or suitable habitat... require pre-construction surveys that shall be conducted within 30 days prior to ground disturbance to avoid direct take

of burrowing owls" (County of Riverside 2006). Pre-construction surveys can be conducted at any time of year. Although the burrowing owl was not observed and/or detected on the Project site during spring surveys, suitable habitat for this species exists throughout the Project site and there is potential for burrowing owls to occupy the Project site in the future. Therefore, a qualified Biologist should conduct a pre-construction survey within 30 days prior to any ground-disturbing activity.

If an active burrow is observed during the non-nesting season, a qualified Biologist will monitor the nest site. When the owl is away from the nest, the Biologist will exclude the owl from the burrow and then remove the burrow so the burrowing owl cannot return to the burrow.

If nesting activity is present at an active burrow, the active site will be protected until nesting activity has ended to ensure compliance with Section 3503.5 of the *California Fish and Game Code*. Peak nesting activity for the burrowing owl normally occurs between April and July. To protect the active burrow, the following restrictions to construction activities will be required until the burrow is no longer active (as determined by a qualified Biologist): (1) Clearing limits will be established within a 500-foot buffer around any active burrow, unless otherwise determined by a qualified Biologist and (2) access and surveying will be restricted within 300 feet of any active burrow, unless otherwise determined by a qualified Biologist. Any encroachment into the buffer area around the active burrow will only be allowed if the Biologist determines that the proposed activity will not disturb the nest occupants. Construction can proceed when the qualified Biologist has determined that fledglings have left the nest.

BonTerra Consulting appreciates the opportunity to assist with this Project. Please contact Jeff Crain at (714) 444-9199 if you have questions or comments.

Sincerely,

BONTERRA CONSULTING



Jeffrey S. Crain
Botanist/Restoration Ecologist



Lindsay A. Messett
Biologist

Attachments: Exhibits 1, 2 and 3
Attachment A – Wildlife Compendium

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References

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Center for Biological Diversity, Defenders of Wildlife, California State Park Rangers Association, Santa Clara Valley Audubon Society, San Bernardino Valley Audubon Society, and Tri-county Conservation League (CBD et al.). 2003 (April 7). *Petition to the State of*

California Fish and Game Commission and Supporting Information for Listing the California Population of the Western Burrowing Owl (Athene cunicularia hypugaea) as an Endangered or Threatened Species under the California Endangered Species Act. Oakland, CA: Center for Biological Diversity et al. <http://www.biologicaldiversity.org/swcbd/species/b-owl/petition.pdf>.

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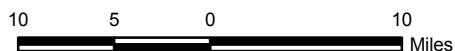
Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*). *The Birds of North America*, No. 231 (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).



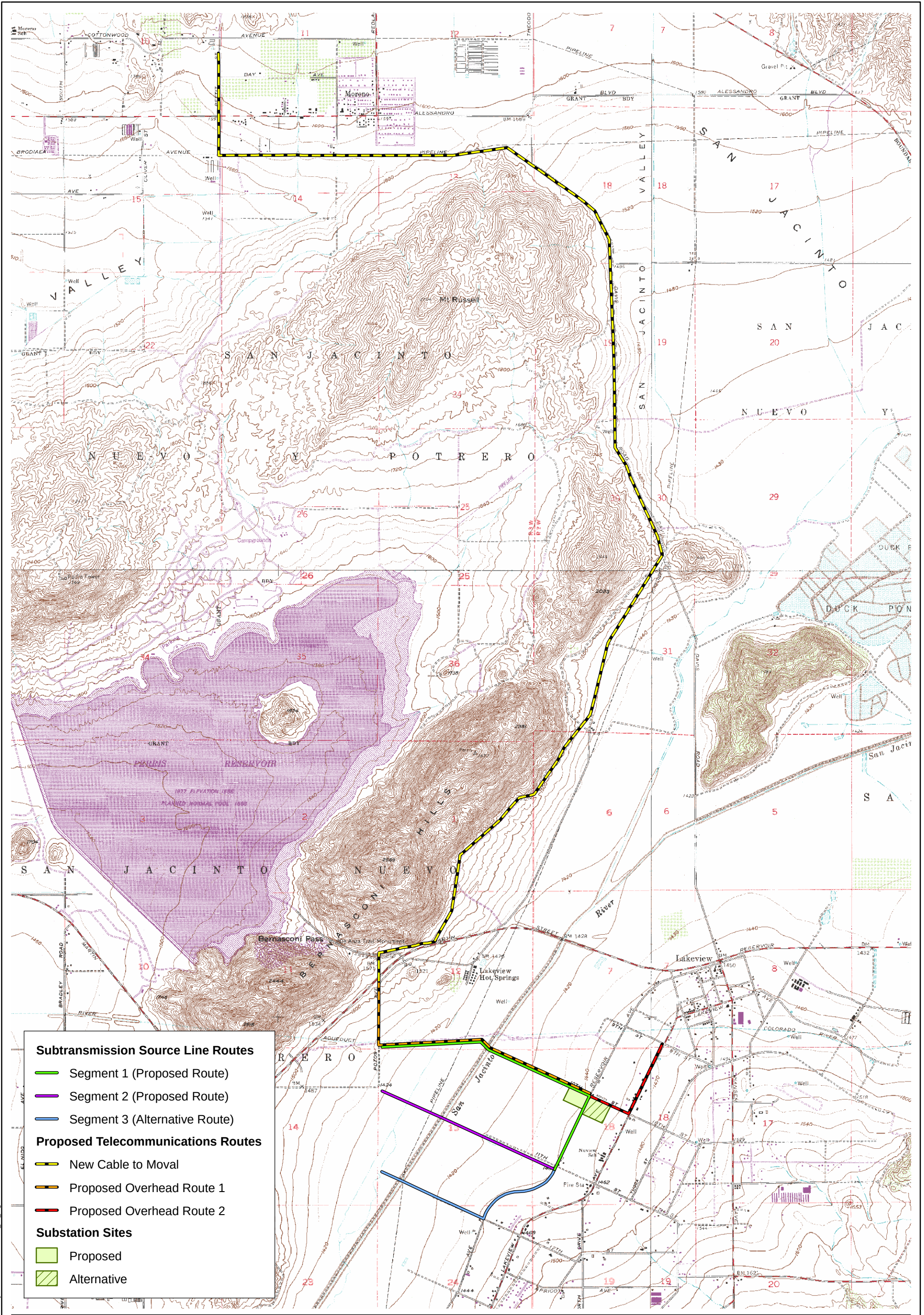
Regional Location

Lakeview Substation and Transmission Line Project

Exhibit 1



Bonterra
CONSULTING



Subtransmission Source Line Routes

- Segment 1 (Proposed Route)
- Segment 2 (Proposed Route)
- Segment 3 (Alternative Route)

Proposed Telecommunications Routes

- New Cable to Moval
- Proposed Overhead Route 1
- Proposed Overhead Route 2

Substation Sites

- Proposed
- Alternative

Local Vicinity

Lakeview Substation and Transmission Line Project

W

E

S

N

3,000

1,500

0

3,000

Feet

Exhibit 2





Suitable burrowing owl habitat located along the Proposed Telecommunications Route, looking southwest.



California ground squirrel burrows located along the Proposed Telecommunications Route.

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Site Photographs

Lakeview Substation and Transmission Line Project

Exhibit 3

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ATTACHMENT A
WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species
Reptiles
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, & HORNED LIZARDS
<i>Sceloporus occidentalis</i> western fence lizard
<i>Uta stansburiana</i> side-blotched lizard
<i>Pituophis catenifer</i> gopher snake
Birds
CATHARTIDAE - NEW WORLD VULTURES
<i>Cathartes aura</i> turkey vulture
ACCIPITRIDAE - HAWKS, KITES, EAGLES, & ALLIES
<i>Accipiter cooperii</i> Cooper's hawk
<i>Buteo jamaicensis</i> red-tailed hawk
FALCONIDAE - FALCONS
<i>Falco sparverius</i> American kestrel
CHARADRIIDAE - PLOVERS
<i>Charadrius vociferus</i> killdeer
COLUMBIDAE - PIGEONS & DOVES
<i>Columba livia</i> * rock pigeon
<i>Zenaida macroura</i> mourning dove
TROCHILIDAE - HUMMINGBIRDS
<i>Calypte anna</i> Anna's hummingbird
TYRANNIDAE - TYRANT FLYCATCHERS
<i>Sayornis nigricans</i> black phoebe
<i>Sayornis saya</i> Say's phoebe
<i>Tyrannus vociferans</i> Cassin's kingbird
<i>Tyrannus verticalis</i> western kingbird
LANIIDAE - SHRIKES
<i>Lanius ludovicianus</i> loggerhead shrike
CORVIDAE - CROWS & JAYS
<i>Corvus brachyrhynchos</i> American crow
<i>Corvus corax</i> common raven

WILDLIFE SPECIES OBSERVED DURING SURVEYS (Continued)

Species
HIRUNDINIDAE - SWALLOWS
<i>Petrochelidon pyrrhonota</i> cliff swallow
TROGLODYTIDAE - WRENS
<i>Thryomanes bewickii</i> Bewick's wren
MIMIDAE - THRASHERS
<i>Mimus polyglottos</i> northern mockingbird
STURNIDAE - STARLINGS
<i>Sturnus vulgaris</i> * European starling
EMBERIZIDAE - SPARROWS & JUNCOS
<i>Melospiza [Pipilo] crissalis</i> California towhee
<i>Aimophila ruficeps</i> rufous-crowned sparrow
<i>Chondestes grammacus</i> lark sparrow
ICTERIDAE - BLACKBIRDS
<i>Agelaius phoeniceus</i> red-winged blackbird
<i>Sturnella neglecta</i> western meadowlark
<i>Euphagus cyanocephalus</i> Brewer's blackbird
<i>Molothrus ater</i> brown-headed cowbird
FRINGILLIDAE - FINCHES
<i>Carpodacus mexicanus</i> house finch
<i>Spinus [Carduelis] psaltria</i> lesser goldfinch
PASSERIDAE - OLD WORLD SPARROWS
<i>Passer domesticus</i> house sparrow *
Mammals
LEPORIDAE - HARES & RABBITS
<i>Sylvilagus audubonii</i> desert cottontail
SCIURIDAE - SQUIRRELS
<i>Spermophilus beecheyi</i> California ground squirrel
GEOMYIDAE - POCKET GOPHERS
<i>Thomomys bottae</i> Botta's pocket gopher

**WILDLIFE SPECIES OBSERVED DURING SURVEYS
(Continued)**

Species
CANIDAE - WOLVES & FOXES
<i>Canis latrans</i> coyote
MUSTELIDAE - WEASELS, SKUNKS & OTTERS
<i>Mephitis mephitis</i> striped skunk
* introduced species

October 14, 2010

Mr. Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, G01 Quad 3A
Rosemead, California 91770

VIA EMAIL
Andrew.Keller@sce.com

Subject: Results of a Habitat Assessment for the Stephens' Kangaroo Rat and the Los Angeles Pocket Mouse on the Lakeview Substation and Transmission Line Project, Riverside County, California

Dear Mr. Keller:

This Letter Report describes the details of a habitat assessment for the federally listed Endangered and State-listed Threatened Stephens' kangaroo rat (*Dipodomys stephensi*) and the Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), a California Species of Special Concern, on the Lakeview Substation and Transmission Line Project (hereafter referred to as the "Project site") in Riverside County, California (Exhibit 1). The purpose of the assessments was to determine the presence of suitable habitat for the Stephens' kangaroo rat and Los Angeles pocket mouse on or immediately adjacent to the Project site. Surveys were conducted by a Biologist that holds the necessary Federal Endangered Species Act (FESA) survey permit and according to guidelines established by the U.S. Fish and Wildlife Service (USFWS).

Project Location

The Project site is located on the U.S. Geological Survey's (USGS') Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Project site is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route runs from the Moval Substation (on Moreno Beach Drive in the City of Moreno Valley) to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Hills to the Ramona Expressway. The Project includes a Proposed Substation Site and an Alternative Substation Site, a Proposed Subtransmission Source Line Route (Segments 1 and 2), a Proposed Telecommunications Route (New Cable to Moval and Proposed Overhead Routes 1 and 2), and an Alternative Subtransmission Source Line Route (Segment 3) (Exhibit 2). A 50-foot buffer is also included on either side of all the Subtransmission Source Line Routes and the Proposed Telecommunications Routes.

Background

The Stephens' kangaroo rat and Los Angeles pocket mouse are special status small mammal species that occur in the general area of the Project described above.

Both species are known from historical data to occur along the Proposed Telecommunications Route (New Cable to Moval) (CDFG 2010).



Survey Methodology

Consulting Biologist Stephen J. Montgomery (USFWS Permit #TE745541-10) assessed the entire Project site for suitable habitat for the target species on August 23, 2010. General habitat conditions along the Project site were first viewed on aerial maps and an evaluation was made concerning the likelihood of presence/absence of each species on and adjacent to the Project site. All undeveloped lands were noted on a field map and then checked for potential suitability for the two species in the field.

Survey Results

Large portions of the Proposed Telecommunications Route (New Cable to Moval) are within known occupied territory for both the Stephens' kangaroo rat and Los Angeles pocket mouse (CDFG 2010). The proposed activity in this area involves daytime use of existing roads to install new cable on existing poles and will not likely impact either species. For this reason, trapping is not recommended in the area. Potentially suitable habitat is found along the Proposed Subtransmission Source Line Route (Segments 1 and 2); the Alternative Subtransmission Source Line Route (Segment 3); and the Proposed Telecommunications Route (Overhead Route 1). Trapping will be conducted in these areas in October 2010.

If you have any comments or questions, please call Jeff Crain at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING



Jeffrey S. Crain
Botanist/Restoration Ecologist

Attachments: Exhibit 1 – Regional Location
Exhibit 2 – Local Vicinity

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REFERENCES

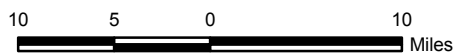
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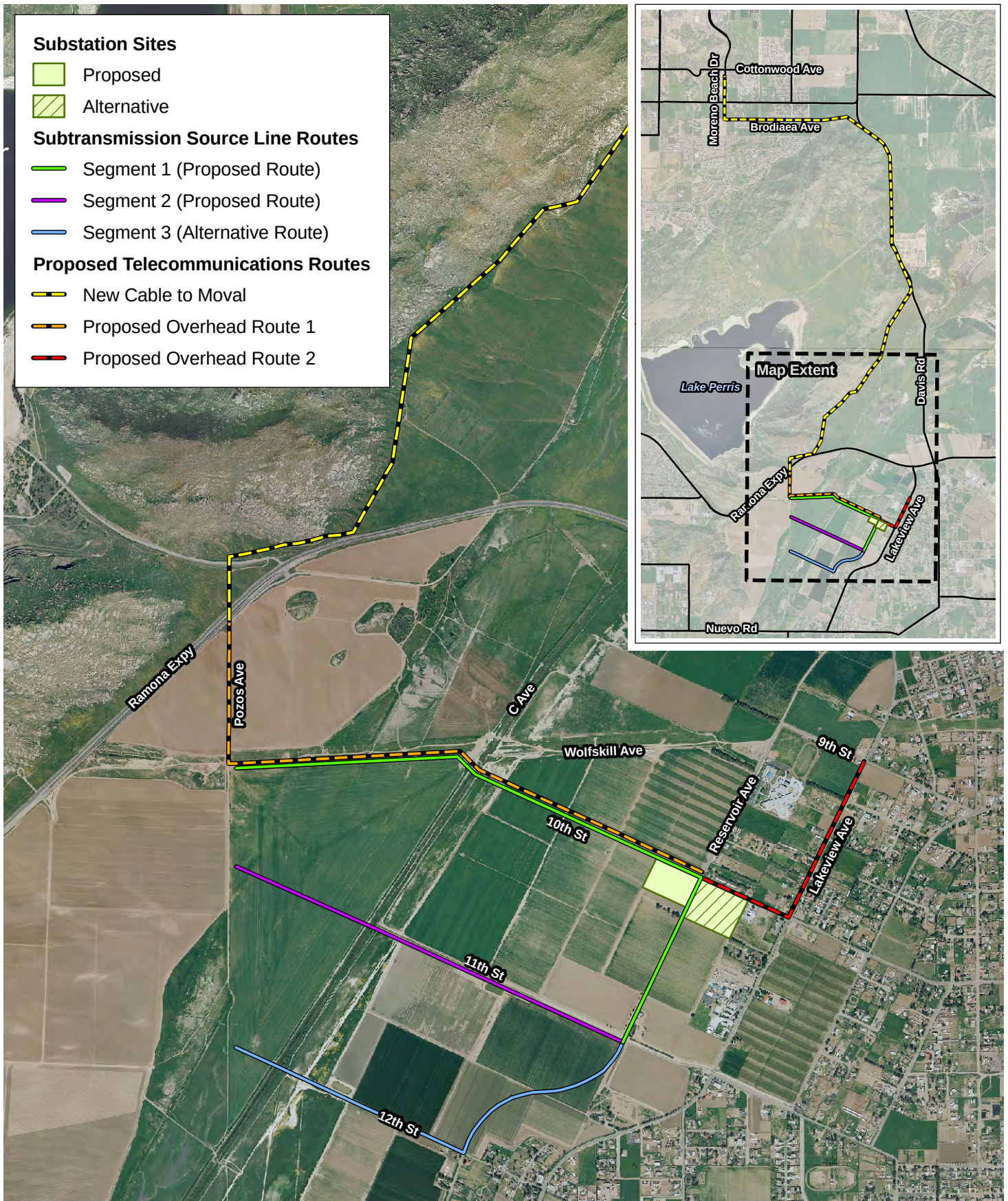
Regional Location

Lakeview Substation and Transmission Line Project

Exhibit 1



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Local Vicinity

Lakeview Substation and Transmission Line Project



2,000 1,000 0 2,000
Feet

Exhibit 2

Bonterra
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September 22, 2010

Mr. Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, G01 Quad 3A
Rosemead, California 91770

VIA EMAIL
Andrew.Keller@sce.com

Subject: Results of Focused Presence/Absence Surveys for the Coastal California Gnatcatcher for the Lakeview Substation and Transmission Line Project in Riverside County, California

Dear Mr Keller:

This Letter Report presents the results of focused surveys for the coastal California gnatcatcher (*Polioptila californica californica*) for the Lakeview Substation and Transmission Line Project (hereafter referred to as the "Project site") located in Riverside County, California (Exhibit 1). The purpose of the surveys was to determine the presence or absence of the coastal California gnatcatcher on or immediately adjacent to the Project site. Surveys were conducted by biologists that hold the necessary Federal Endangered Species Act (FESA) survey permit and according to guidelines established by the U.S. Fish and Wildlife Service (USFWS).

Project Location and Description

The Project site is located on the U.S. Geological Survey's (USGS) Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Project site is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route runs from the Moval Substation on Moreno Beach Drive in the City of Moreno Valley to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Mountains to the Ramona Expressway. The Project site includes a Proposed and Alternative Substation Site, the Proposed Subtransmission Source Line Route, and the Proposed Telecommunications Route (Exhibit 2).

Land uses in the immediate vicinity of the Project site are agricultural and residential. Open space is present in the Bernasconi Hills in the northwestern portion of the Project site and the Lakeview Mountains to the southeast of the Project site. Topography in the Project vicinity is mostly flat in the northern portion of the Project and varied in the southern portion with an approximate range of elevation from approximately 1,400 feet to 2,200 feet above mean sea level (msl).

Vegetation types and other areas mapped on the Project site include alkali grassland, annual grassland, alkali scrub playa, disturbed alkali scrub playa, alkali wetland, Riversidean sage scrub, disturbed Riversidean sage scrub, southern willow scrub, ruderal, agriculture, ornamental, irrigation ditch, detention basin, disturbed, and developed (Exhibits 3A–3E). The focused surveys for the coastal California gnatcatcher were conducted within all suitable



Riversidean sage scrub and disturbed Riversidean sage scrub habitats that were dominated by brittlebush (*Encelia farinosa*), interior flat-topped buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), California sagebrush (*Artemisia californica*), deerweed (*Lotus scoparius*), and white sage (*Salvia apiana*). Specifically, the survey area for the gnatcatcher includes only the southern portion of the New Cable to Moval and a portion of the Proposed Overhead Route 1 (Exhibits 3A–3E) due to the presence of suitable habitat. Surveys were not conducted within the northernmost portion of the New Cable to Moval; southeastern portion of Proposed Overhead Route 1; all of Segments 1, 2, and 3; Proposed Overhead Route 2; and Proposed and Alternative Substation Sites (Exhibit 2) due to the absence of suitable habitat. Photos of representative habitat in the survey area are provided in Exhibit 4.

Background

Coastal California Gnatcatcher

Recent taxonomic studies indicate the California gnatcatcher consists of four subspecies that extend from southwestern California to southern Baja California, Mexico (Atwood and Lerman 2006; Mellink and Rea 1994). The coastal California gnatcatcher, the northernmost gnatcatcher subspecies, is restricted to lowland areas from central Ventura County through Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties to the Baja California, Mexico border (Atwood and Lerman 2006; Mellink and Rea 1994). Formerly, the coastal California gnatcatcher was common from the San Fernando Valley east along the base of the San Gabriel Mountains to Claremont (Atwood 1990). The coastal California gnatcatcher is now rare in the northern part of its range with a handful of sightings from Santa Clarita to Tujunga Wash, though a small population persists near Moorpark in Ventura County. The coastal California gnatcatcher has been recorded from sea level to approximately 3,000 feet above msl (USFWS 2003); however, greater than 90 percent of gnatcatcher records are from elevations below 820 feet above msl along the coast (Atwood and Bolsinger 1992; MBA 1991) and between sea level and 1,800 feet above msl inland. Recent estimates by the USFWS regarding the population size of the coastal California gnatcatcher in Southern California have been about 3,000 pairs (Atwood and Bontrager 2001).

The coastal California gnatcatcher typically occurs within coastal and inland sage scrub vegetation types. Sage scrub often occurs in a patchy distribution pattern throughout the gnatcatcher's range. Coastal California gnatcatchers also use chaparral, grassland, and riparian habitats that are near sage scrub. These non-sage scrub habitats are used for dispersal and foraging (Atwood et al. 1998; Campbell et al. 1998; USFWS 2003). Availability of these non-sage scrub areas is essential during certain times of the year, particularly during drought conditions, or for dispersal, foraging, or nesting (USFWS 2003).

The coastal California gnatcatcher was designated as a Threatened species by the USFWS on March 25, 1993. A Special Rule was issued that would allow incidental take of coastal California gnatcatcher under Section 9 of the FESA if the take results from activities conducted in accordance with the State's Natural Community Conservation Plan (NCCP) Act (USFWS 1993). For those not participating in the State's NCCP, any activity that may result in the take of coastal California gnatcatcher requires formal consultation with the USFWS under Sections 7 or 10 of the FESA.

On December 19, 2007, the USFWS published a final rule revising critical habitat for the coastal California gnatcatcher. The revised critical habitat designates 197,303 acres of land in San Diego, Orange, Riverside, San Bernardino, Los Angeles, and Ventura Counties as critical

habitat for the coastal California gnatcatcher (USFWS 2007). The Project site is not located in the designated critical habitat for the coastal California gnatcatcher.

Survey Methodology

The USFWS coastal California gnatcatcher survey protocol recommends six visits to all potentially occupied habitat areas for surveys conducted entirely within the breeding season, which extends from March 15 to June 30 (USFWS 1997a, USFWS 1997b). All visits must take place at least one week apart during the morning hours, and no more than 80 acres of suitable habitat may be surveyed per visit. BonTerra Consulting Biologist Lindsay Messett (USFWS Permit No. PRT-067064-1) conducted the six focused survey visits. Surveys were conducted on April 9, 16, and 27, and on May 4, 20 and 27, 2010. The surveys covered all potentially suitable habitats for the coastal California gnatcatcher in the survey area.

Weather conditions met the USFWS survey protocol requirements for optimal gnatcatcher detection. Weather conditions that were too cold (below 55 degrees Fahrenheit [°F]), too hot (above 95°F), or too windy (wind speed greater than 15 miles per hour) were avoided. Surveys were conducted by slowly walking through all appropriate habitats (i.e., Riversidean sage scrub) and while listening and watching for gnatcatcher activity. A combination of taped recordings of gnatcatcher vocalizations and “pishing” sounds were used in an attempt to elicit responses from any gnatcatchers that might be present. The frequency of vocalization playback and “pishing” varied depending on conditions, such as habitat patch size and topography in each area. All bird species detected during the survey were recorded, including notable observations of special status birds or other wildlife species. A list of the species observed during the surveys is included in Attachment A.

Survey Results

No coastal California gnatcatchers were observed or detected on or adjacent to the survey area during the focused surveys. Survey dates, times and weather data for the focused coastal California gnatcatcher surveys are shown in Table 1 below.

TABLE 1
SUMMARY OF COASTAL CALIFORNIA GNATCATCHER SURVEYS

Survey Number	Date	Time (Start/End)	Surveyors	Weather Conditions			Gnatcatchers Observed and/or Detected
				Temperature (°F) (Start/End)	Wind (mph) (Start/End)	Cloud Cover (%) (Start/End)	
1	April 9, 2010	0710/1140	Messett	62/74	0–1/0–2	Clear/Clear	None
2	April 16, 2010	0845/1215	Messett	59/66	0–1/0–4	20%/10%	None
3	April 27, 2010	0715/1130	Messett	57/72	0–2/0–4	Clear/30%	None
4	May 4, 2010	0700/1145	Messett	61/78	0–1/0–2	Clear/Clear	None
5	May 20, 2010	0730/1150	Messett	63/80	0–1/0–6	Clear/25%	None
6	May 27, 2010	0800/1205	Messett	59/70	0–1/0–4	100%/100%	None

Special Status (Sensitive) Species

Three special status wildlife species were observed and/or detected in the survey area during the surveys: loggerhead shrike (*Lanius ludovicianus*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*) and tricolored blackbird (*Agelaius tricolor*).

If you have any comments or questions, please call Jeff Crain or Lindsay Messett at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING



Jeff S. Crain
Botanist/Restoration Ecologist

I certify that the information in this survey report and enclosed exhibits fully and accurately present my work.



Lindsay A. Messett
Ecologist
(PRT # 067064-1)

Exhibits 1, 2, 3A-3E, and 4
Attachment A – Wildlife Compendium

cc: Ms. Sandy Marquez, USFWS

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Regional Location

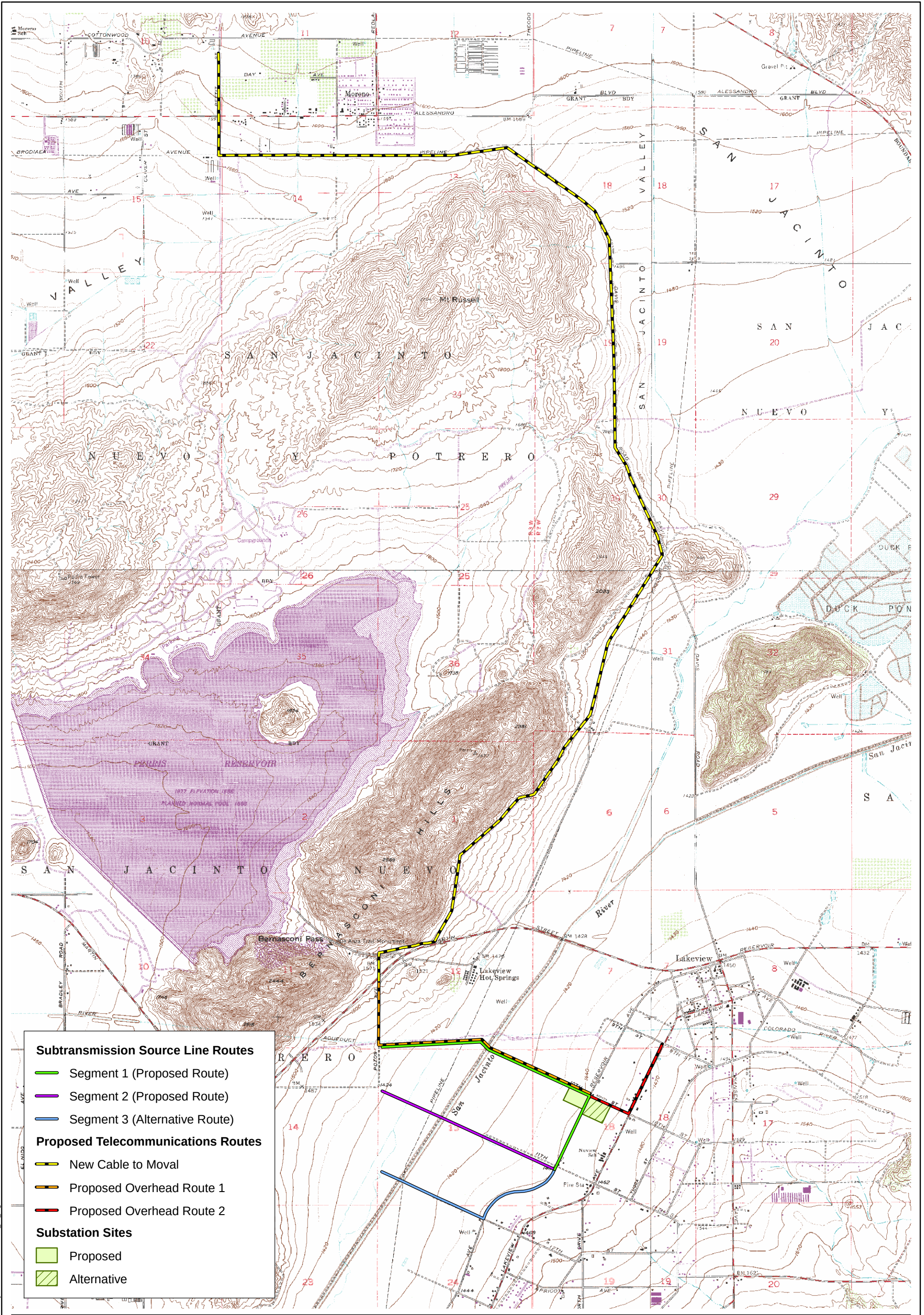
Lakeview Substation and Transmission Line Project



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Exhibit 1

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Subtransmission Source Line Routes

- Segment 1 (Proposed Route)
- Segment 2 (Proposed Route)
- Segment 3 (Alternative Route)

Proposed Telecommunications Routes

- New Cable to Moval
- Proposed Overhead Route 1
- Proposed Overhead Route 2

Substation Sites

- Proposed
- Alternative

Local Vicinity

Lakeview Substation and Transmission Line Project

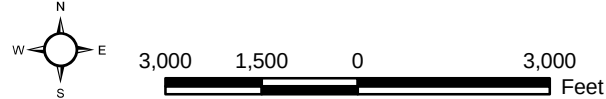
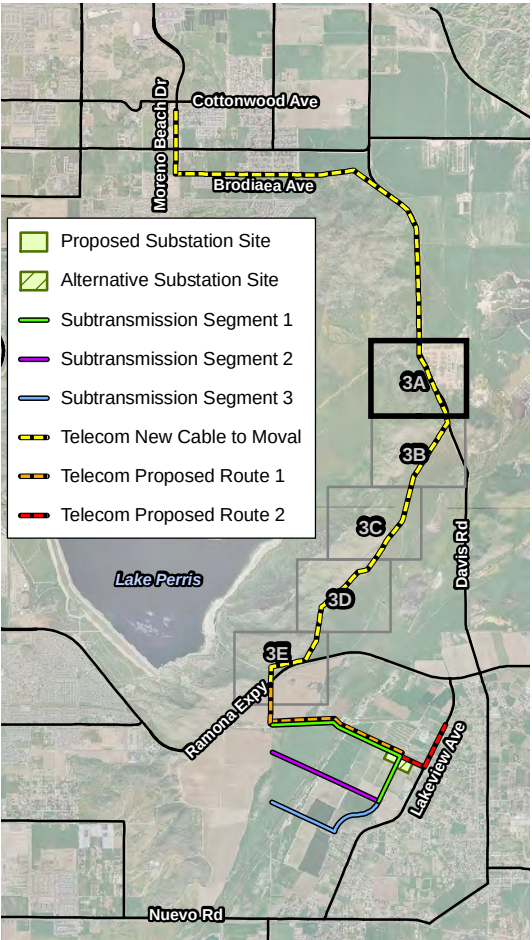


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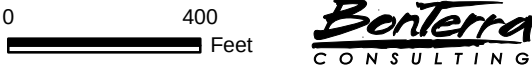


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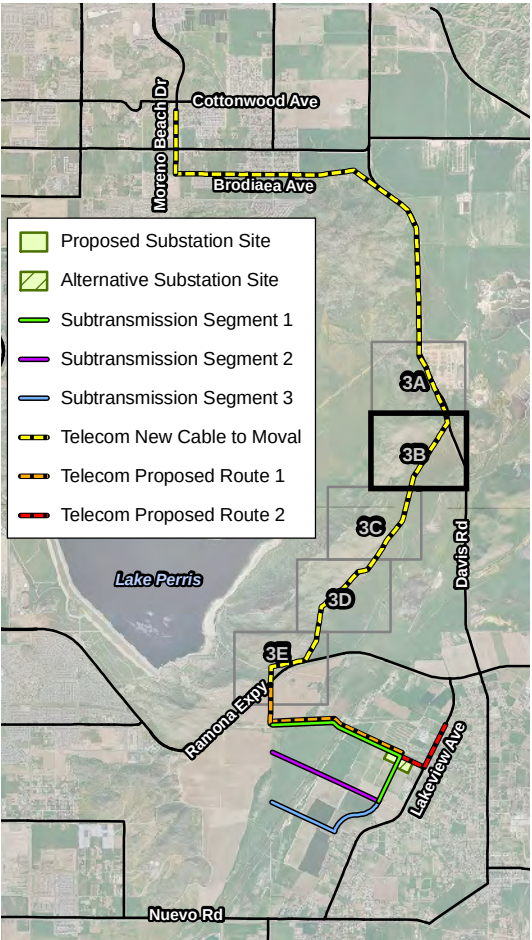
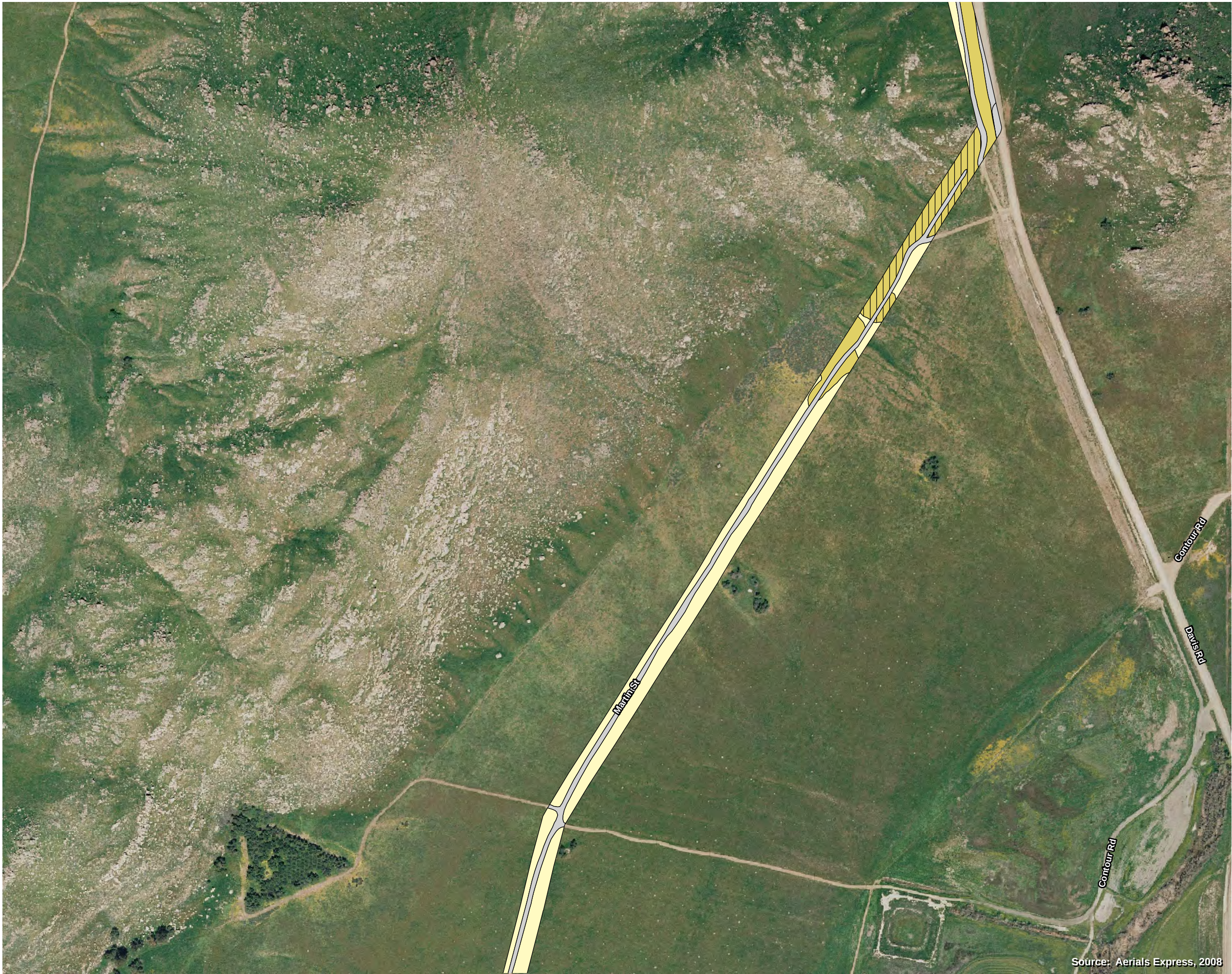
Vegetation Types **Exhibit 3A**

*Lakeview Substation and
Transmission Line Project*



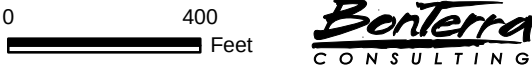
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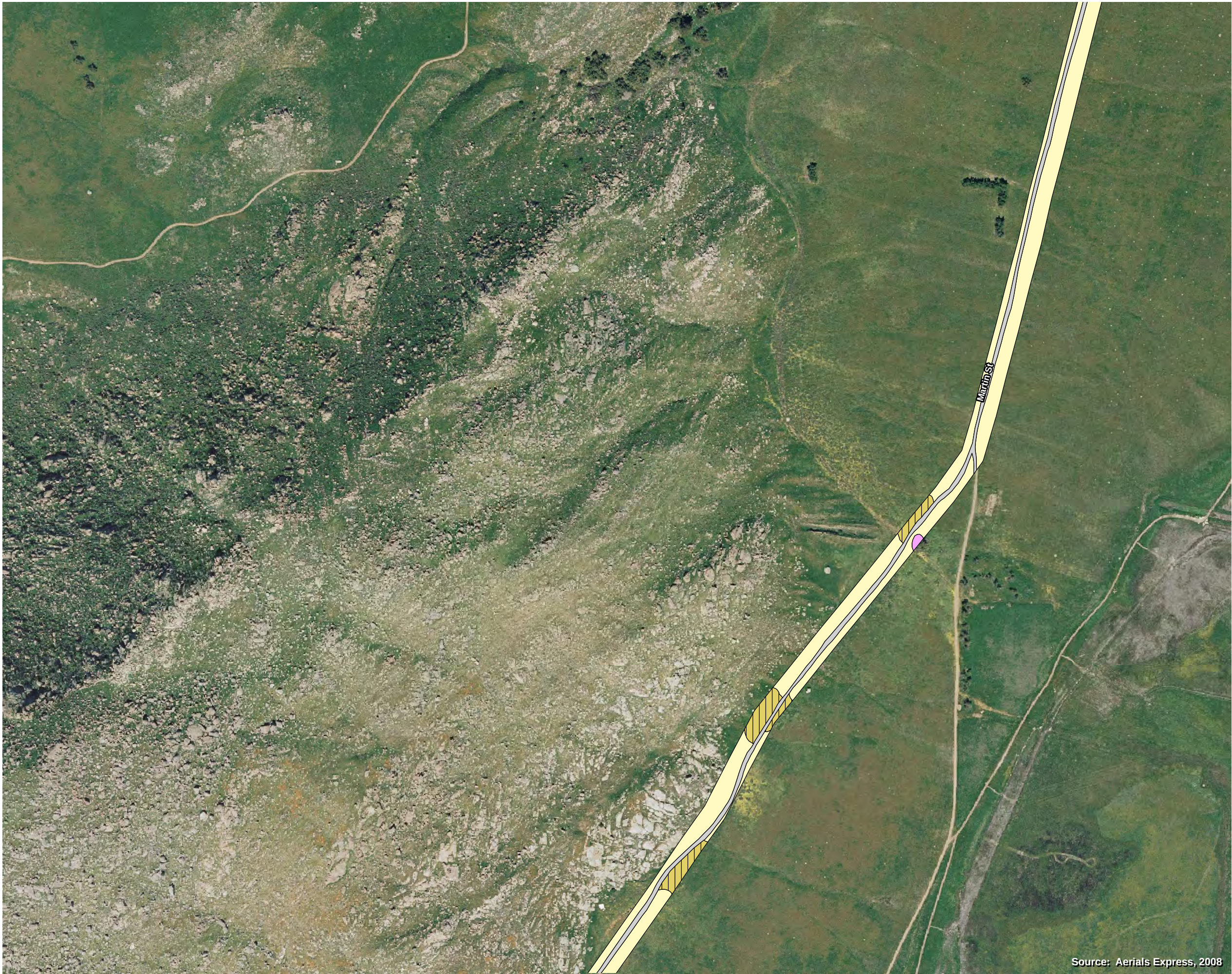


Vegetation Types **Exhibit 3B**

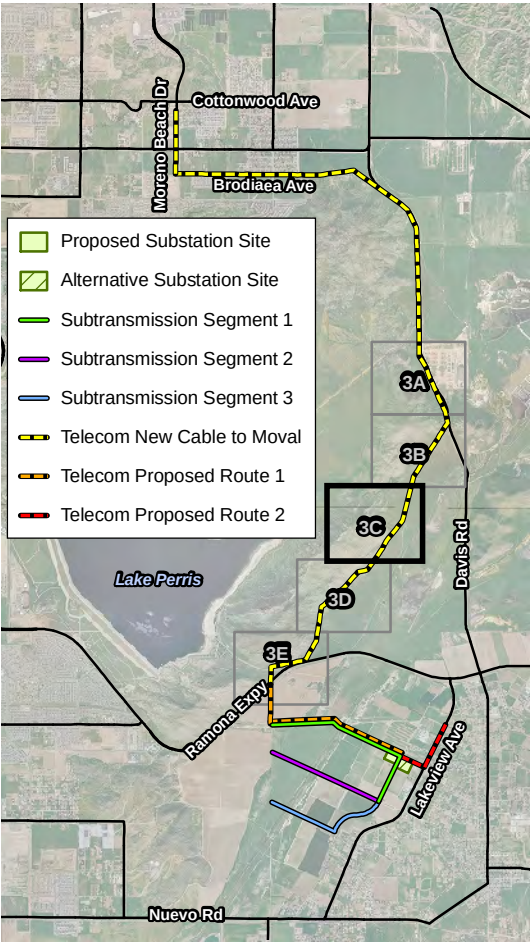
*Lakeview Substation and
Transmission Line Project*



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Source: Aerials Express, 2008



Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

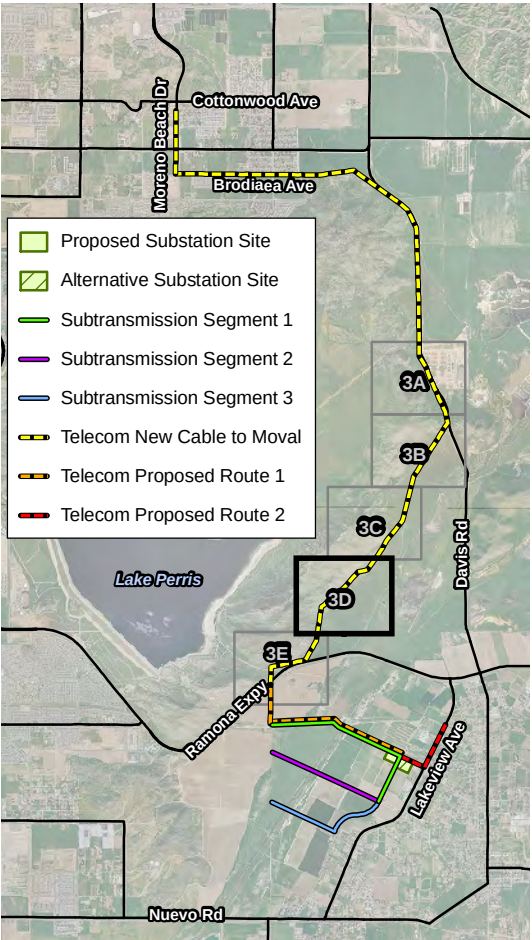
Vegetation Types

Exhibit 3C

Lakeview Substation and
Transmission Line Project

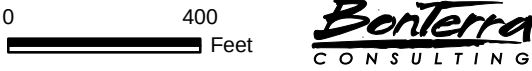


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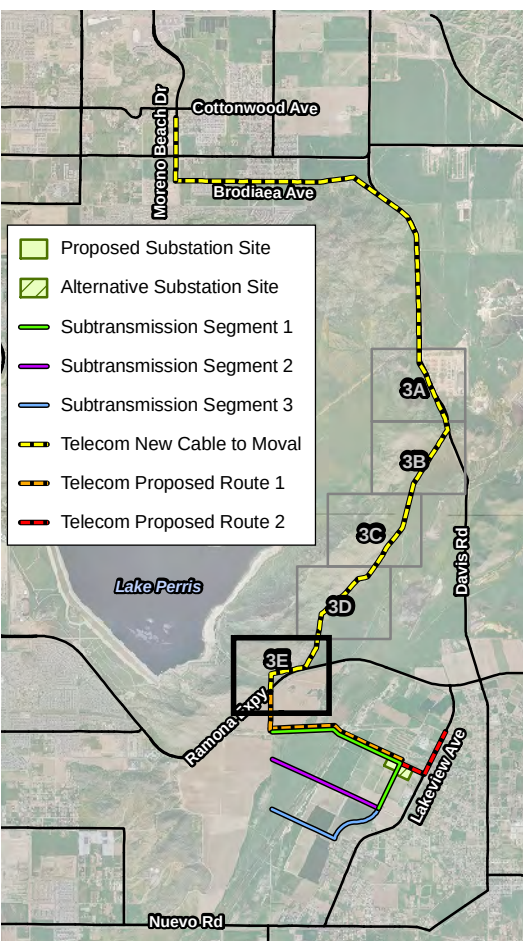
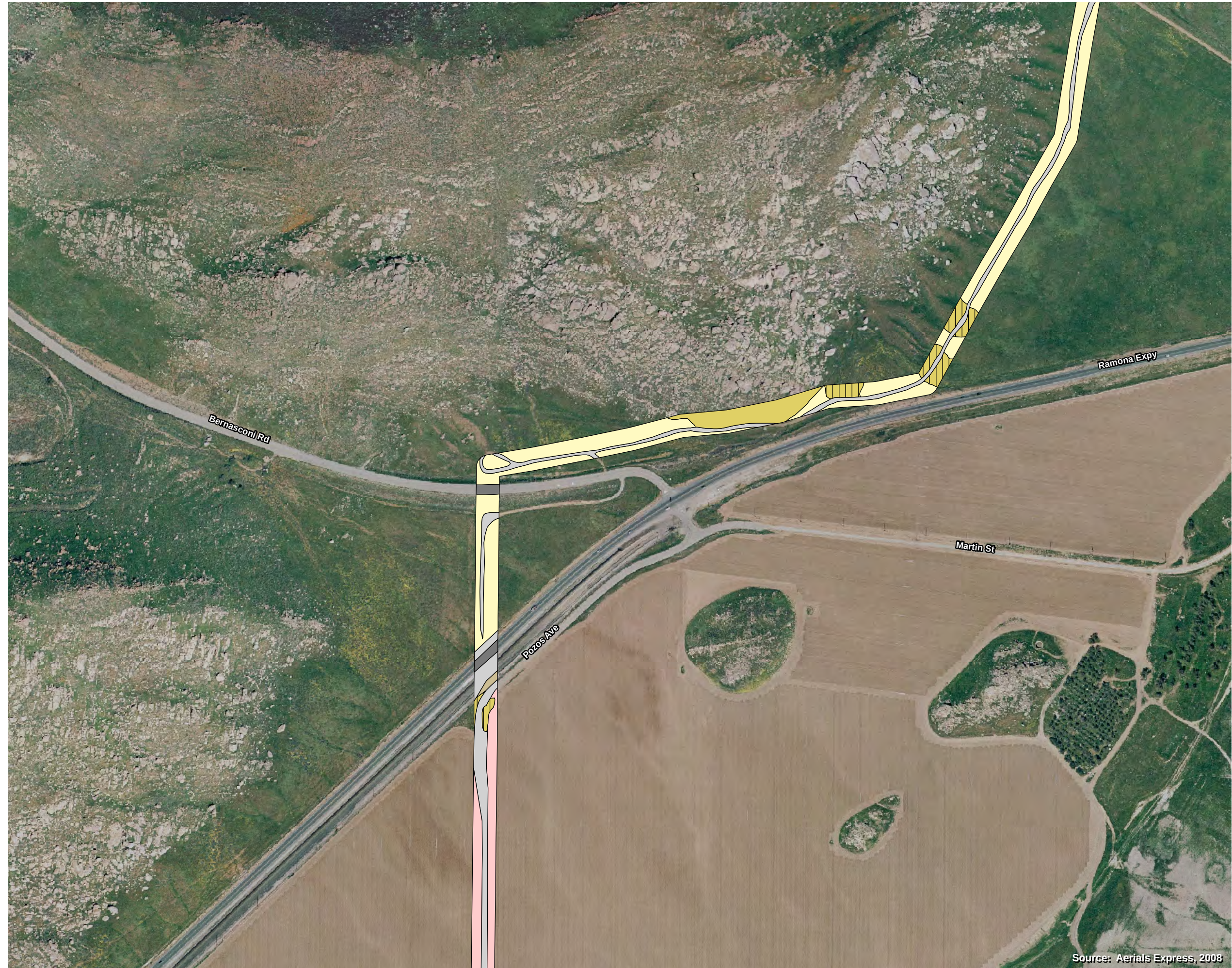


Vegetation Types Exhibit 3D

*Lakeview Substation and
Transmission Line Project*

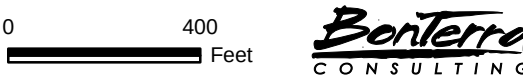


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Vegetation Types Exhibit 3E

Lakeview Substation and Transmission Line Project



Source: Aerials Express, 2008



Representative site photograph depicting Riversidean sage scrub vegetation within the survey area, looking north.



Representative site photograph depicting Riversidean sage scrub vegetation within the survey area, looking east.

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Site Photographs

Lakeview Substation and Transmission Line Project Site

Exhibit 4

Bonterra
CONSULTING

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ATTACHMENT A
WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species
Reptiles
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS
<i>Sceloporus occidentalis</i> western fence lizard
<i>Uta stansburiana</i> side-blotched lizard
TEIIDAE - WHIPTAIL LIZARDS
<i>Aspidoscelis [Cnemidophorus] tigris stejnegeri</i> coastal western whiptail
COLUBRIDAE - COLUBRID SNAKES
<i>Masticophis flagellum</i> coachwhip
<i>Pituophis catenifer</i> gopher snake
Birds
ANATIDAE - WATERFOWL
<i>Anas platyrhynchos</i> mallard
ODONTOPHORIDAE - QUAILS
<i>Callipepla californica</i> California quail
CATHARTIDAE - NEW WORLD VULTURES
<i>Cathartes aura</i> turkey vulture
ACCIPITRIDAE - HAWKS
<i>Circus cyaneus</i> northern harrier
<i>Accipiter cooperii</i> Cooper's hawk
<i>Buteo jamaicensis</i> red-tailed hawk
FALCONIDAE - FALCONS
<i>Falco sparverius</i> American kestrel
COLUMBIDAE - PIGEONS & DOVES
<i>Columba livia</i> * rock pigeon
<i>Zenaida macroura</i> mourning dove
CUCULIDAE - CUCKOOS & ROADRUNNERS
<i>Geococcyx californianus</i> greater roadrunner
APODIDAE - SWIFTS
<i>Aeronautes saxatalis</i> white-throated swift
TROCHILIDAE - HUMMINGBIRDS
<i>Calypte anna</i> Anna's hummingbird
<i>Calypte costae</i> Costa's hummingbird

WILDLIFE SPECIES OBSERVED DURING SURVEYS (Continued)

Species
<i>Selasphorus sasin</i> Allen's hummingbird
PICIDAE - WOODPECKERS
<i>Melanerpes formicivorus</i> acorn woodpecker
TYRANNIDAE - TYRANT FLYCATCHERS
<i>Sayornis nigricans</i> black phoebe
<i>Sayornis saya</i> Say's phoebe
<i>Tyrannus vociferans</i> Cassin's kingbird
LANIIDAE - SHRIKES
<i>Lanius ludovicianus</i> loggerhead shrike
CORVIDAE - JAYS & CROWS
<i>Aphelocoma californica</i> western scrub-jay
<i>Corvus brachyrhynchos</i> American crow
<i>Corvus corax</i> common raven
ALAUDIDAE - LARKS
<i>Eremophila alpestris</i> horned lark
HIRUNDINIDAE - SWALLOWS
<i>Tachycineta bicolor</i> tree swallow
<i>Stelgidopteryx serripennis</i> northern rough-winged swallow
<i>Petrochelidon pyrrhonota</i> cliff swallow
TROGLODYTIDAE - WRENS
<i>Salpinctes obsoletus</i> rock wren
<i>Catherpes mexicanus</i> canyon wren
<i>Thryomanes bewickii</i> Bewick's wren
SYLVIIDAE - GNATCATCHERS
<i>Poliophtila caerulea</i> blue-gray gnatcatcher
TIMALIIDAE - WRENTITS
<i>Chamaea fasciata</i> wrentit
MIMIDAE - THRASHERS
<i>Mimus polyglottos</i> northern mockingbird
<i>Oreoscoptes montanus</i> sage thrasher

WILDLIFE SPECIES OBSERVED DURING SURVEYS (Continued)

Species
<i>Toxostoma redivivum</i> California thrasher
STURNIDAE - STARLINGS
<i>Sturnus vulgaris</i> * European starling
EMBERIZIDAE - SPARROWS & JUNCOS
<i>Pipilo maculatus</i> spotted towhee
<i>Pipilo crissalis</i> California towhee
<i>Aimophila ruficeps</i> rufous-crowned sparrow
<i>Chondestes grammacus</i> lark sparrow
<i>Amphispiza belli</i> sage sparrow
<i>Melospiza melodia</i> song sparrow
<i>Zonotrichia leucophrys</i> white-crowned sparrow
ICTERIDAE - BLACKBIRDS
<i>Agelaius phoeniceus</i> red-winged blackbird
<i>Agelaius tricolor</i> tricolored blackbird
<i>Sturnella neglecta</i> western meadowlark
FRINGILLIDAE - FINCHES
<i>Carpodacus mexicanus</i> house finch
<i>Spinus [Carduelis] psaltria</i> lesser goldfinch
PASSERIDAE - OLD WORLD SPARROWS
<i>Passer domesticus</i> house sparrow *
Mammals
LEPORIDAE - HARES & RABBITS
<i>Sylvilagus audubonii</i> desert cottontail
SCIURIDAE - SQUIRRELS
<i>Spermophilus beecheyi</i> California ground squirrel
CANIDAE - WOLVES & FOXES
<i>Canis latrans</i> coyote

**WILDLIFE SPECIES OBSERVED DURING SURVEYS
(Continued)**

Species
Invertebrates
PIERIDAE - WHITES, SULFURS, & ORANGETIPS
<i>Anthocharis sara</i> Sara orangetip
NYMPHALIDAE - BRUSH-FOOTED BUTTERFLIES
<i>Vanessa cardui</i> painted lady
LYCAENIDAE - BLUES, HAIRSTREAKS, & COPPERS
<i>Icaricia acmon</i> acmon blue
* introduced species

October 14, 2010

Mr. Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, G01 Quad 3A
Rosemead, California 91770

VIA EMAIL
Andrew.Keller@sce.com

Subject: Results of a Fairy Shrimp Habitat Assessment for the Lakeview Substation and Transmission Line Project, Riverside County, California

Dear Mr. Keller:

This Letter Report presents the results of a habitat assessment for the Riverside fairy shrimp (*Streptocephalus woottoni*) on the Lakeview Substation and Transmission Line Project (hereafter referred to as the "Project site") located in Riverside County, California (Exhibit 1). The purpose of the surveys was to determine the presence or absence of suitable habitat for the Riverside fairy shrimp on or immediately adjacent to the Project site.

Project Location

The Project site is located on the U.S. Geological Survey's (USGS') Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Project site is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route runs from the Moval Substation on Moreno Beach Drive in the City of Moreno Valley to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Mountains to the Ramona Expressway. The Project includes a Proposed Substation Site and an Alternative Substation Site, a Proposed Subtransmission Source Line Route (Segments 1 and 2), a Proposed Telecommunications Route (New Cable to Moval and Proposed Overhead Routes 1 and 2), and an Alternative Subtransmission Source Line Route (Segment 3) (Exhibit 2). A 50-foot buffer is also included on either side of all the Subtransmission Source Line Routes and the Proposed Telecommunications Routes.

Land uses in the immediate vicinity of the Project site are agricultural and residential. Open space is present in the Bernasconi Hills in the northwestern portion of the Project site and the Lakeview Mountains to the southeast of the Project site. Topography in the Project vicinity is mostly flat in the northern portion of the Project and varied in the southern portion with elevation ranging from approximately 1,400 feet to 2,200 feet above mean sea level (msl).

Background

Riverside Fairy Shrimp

The Riverside fairy shrimp is a federally listed Endangered species. This species inhabits deep, long-lived pools in seasonal grasslands, some of which are interspersed among chaparral or coastal sage scrub vegetation (Eriksen and Belk



1999). Riverside fairy shrimp are found in vernal pools, vernal pool-like ephemeral ponds, stock ponds, and other human-modified depressions (Dudek 2003). They inhabit warm-water pools with low to moderate amounts of dissolved solids (Eriksen and Belk 1999). This species occurs within approximately 30 miles of the coast in Riverside, Orange, and San Diego Counties and in Baja California, Mexico (Eriksen and Belk 1999). In the vicinity of the Project site, this species has been reported from the Santa Rosa Plateau, Skunk Hollow, Murrieta, Wildomar, Lake Elsinore, and Alberhill (Dudek 2003) areas.

On May 30, 2001, the U.S. Fish and Wildlife Service (USFWS) published a final rule designating 6,870 acres of land as critical habitat for the Riverside fairy shrimp in Los Angeles, Orange, Riverside, San Diego, and Ventura Counties (USFWS 2001). Following lawsuits, the USFWS proposed a revised critical habitat designation on April 27, 2004. This proposed rule was finalized on April 12, 2005. The current final critical habitat designation covers 306 acres of land in Orange, San Diego, and Ventura Counties (USFWS 2005b). The Project site is not located in final critical habitat for Riverside fairy shrimp.

Survey Methodology

BonTerra Consulting Biologist Jeff Crain (TE-047998-1) surveyed the Project site on November 16, 2009. All areas with suitable soils were examined for evidence of suitable ponding habitat for the Riverside fairy shrimp. Potential ponding areas were noted by the presence of a visible depression and/or cracked soils.

Site Description

Vegetation types and other areas mapped on the Project site include alkali grassland, annual grassland, alkali scrub playa, disturbed alkali scrub playa, alkali wetland, disturbed mule fat scrub, Riversidean sage scrub, disturbed Riversidean sage scrub, southern willow scrub, ruderal, agriculture, ornamental, detention basin, irrigation ditch, disturbed, and developed (Exhibit 3). The prevalent soil types within the Project site include Domino fine sandy loam; Domino fine sandy loam, saline-alkali; Domino silt loam; Domino silt loam, saline-alkali; Exeter sandy loam; Exeter sandy loam, deep; Gorgonio loamy sand; Greenfield sandy loam; Hanford coarse sandy loam; Metz loamy fine sand; Metz loamy sand; Pachappa fine sandy loam; Placentia fine sandy loam; Ramona sandy loam; Riverwash; Rockland; San Emigdio fine sandy loam, San Emigdio loam; Terrace escarpments; Willows silty clay, saline-alkali; Willows silty clay, strongly saline-alkali; and Willows silty clay, deep, strongly saline-alkali (USDA NRCS 2007) (Exhibit 4).

Survey Results

Suitable habitat for Riverside fairy shrimp is present along the Alternative Subtransmission Source Line Route (Segment 3). Only one area exhibited evidence of ponding: a depression along 12th Street, east of B Avenue, along the Alternative Subtransmission Source Line Route (Segment 3) (Exhibit 5). The potential ponding area occurs on Willows silty-clay soils, demonstrated cracked surface soils, and supported Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), a plant typically associated with intermittently ponded areas.

Discussion

Although the ponding area described has potential to support Riverside fairy shrimp, it is located on an alternative source line route site and not part of the Proposed Subtransmission Source Line Route. In addition, construction activities involving the installation of transmission poles and transmission line cables can be installed without impacting suitable habitat for this species. Also, due to the sensitive nature of the plant community and the presence of special status plant species, including Coulter's goldfields and San Jacinto Valley crownscale (*Atriplex coronata* var. *notator*), impacts to this area would be avoided as part of the final Project design. Therefore, protocol surveys for Riverside fairy shrimp are not recommended at this time. Should the Alternative Subtransmission Source Line Route (Segment 3) become a part of the Proposed Project, and impacts cannot be avoided as part of the Project design, protocol surveys will be necessary.

If you have any comments or questions, please call Jeff Crain at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING



Jeff S. Crain
Senior Botanist

Attachments: Exhibit 1 – Regional Location
Exhibit 2 – Local Vicinity
Exhibit 3 – Vegetation Types
Exhibit 4 – Soil Types
Exhibit 5 – Potential Riverside Fairy Shrimp Habitat

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References

- California Department of Fish and Game (CDFG). 2010. California Natural Diversity Database. Records of Occurrence for Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5' Quadrangles. Sacramento, CA: CDFG, Natural Heritage Division.
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- Eriksen, C. and D. Belk. 1999. *Fairy Shrimps of California's Puddles, Pools, and Playas*. Eureka, CA: Mad River Press, Inc.

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- S.A. and M.A. Simovich. 1996. Factors Affecting the Distribution and Co-Occurrence of Two Southern Californian Anostracans (Branchiopoda), *Branchinecta sandiegonensis* and *Streptocephalus woottoni*. *Journal of Crustacean Biology* 16: 669–677. Lawrence, KS: The Crustacean Society.
- U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2007 (January 10). Soil Survey Geographic (SSURGO) Database for Orange and Western Part of Riverside Counties, California. Fort Worth, TX: USDA, NRCS.
- U.S. Fish and Wildlife Service (USFWS). 2005a (August 11). Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule. *Federal Register* 68(151): 46683–46867. Washington, D.C.: USFWS
- . 2005b (April 12). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Riverside Fairy Shrimp (*Streptocephalus woottoni*); Final Rule. *Federal Register* 70(69): 19153–19204. Washington, D.C.: USFWS.
- . 2003 (August 6). Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule. *Federal Register* 68(151): 46683–46867. Washington, D.C.: USFWS.
- . 2001 (May 30). Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Riverside Fairy Shrimp; Final Rule. *Federal Register* 66(104): 29383–29414. Washington, D.C.: USFWS.
- . 1996. *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods*. Washington, D.C.: USFWS.



Regional Location

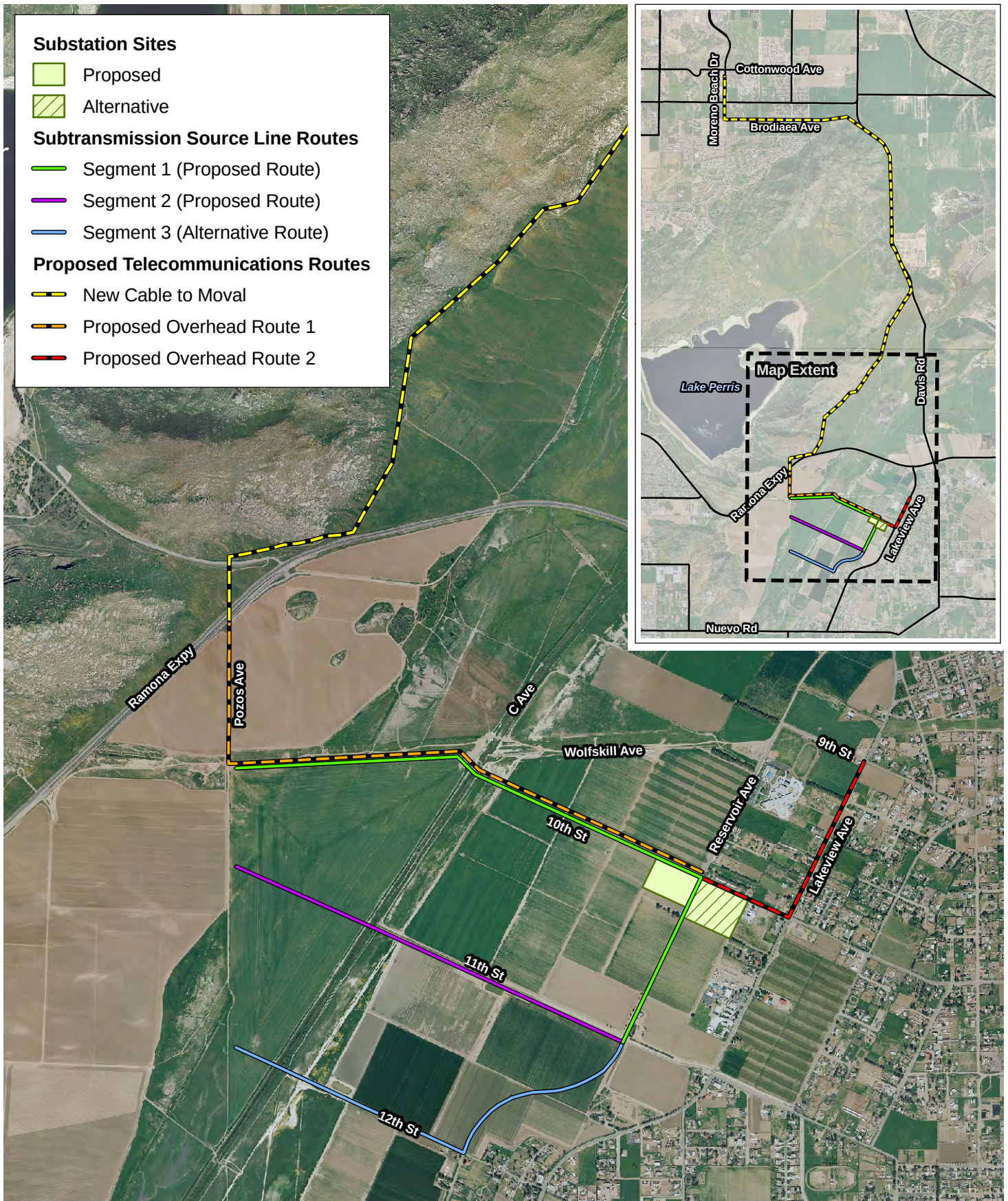
Lakeview Substation and Transmission Line Project



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Exhibit 1

Bonterra
CONSULTING



Local Vicinity

Lakeview Substation and Transmission Line Project

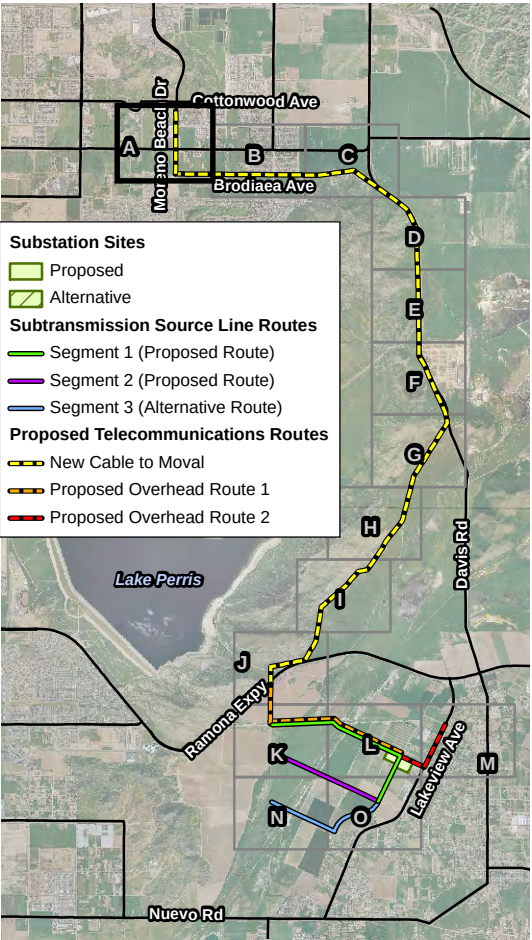


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Feet

Exhibit 2

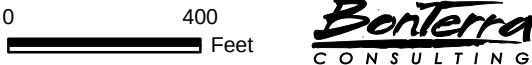
Bonterra
CONSULTING

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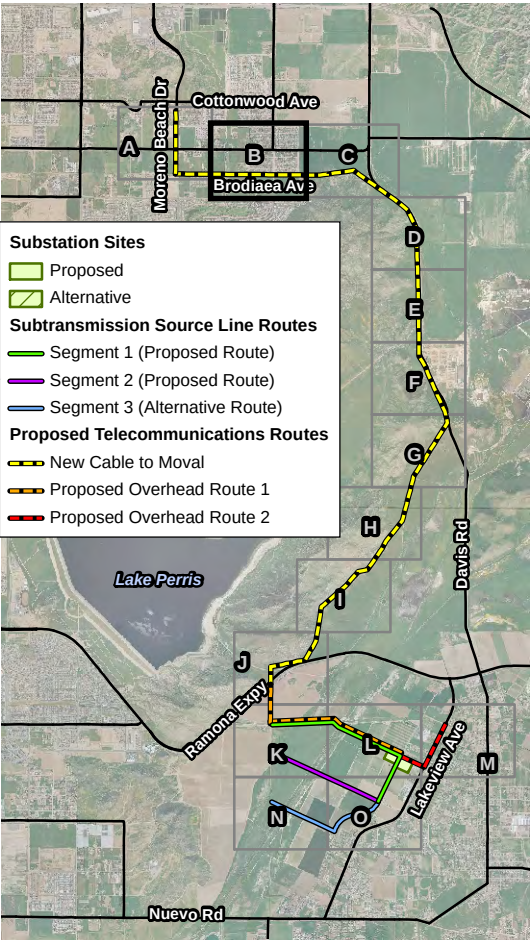
Vegetation Types **Exhibit 3A**

Lakeview Substation and
Transmission Line Project



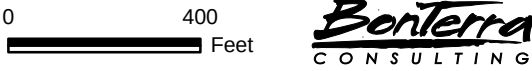
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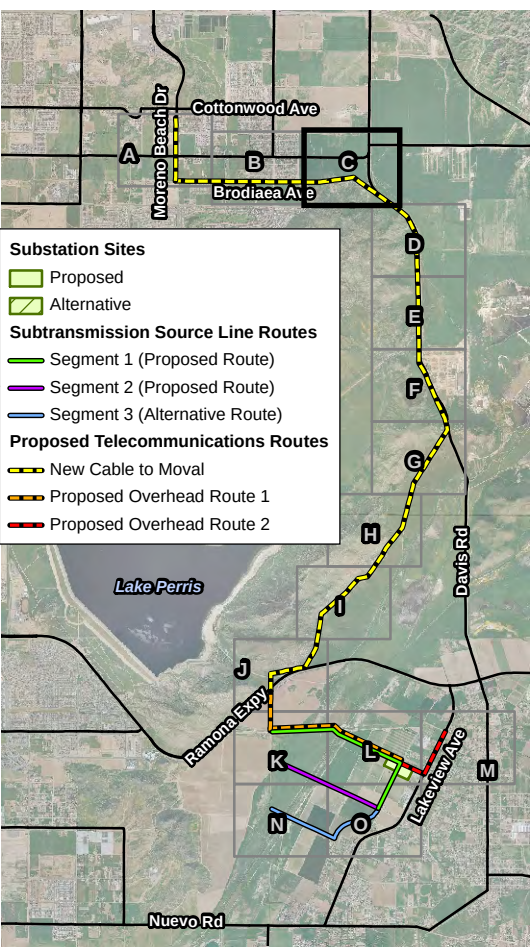
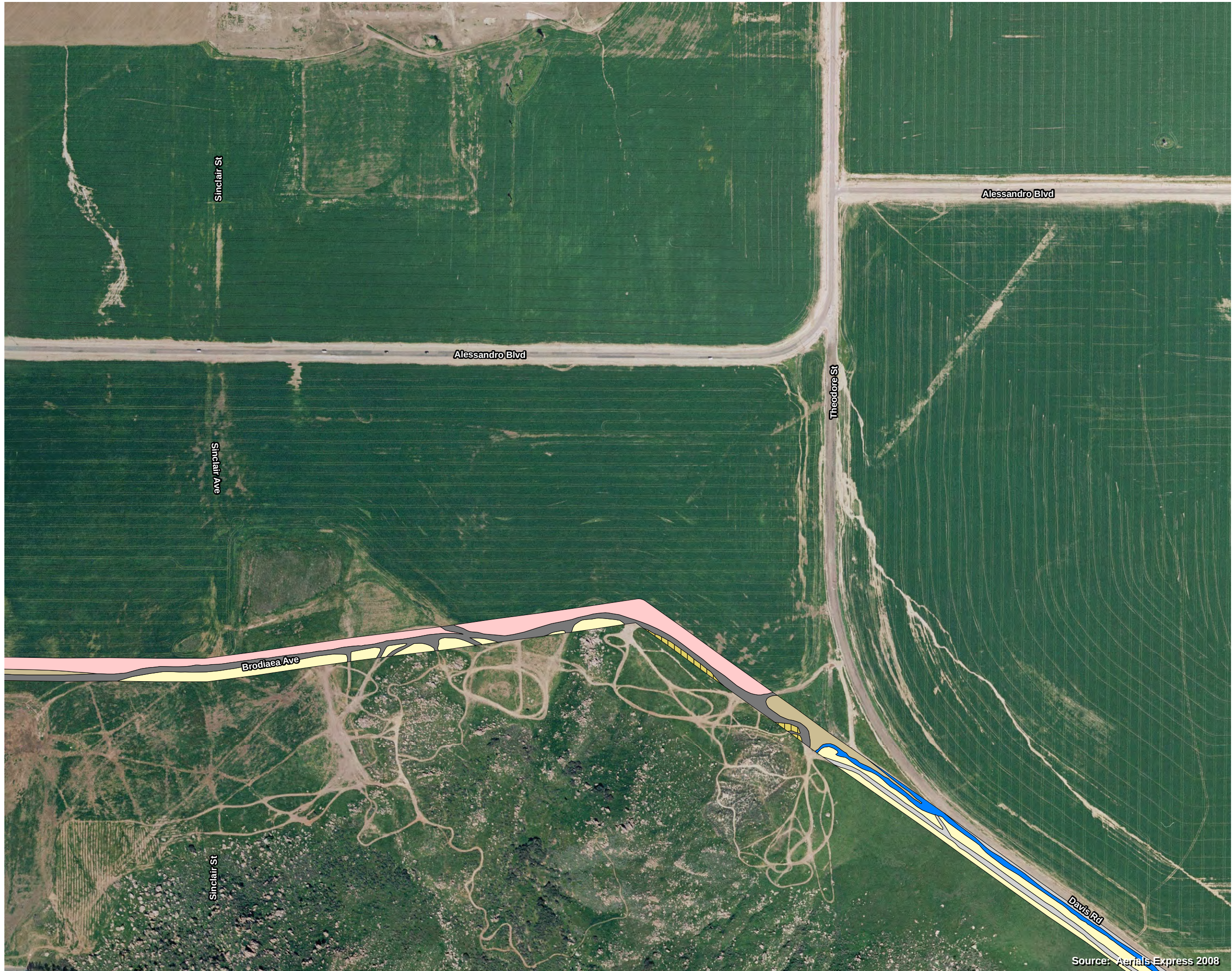
Vegetation Types Exhibit 3B

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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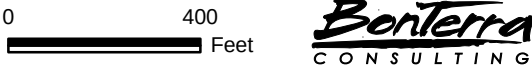


- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

Vegetation Types **Exhibit 3C**

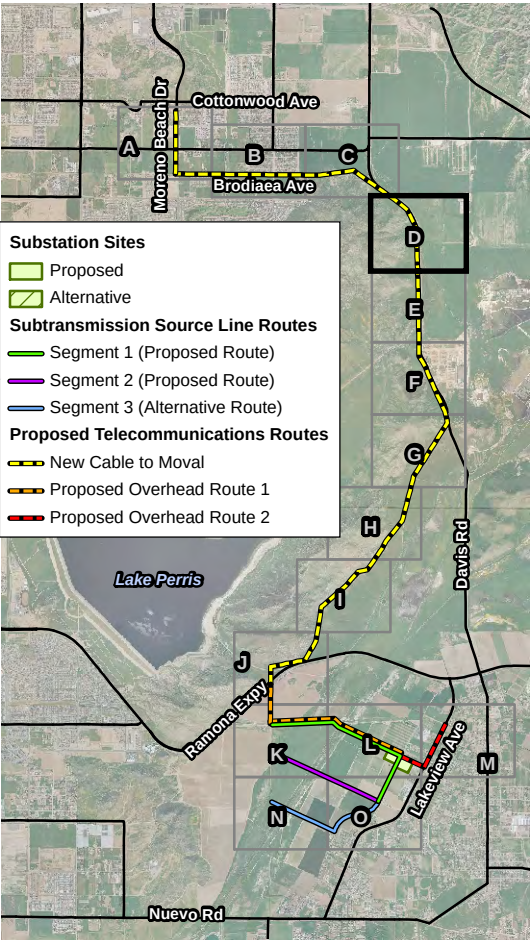
Lakeview Substation and
Transmission Line Project



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Source: Aerials Express 2008



Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types

Exhibit 3D

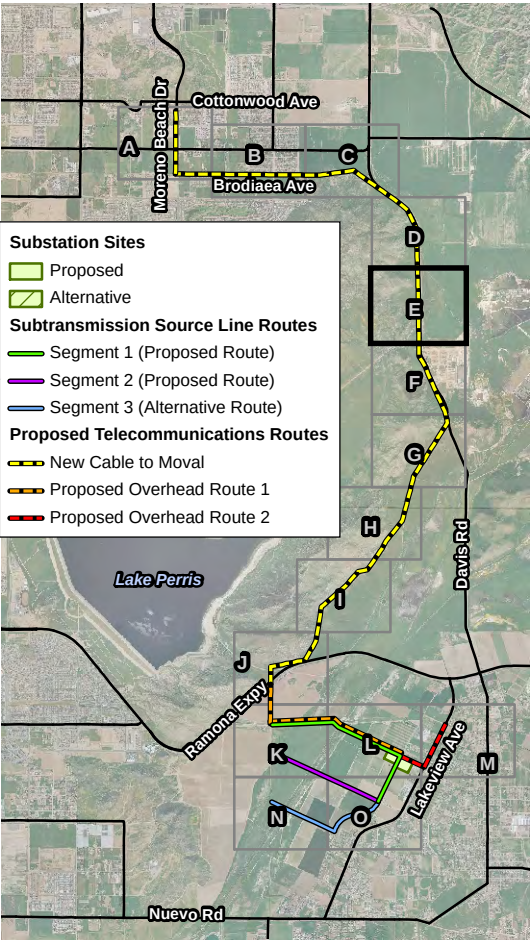
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Transmission Line Project



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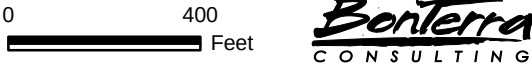


- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

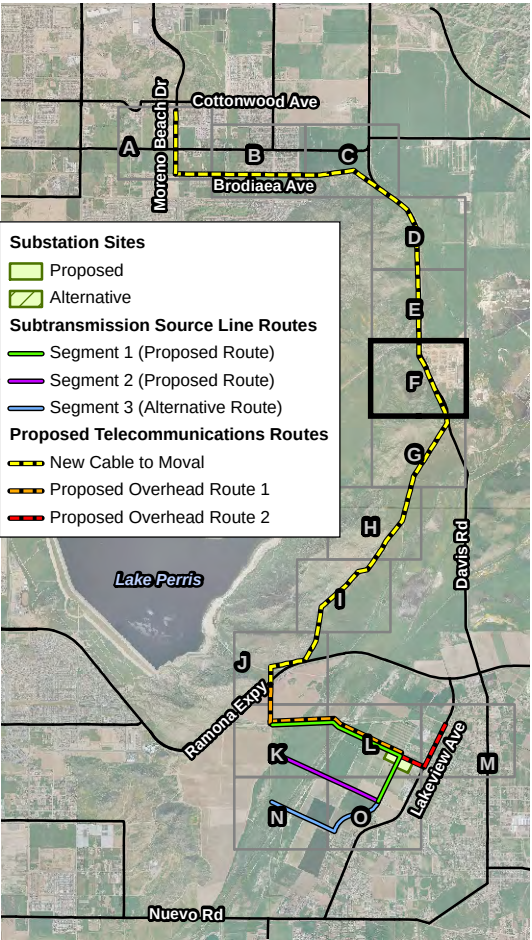
- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

Vegetation Types Exhibit 3E

Lakeview Substation and Transmission Line Project

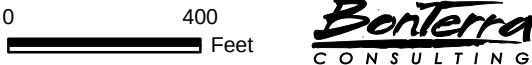


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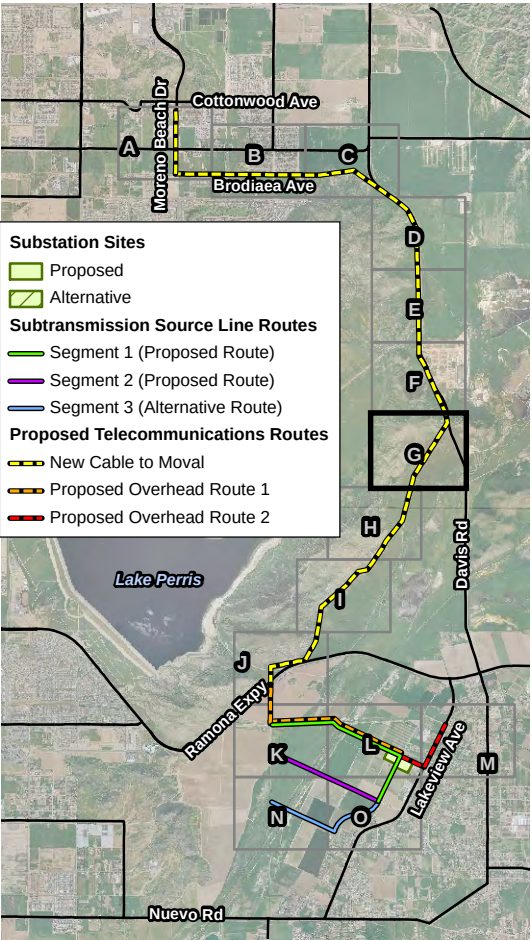


Vegetation Types **Exhibit 3F**

*Lakeview Substation and
Transmission Line Project*



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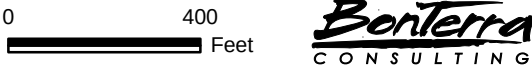


- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

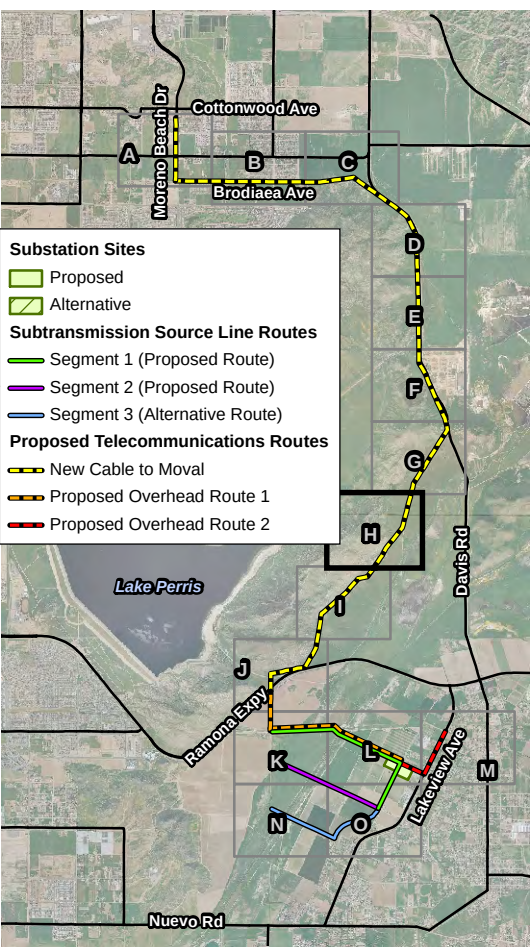
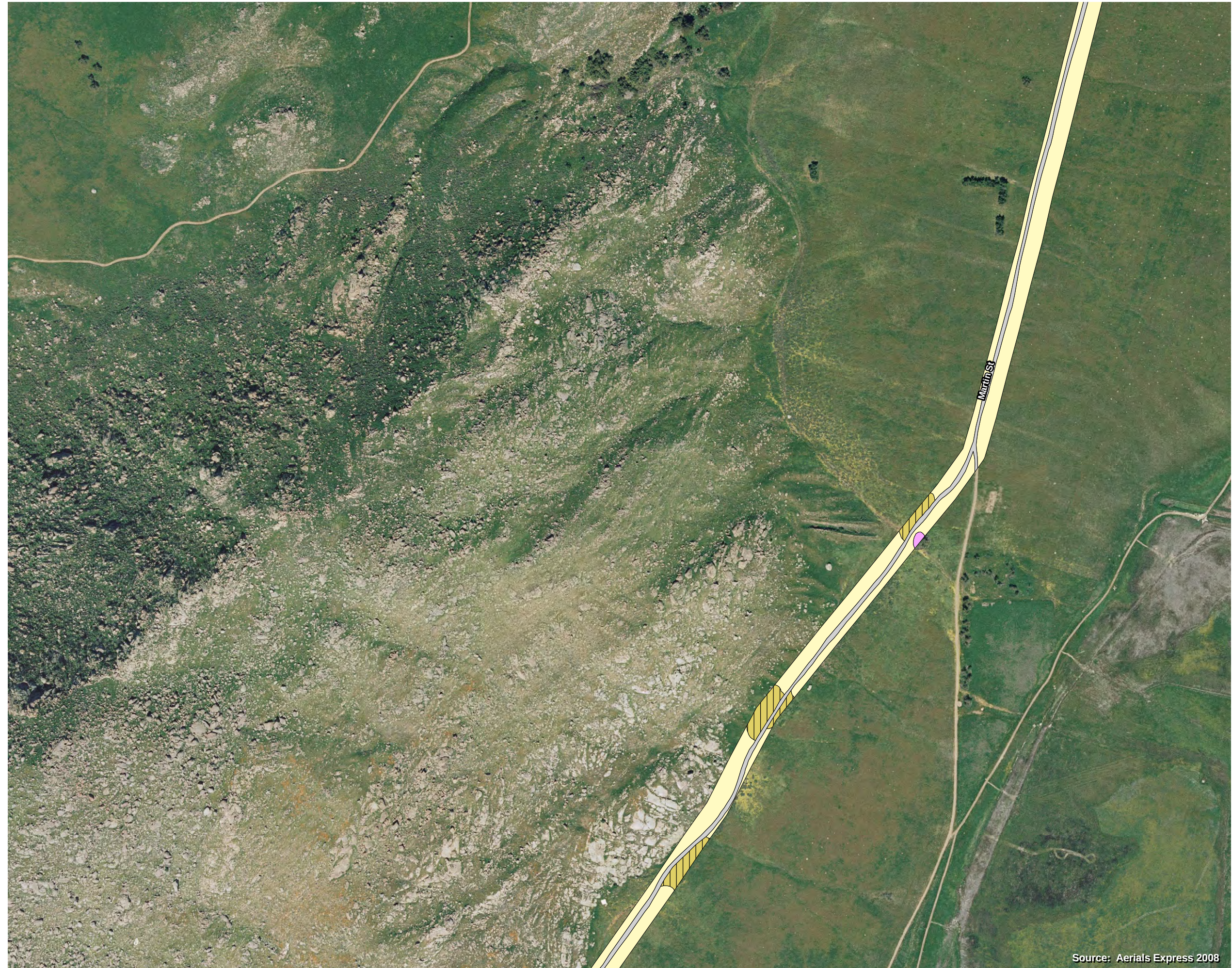
- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

Vegetation Types Exhibit 3G

Lakeview Substation and
Transmission Line Project



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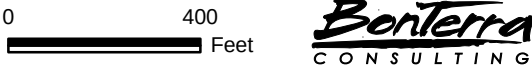


- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

Vegetation Types Exhibit 3H

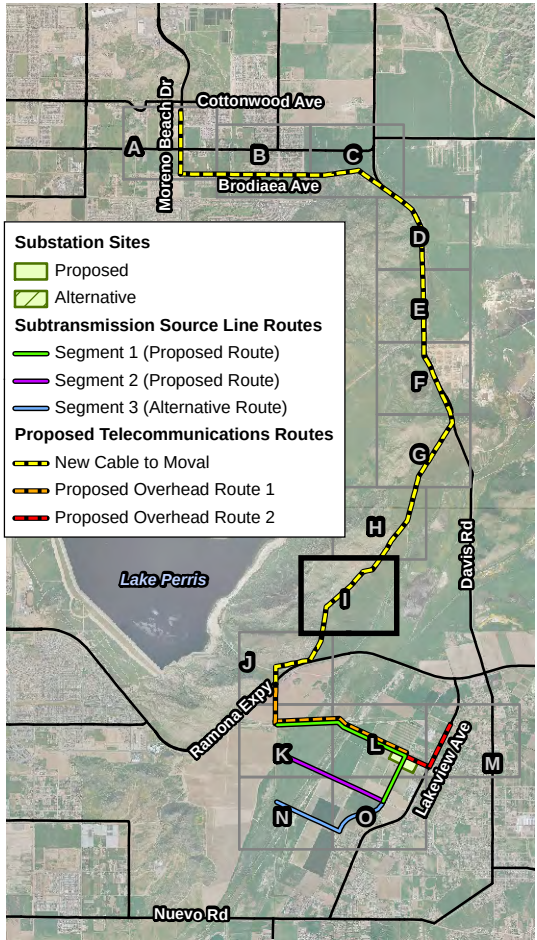
Lakeview Substation and
Transmission Line Project



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Source: Aerials Express 2008



- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

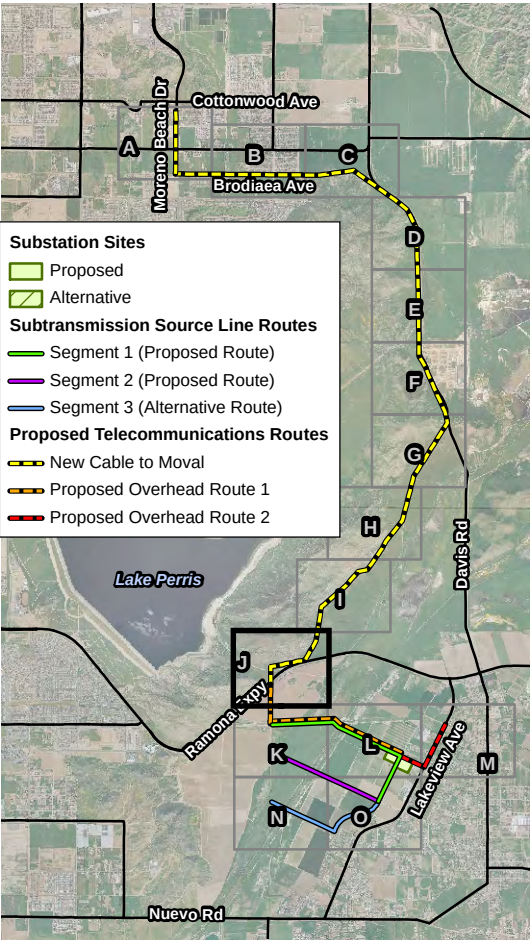
- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

Vegetation Types **Exhibit 31**

Lakeview Substation and
Transmission Line Project

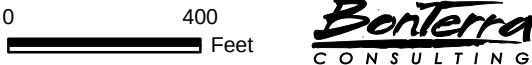


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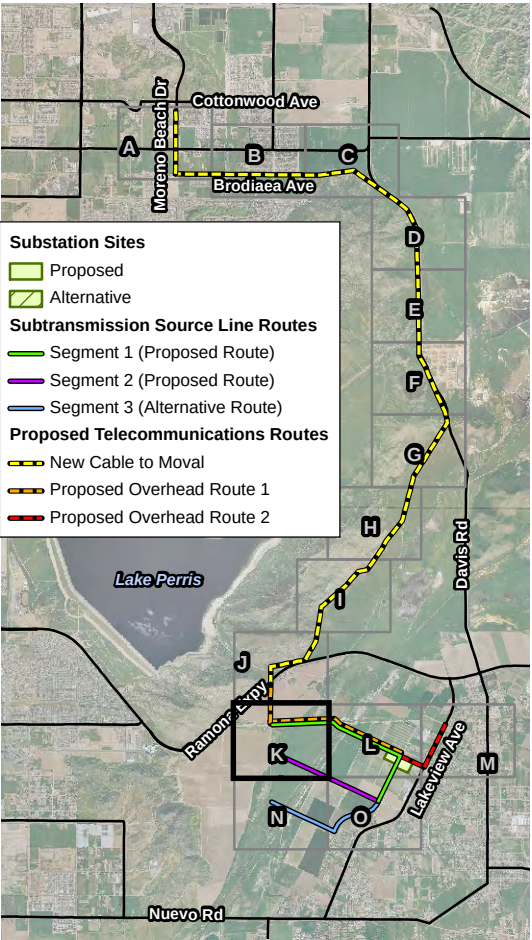


Vegetation Types **Exhibit 3J**

Lakeview Substation and
Transmission Line Project



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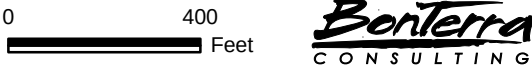


- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

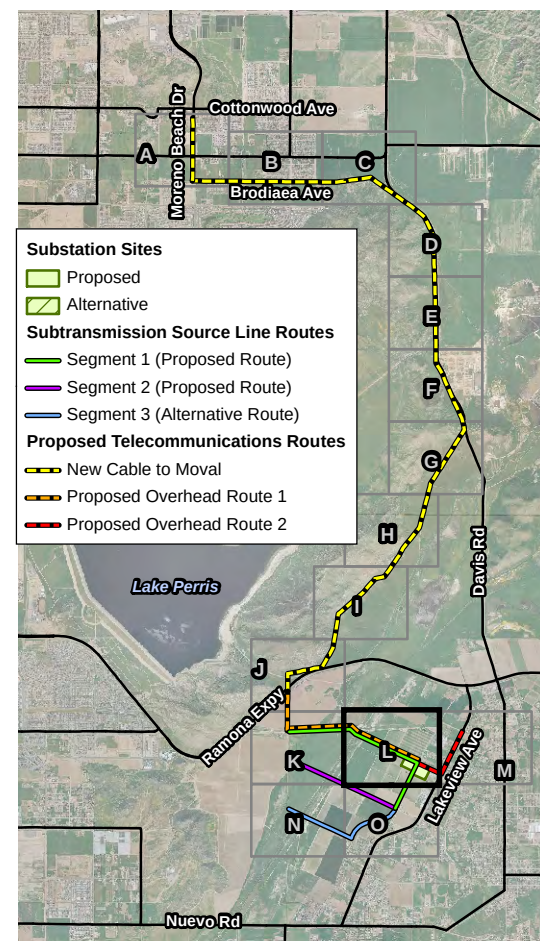
- Vegetation Types and Other Areas**
- Alkali Grassland
 - Annual Grassland
 - Alkali Scrub Playa
 - Disturbed Alkali Scrub Playa
 - Alkali Wetland
 - Riversidean Sage Scrub
 - Disturbed Riversidean Sage Scrub
 - Southern Willow Scrub
 - Ruderal
 - Agriculture
 - Ornamental
 - Irrigation Ditch
 - Detention Basin
 - Disturbed
 - Developed

Vegetation Types Exhibit 3K

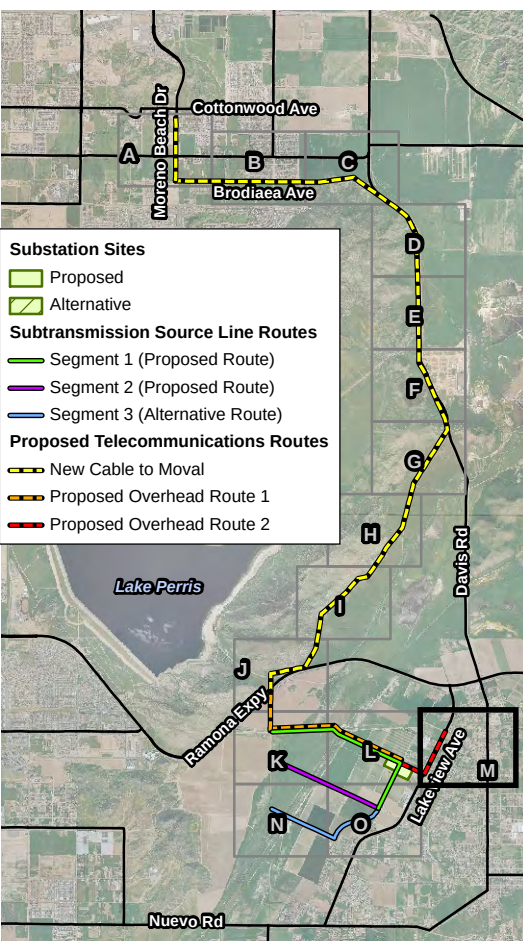
Lakeview Substation and Transmission Line Project



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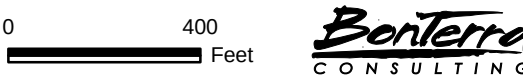


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Vegetation Types **Exhibit 3M**

Lakeview Substation and
Transmission Line Project

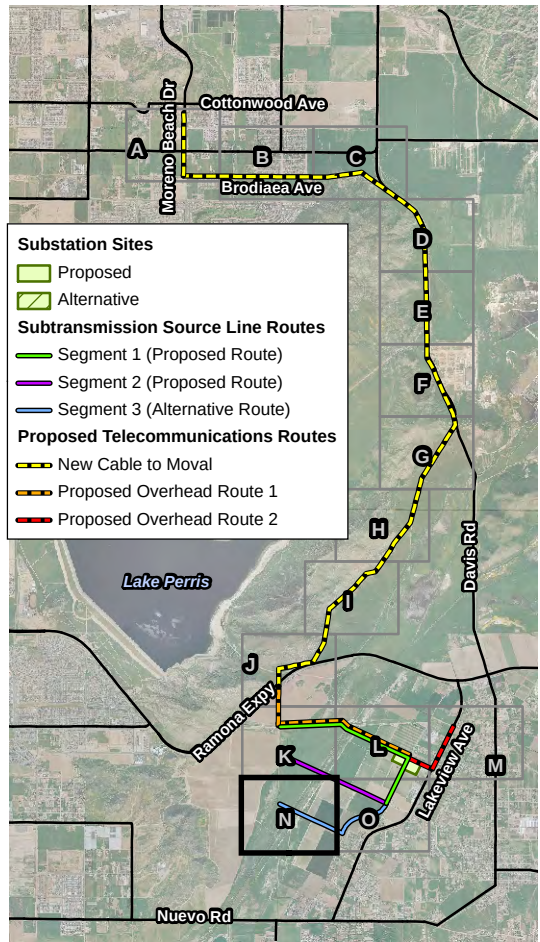


Source: Aerials Express 2008

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Source: Aerials Express 2008



Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types

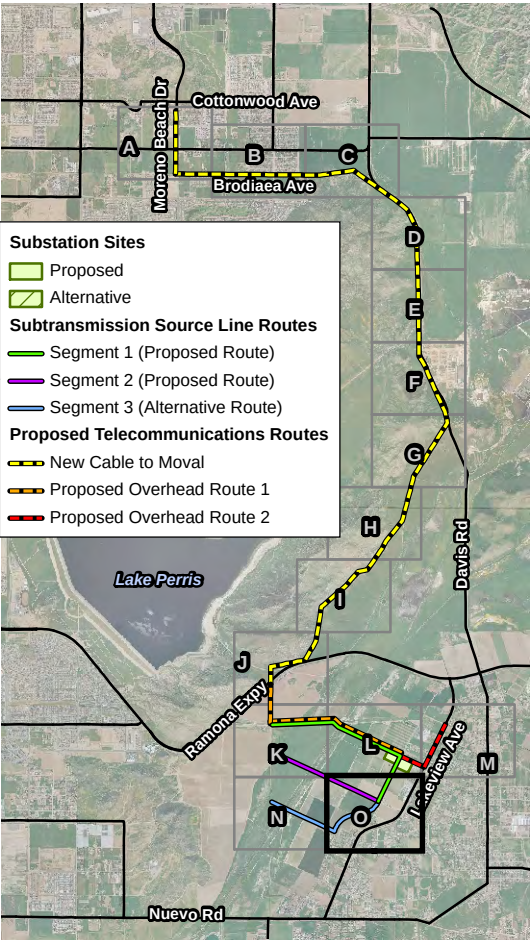
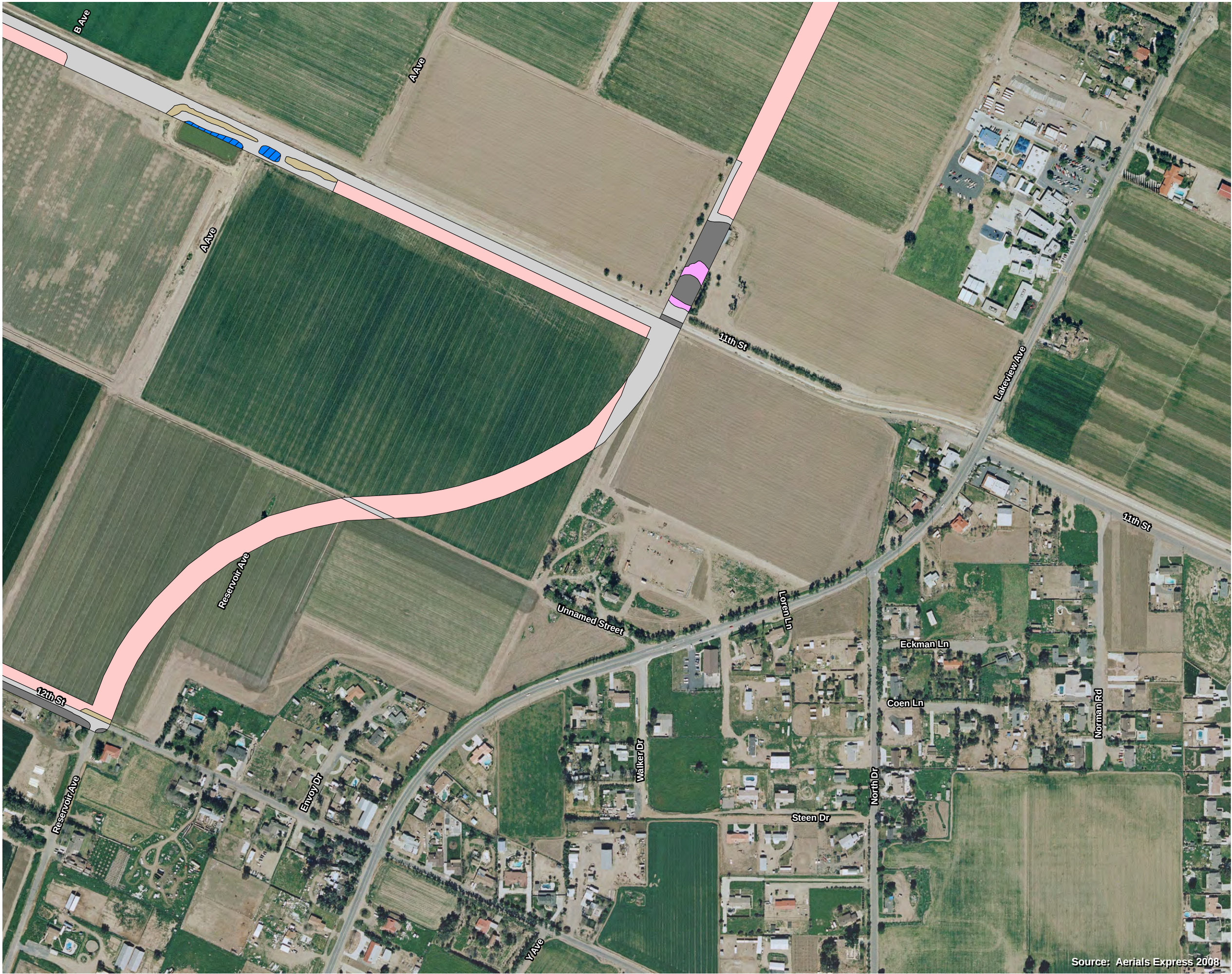
Exhibit 3N

Lakeview Substation and
Transmission Line Project

0 400
Feet

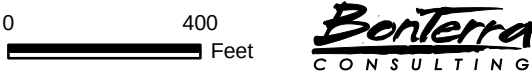
Bonterra
CONSULTING

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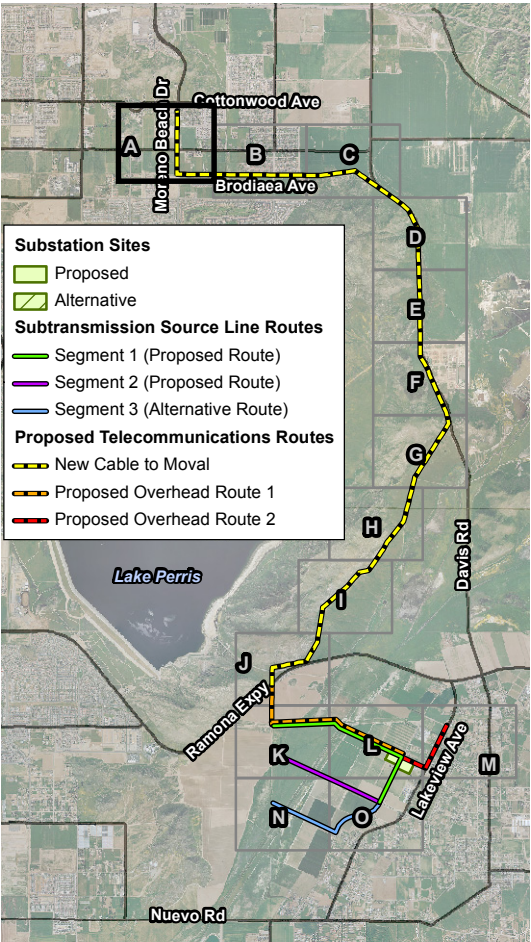
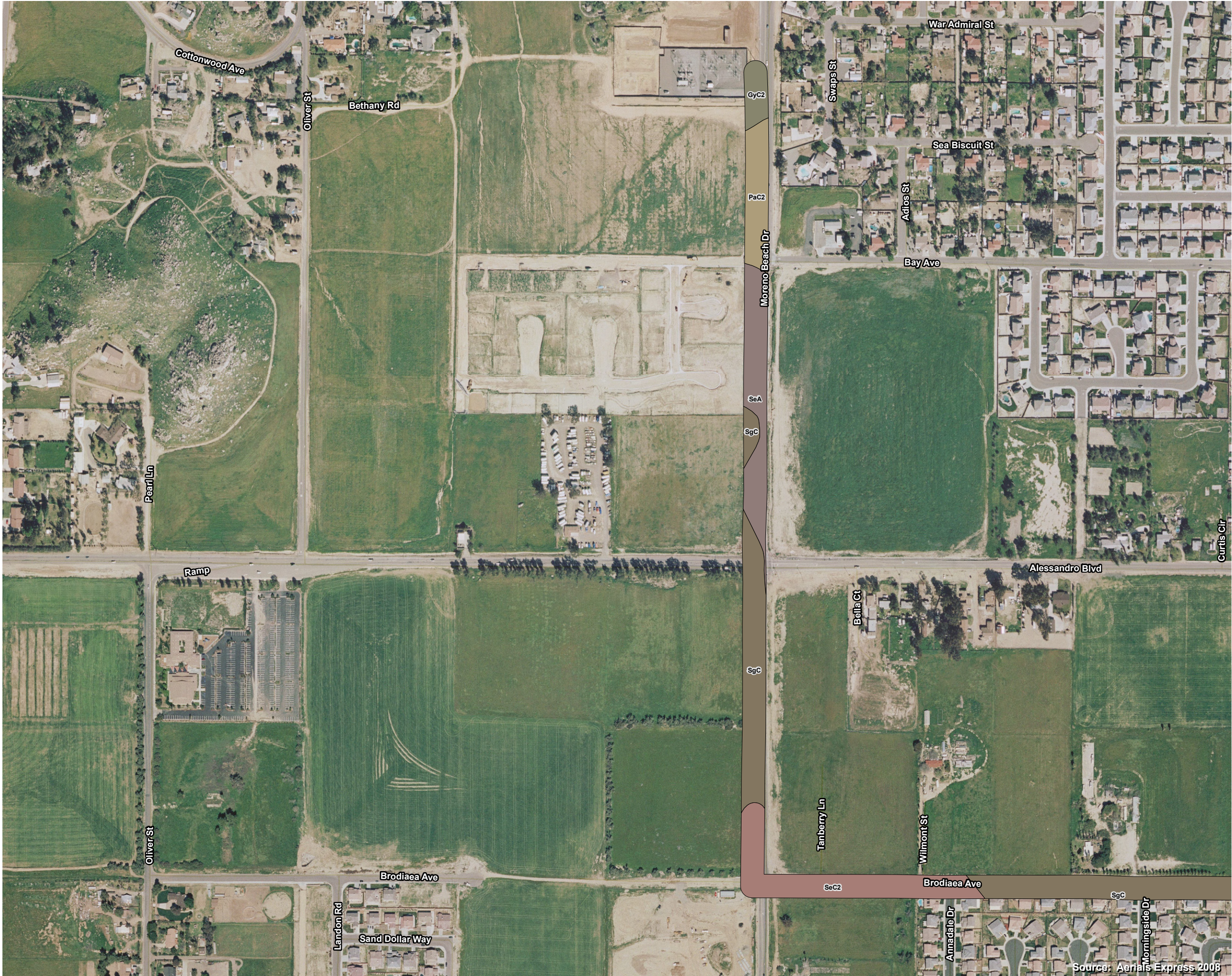
Vegetation Types **Exhibit 30**

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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Soil Types	
	GyC2, Greenfield sandy loam 2 to 8 percent slopes, eroded
	PaC2, Pachappa fine sandy loam 2 to 8 percent slopes, eroded
	SeA, San Emigdio fine sandy loam 0 to 2 percent slopes
	SeC2, San Emigdio fine sandy loam 2 to 8 percent slopes, eroded
	SgC, San Emigdio loam 2 to 8 percent slopes

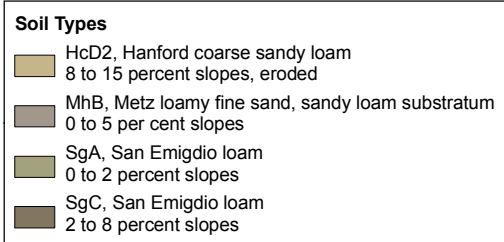
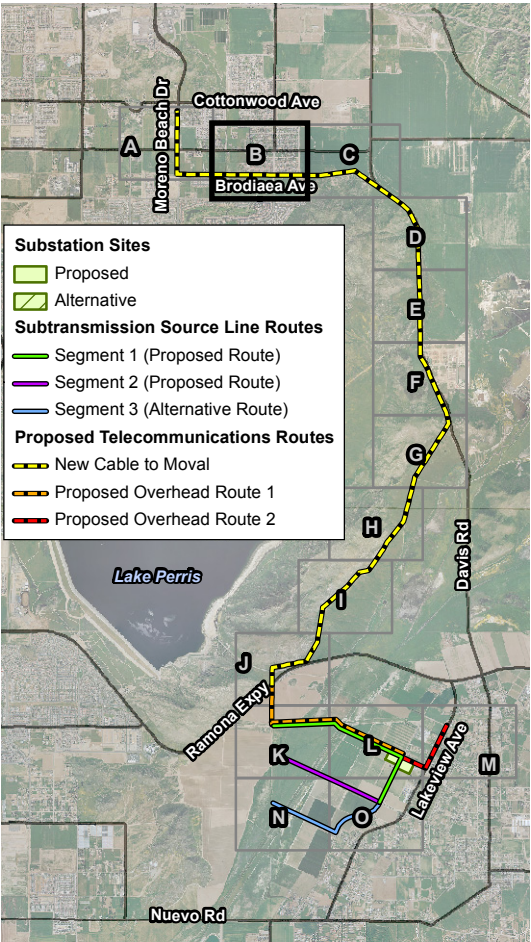
Soil Types Exhibit 4A

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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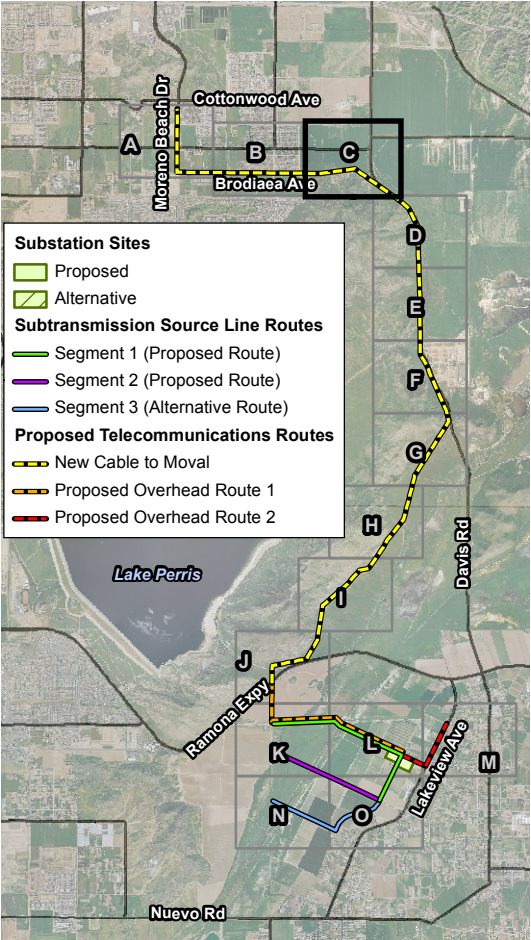
Soil Types Exhibit 4B

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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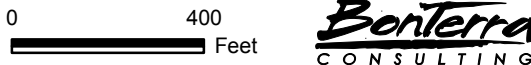


- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Soil Types**
- GhC, Gorgonio loamy sand
0 to 8 percent slopes
 - GyC2, Greenfield sandy loam
2 to 8 percent slopes, eroded
 - HcC, Hanford coarse sandy loam
2 to 8 percent slopes
 - HcD2, Hanford coarse sandy loam
8 to 15 percent slopes, eroded
 - MdC, Metz loamy sand
2 to 8 percent slopes
 - RfF, Rockland
 - SgC, San Emigdio loam
2 to 8 percent slopes

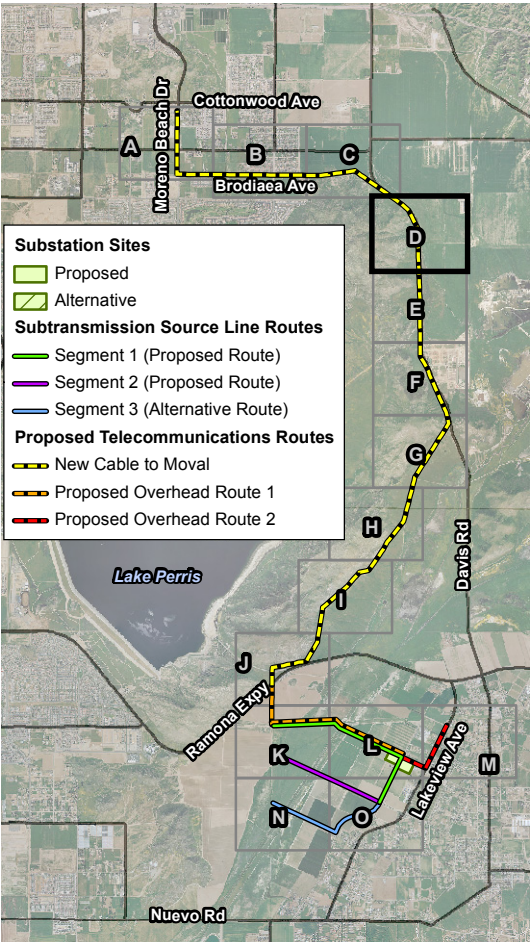
Soil Types Exhibit 4C

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Soil Types**
- GyA, Greenfield sandy loam
0 to 2 percent slopes
 - GyC2, Greenfield sandy loam
2 to 8 percent slopes, eroded
 - HcC, Hanford coarse sandy loam
2 to 8 percent slopes
 - RtF, Rockland

Soil Types Exhibit 4D

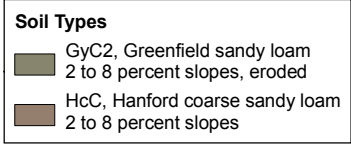
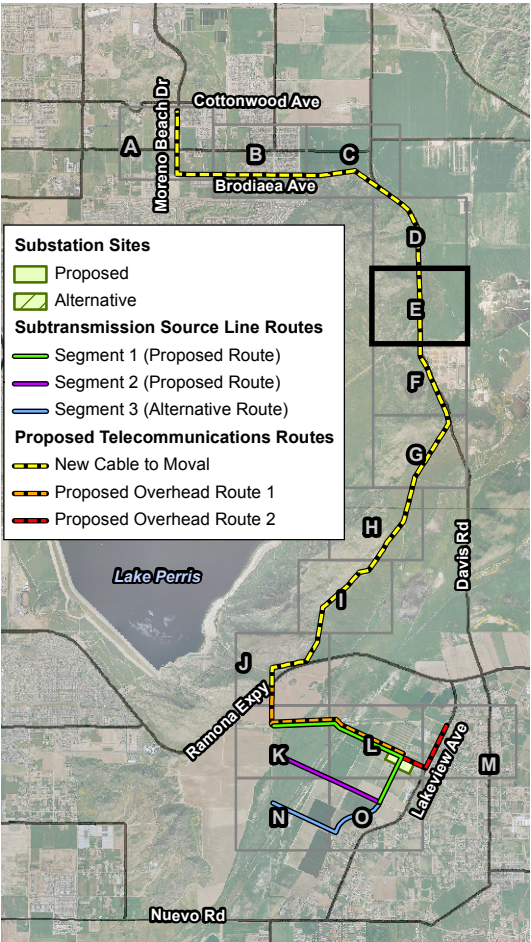
Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008



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Soil Types **Exhibit 4E**

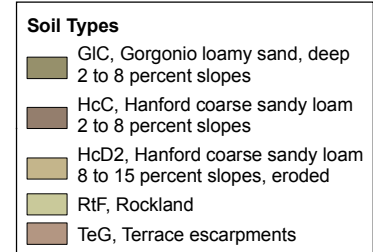
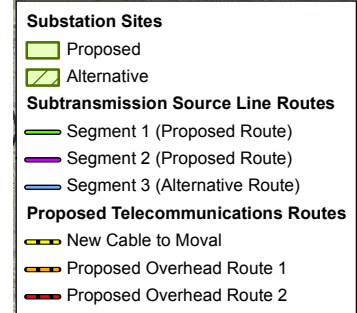
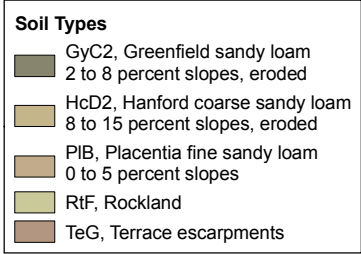
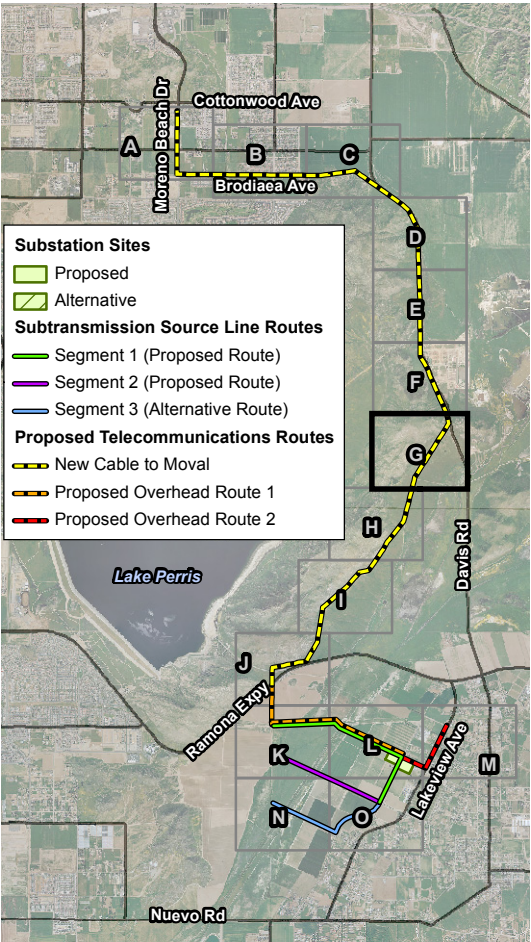


Exhibit 4F

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Feet

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Soil Types Exhibit 4G

Lakeview Substation and
Transmission Line Project

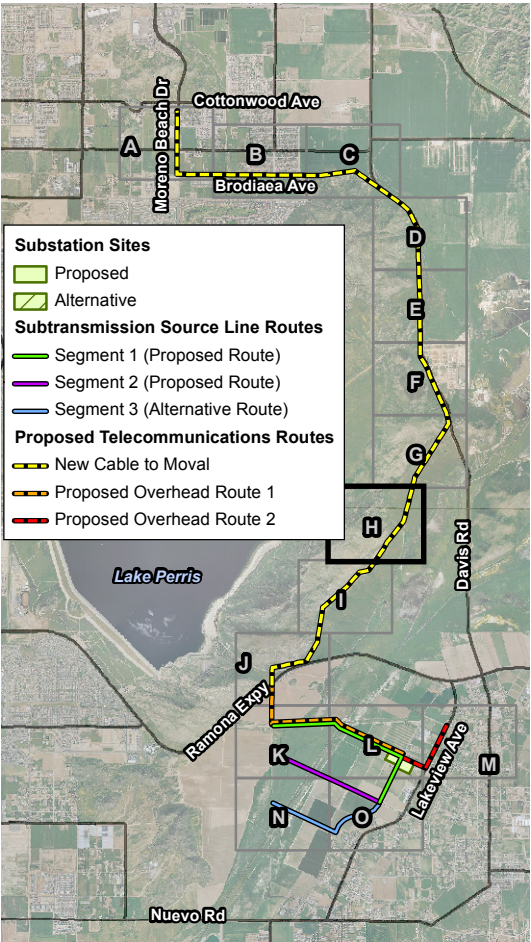


Source: Aerials Express 2008

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Source: Aerials Express 2008



- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

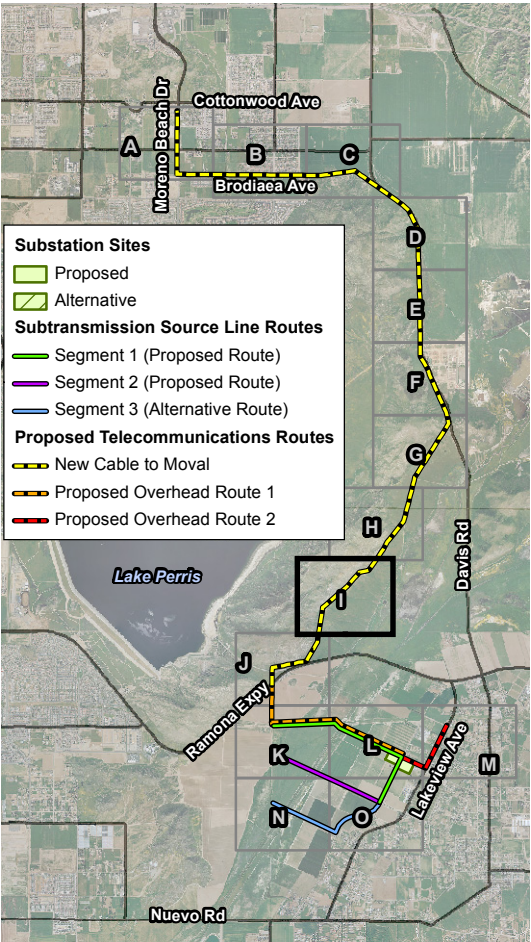
- Soil Types**
- GyC2, Greenfield sandy loam
2 to 8 percent slopes, eroded
 - HcC, Hanford coarse sandy loam
2 to 8 percent slopes
 - HcD2, Hanford coarse sandy loam
8 to 15 percent slopes, eroded
 - RtF, Rockland
 - TeG, Terrace escarpments

Soil Types Exhibit 4H

Lakeview Substation and
Transmission Line Project



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- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

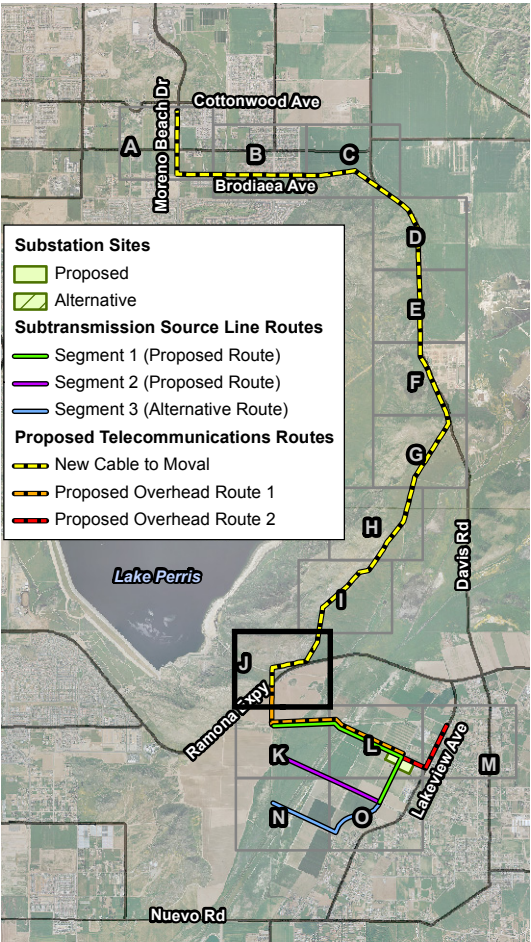
- Soil Types**
- HcD2, Hanford coarse sandy loam
8 to 15 percent slopes, eroded
 - RtF, Rockland
 - TeG, Terrace escarpments

Soil Types Exhibit 41

Lakeview Substation and
Transmission Line Project



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- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Soil Types**
- EnC2, Exeter sandy loam
2 to 8 percent slopes, eroded
 - HcC, Hanford coarse sandy loam
2 to 8 percent slopes
 - HcD2, Hanford coarse sandy loam
8 to 15 percent slopes, eroded
 - RfF, Rockland
 - TeG, Terrace escarpments

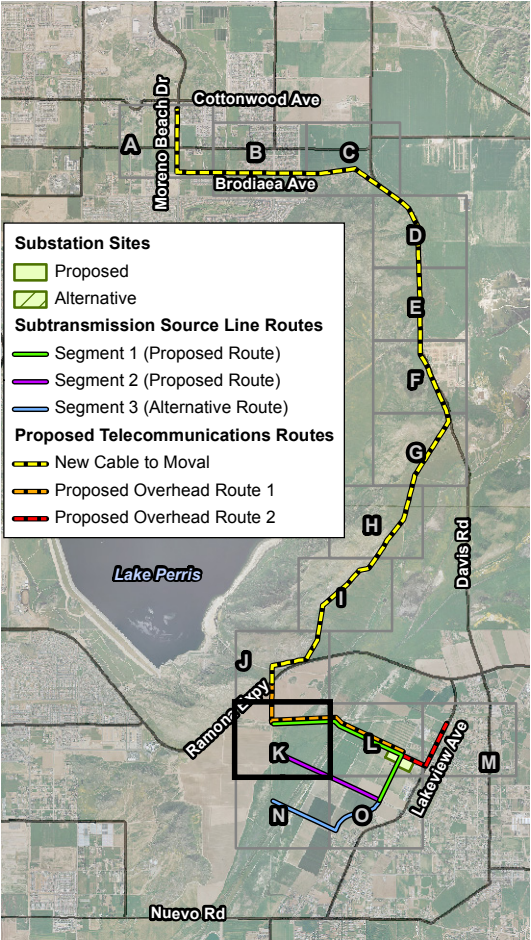
Soil Types Exhibit 4J

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

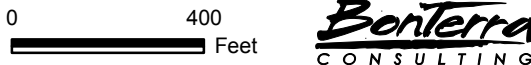
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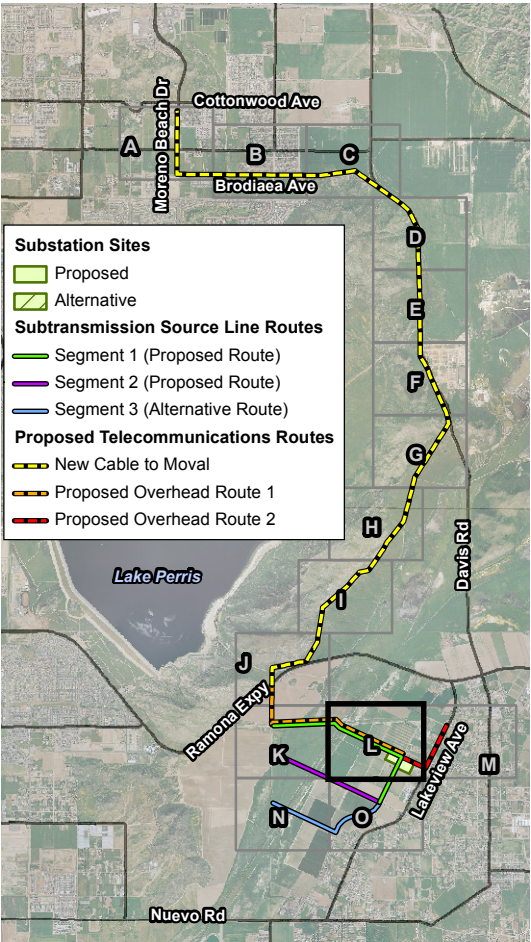
Soil Types	
	Dv, Domino silt loam, saline-alkali
	HcC, Hanford coarse sandy loam 2 to 8 percent slopes
	RsC, Riverwash
	Wf, Willows silty clay
	Wg, Willows silty clay, saline-alkali
	Wh, Willows silty clay, strongly saline-alkali
	Wn, Willows silty clay, deep, strongly saline-alkali

Soil Types Exhibit 4K

Lakeview Substation and
Transmission Line Project



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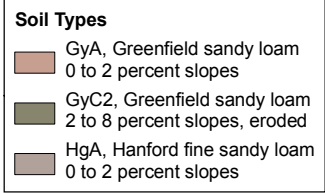
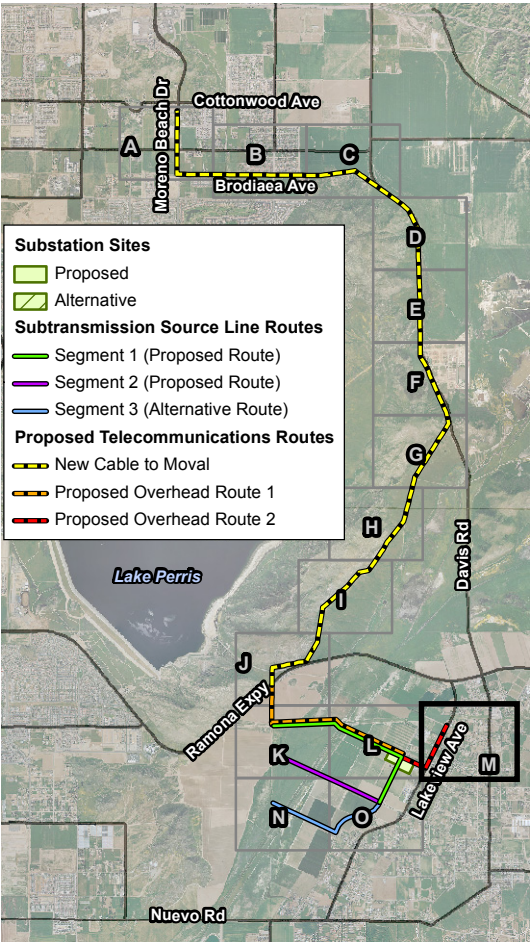
Soil Types	
	Dt, Domino fine sandy loam, saline-alkali
	Du, Domino silt loam
	Dv, Domino silt loam, saline-alkali
	EpC2, Exeter sandy loam, deep, 2 to 8 percent slopes, eroded
	GyA, Greenfield sandy loam 0 to 2 percent slopes
	HcC, Hanford coarse sandy loam 2 to 8 percent slopes
	PaA, Pachappa fine sandy loam 0 to 2 percent slopes
	PaC2, Pachappa fine sandy loam 2 to 8 percent slopes, eroded
	RaA, Ramona sandy loam 0 to 2 percent slopes
	RsC, Riverwash
	Wg, Willows silty clay, saline-alkali
	Wh, Willows silty clay, strongly saline-alkali
	Wn, Willows silty clay, deep, strongly saline-alkali

Soil Types Exhibit 4L

Lakeview Substation and Transmission Line Project



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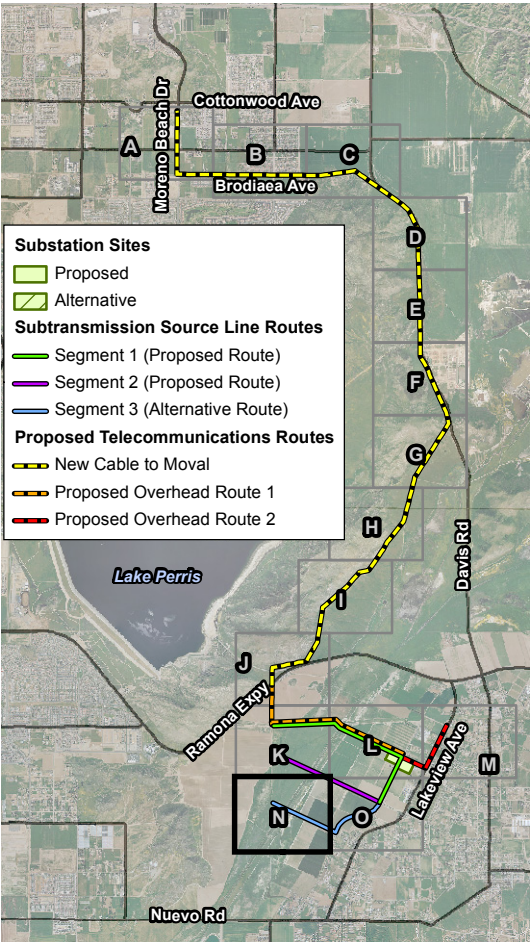
Soil Types Exhibit 4M

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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Soil Types	
Dv, Domino silt loam, saline-alkali	
EpA, Exeter sandy loam, deep 0 to 2 percent slopes	
GyC2, Greenfield sandy loam 2 to 8 percent slopes, eroded	
RsC, Riverwash	
Wf, Willows silty clay	
Wg, Willows silty clay, saline-alkali	
Wn, Willows silty clay, deep, strongly saline-alkali	

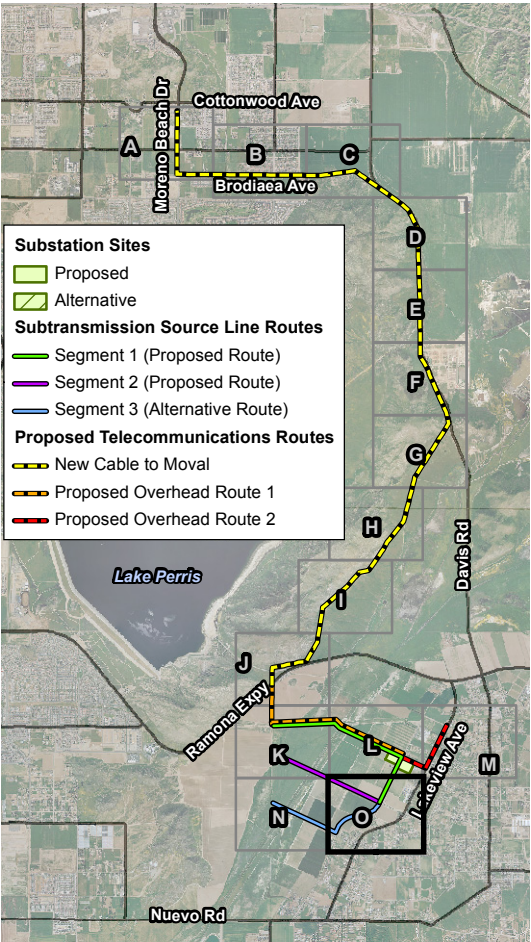
Soil Types Exhibit 4N

Lakeview Substation and
Transmission Line Project



Source: Aerials Express 2008

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Soil Types	
Dv	Domino silt loam, saline-alkali
EpA	Exeter sandy loam, deep 0 to 2 percent slopes
Gyc2	Greenfield sandy loam 2 to 8 percent slopes, eroded
PaA	Pachappa fine sandy loam 0 to 2 percent slopes
RaA	Ramona sandy loam 0 to 2 percent slopes
Wh	Willows silty clay, strongly saline-alkali

Soil Types Exhibit 40

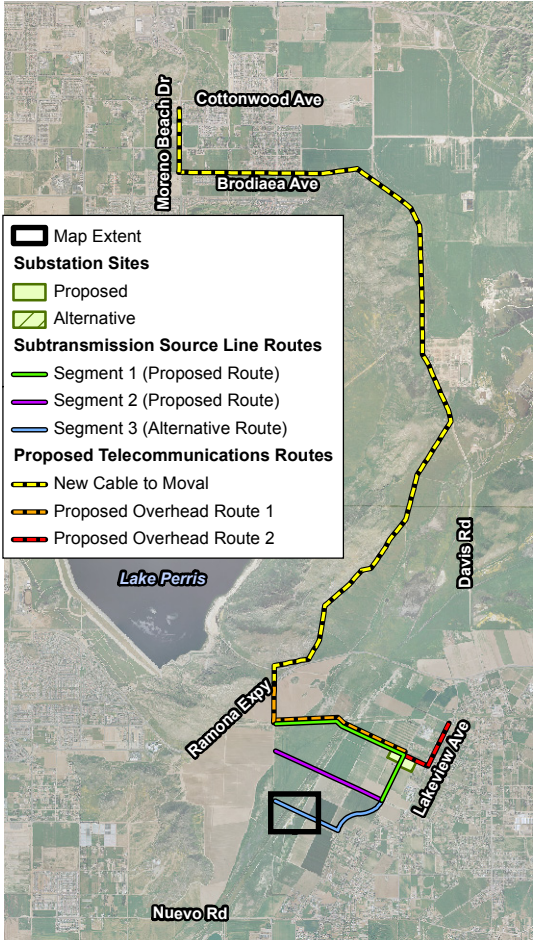
Lakeview Substation and
Transmission Line Project



Bonterra
CONSULTING

Source: Aerials Express 2008

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- Map Extent**
- Map Extent
- Substation Sites**
- Proposed
 - Alternative
- Subtransmission Source Line Routes**
- Segment 1 (Proposed Route)
 - Segment 2 (Proposed Route)
 - Segment 3 (Alternative Route)
- Proposed Telecommunications Routes**
- New Cable to Moval
 - Proposed Overhead Route 1
 - Proposed Overhead Route 2

- Survey Area**
- Survey Area
- Potential Riverside Fairy Shrimp Habitat**
- Potential Riverside Fairy Shrimp Habitat

Potential Riverside Fairy Shrimp Habitat Exhibit 5

Lakeview Substation and Transmission Line Project