May 7, 2018

COMMENT FOR CHSRA BUSINESS PLAN:

ADDITIONAL UTILITY RELOCATION COSTS ARE MISSING FROM THE ESTIMATE.

HIGH VOLTAGE TOWERS THAT CARRY ELECTRICITY ACROSS THE STATE OF CALIFORNIA INTERSECT WITH HIGH SPEED RAIL (HSR) IN MANY LOCATIONS. WHERE THESE TWO SYSTEMS OVERLAP, THE HIGH VOLTAGE TOWERS (HVT) MUST BE RAISED HIGHER OVER THE TRACKS TO MEET CLEARANCE REQUIREMENTS, OR THE WIRES MUST BE RELOCATED UNDERGROUND; THE AUTHORITY STATES THEY WILL BE RELOCATING THE HIGH VOLTAGE WIRES UNDERGROUND.

THE COSTS OF BURYING HIGH VOLTAGE WIRES IS TEN TIMES HIGHER THAN RAISING THE WIRES ABOVE THE TRACKS. THESE ADDITIONAL EXPENSES WILL BE PAID FOR BY THE CONSUMERS.

THESE RELOCATION COSTS ARE NOT ACCOUNTED FOR IN THE NEW BUSINESS PLAN.

In 2008, when Proposition 1A passed, voters approved of using the Union Pacific Railroad (UPRR) corridor between Merced and Fresno for High Speed Rail; the monies were to be spent to improve the existing rail corridor.

After 2011, a track alignment alternative called the Hybrid was chosen by the Authority that veers from the UPRR corridor and wanders to and fro across open farmland. The sixty mile straight route now has an additional 20 miles of high speed curves and spirals adding considerable length of track to the corridor. The California High Speed Rail Authority (CHSRA) officials continue to state that this route between Merced and Fresno is the backbone of the high speed rail system, yet this backbone has developed scoliosis, or curvature of the spine.

See Attachments 1, 2, and 3, High Speed Rail Maps. The Statewide map has not been updated to show the new curvature between Merced and Fresno.

Many electric transmission lines cross the state. These lines intersect with the high speed rail tracks in multiple locations. See Attachment 4, Electric Transmission Lines. Where these two systems overlap has not been identified by the Authority on their maps or in their environmental impact reports.

Along the HSR route, the small farming community of Fairmead is located between Merced and Fresno. The High Speed Rail (HSR) tracks curve through the region and the focus will be a set of

High Voltage Towers that cross the high speed rail tracks near the Valley State Prison. See Attachment 5A, Google map of the region.

A critical set of 125 Kilovolt High Voltage Towers (HVT) travels from Merced and Fresno between State Route 99 and the BNSF railroad. The line of towers appears as a dash/dot line on Google maps because the PG&E clears the farmland underneath of all fruit trees; the dash lines are the areas underneath the wires where the land is a barren yellow, the towers are the dots. Further magnification will show the shadows of the towers.

Where high voltage transmission lines cross over electrified rail tracks, there could be interference between the two systems which could result in arching of electrical power between the two lines, not unlike when you drove down the highway under a high voltage line and your radio goes out. The HSR system could lose signaling.

See Attachment 5B, CHSRA Key Map and Attachment 5C, New Tower locations needed to cross HSR tracks. These attachments provide one example of the lack of oversight in the HSR budget.

The Authority did not mark this series of high voltage towers on their map of High-Risk Utilities in their Draft Environmental Impact Report (DEIR) or the Final (FEIR). On the EIR maps, there is a notation that the electrical transmission lines will be shown, but this set of HVTs is not shown. See Attachment 6, Public Utilities and Energy.

See Attachment 7, Overhead Contact System (OCS) for High Speed Rail.

See Attachment 8, METRO Green Line near Los Angeles International Airport. The transit system's OCS wires can be seen underneath a series of high voltage towers. Two sets of towers had to be raised higher to accommodate the catenary system of the trains. The process took seven years.

In the State of California, when a set of power lines cross over an electrified railroad track, the rules governing the distance between the two sets of lines are found in the California Public Utilities Commission (CPUC) General Order 95 (GO95). These rules were established during the era of trolley car lines, when trolley cars ran at a maximum of sixty miles an hour. These rules have not been updated for speeds of 220 miles per hour.

See Attachment 9 an 10, General Order 95, clearances for overhead wires above a trolly car OCS.

In order to raise the lowest line of an high voltage tower, all the lines on the tower must be raised incrementally. There is a cascading affect and the high voltage towers on either side of the HSR tracks will have to be re-built, approximately three towers on each side of the HSR tracks (See again Attachment 5C for locations of new towers).

Power lines will have to be lengthened and nearby towers will require wires cut and adjusted using precise calculations. During construction, electricity will have to be diverted and re-routed in stages. HVT relocations would have to be staggered in scheduling. For each case there will be road closures, detours, CPUC public participation hearings, EIR/EIS, community outreach, eminent domain legal fees, right-of-way agreements, rental fees established, permits and contractor review and supervision. The Federal Aviation Administration (FAA) will require a formal review of the new height of the towers; much crop dusting occurs in the Central Valley. The FAA may take ten years to approve new airspace altitude restrictions.

In contrast to this standard approach to the problem: re-building and raising the high voltage towers over the catenaries, the CHSRA states in their documents that they will work with the the utility owners to put the high voltage wires underground. See Attachment 11 from the EIR.

For the consumer, this is not economically feasible. The Transmission Agency of Northern California (TANC) estimates that underground utility lines would cost 10 to 30 times greater than overhead construction. See Attachment 12 from their web site, Problems of Underground Transmission Lines.

Burying high voltage lines will require a vault. These vaults are typically 20’ x 30’ structures, roughly the size of a living room. These vaults must be air conditioned. This will require an additional power line to the vault. The vault must be secured against vandalism. This vault will be built in a flood zone and must be protected with additional drainage details that have not been provided. There are significant environmental hazards. There will be additional property needed from the owners of the farmland and will require permanent take, not just an easement.

The San Francisco Chronicle published an article about the high cost of under- grounding power lines after the wildfires in Northern California. See Attachment 13A &13B.

After the alignment through Fairmead was chosen, Pacific Gas and Electric, Southern California Edison, San Diego Gas & Electric, Southern California Gas Company, East Bay Municipal Utility District, Sacramento Municipal Utility District and the Los Angeles Department of Water and Power began evidentiary hearings with the CPUC about the various critical interfaces with high speed rail.

See Attachment 14, California High-Speed Rail Safety. From that document:

“In March 2013, the California High Speed Rail Authority petitioned the CPUC to create regulations governing safety standards for the use of 25 kilovolt (kV) electric lines to power high-speed trains.The CPUC opened a proceeding (R13-03-009) to establish uniform safety requirements governing the design, construction, operation, and maintenance of overhead 25 kV railroad electrification systems and the specific safety challenges the system presents. Evidentiary hearings are scheduled to commence in December 2014.”

The rules for governing the clearances between the high speed rail catenary and the high voltage towers were to be discussed and revisions were to be made. The CPUC was well aware that the clearances had not been updated since the era of trolley cars. But it appears the meetings did not change that distance and it is still the same as it was for the trolley car era; there are many documents on the matter that can be found here:

https://apps.cpuc.ca.gov/apex/f?p=401:57:0::NO:RP,58,RIR:P5_PROCEEDING_SELECT:R1303009

The CHSRA representative's response to the collective energy agencies, was, literally, "I don't have to answer you," and no further response was provided. See Attachment 15. Here is the document on the need for further evidentiary hearings by the CPUC. The quote can be found at the top of page 3:

http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M089/K025/89025450.PDF

The bottom wire of the High Voltage Tower should be raised higher above the High Speed rail catenaries than a trolley car wire; the high speed trains will be going 220 miles per hour. The CPUC stated they were going to change these rules, but did not change General Order 95 to accommodate high speed trains.

Further investigation was denied. See the Administrative Law Judge's ruling denying motions for additional evidentiary hearings:

http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M089/K640/89640945.PDF

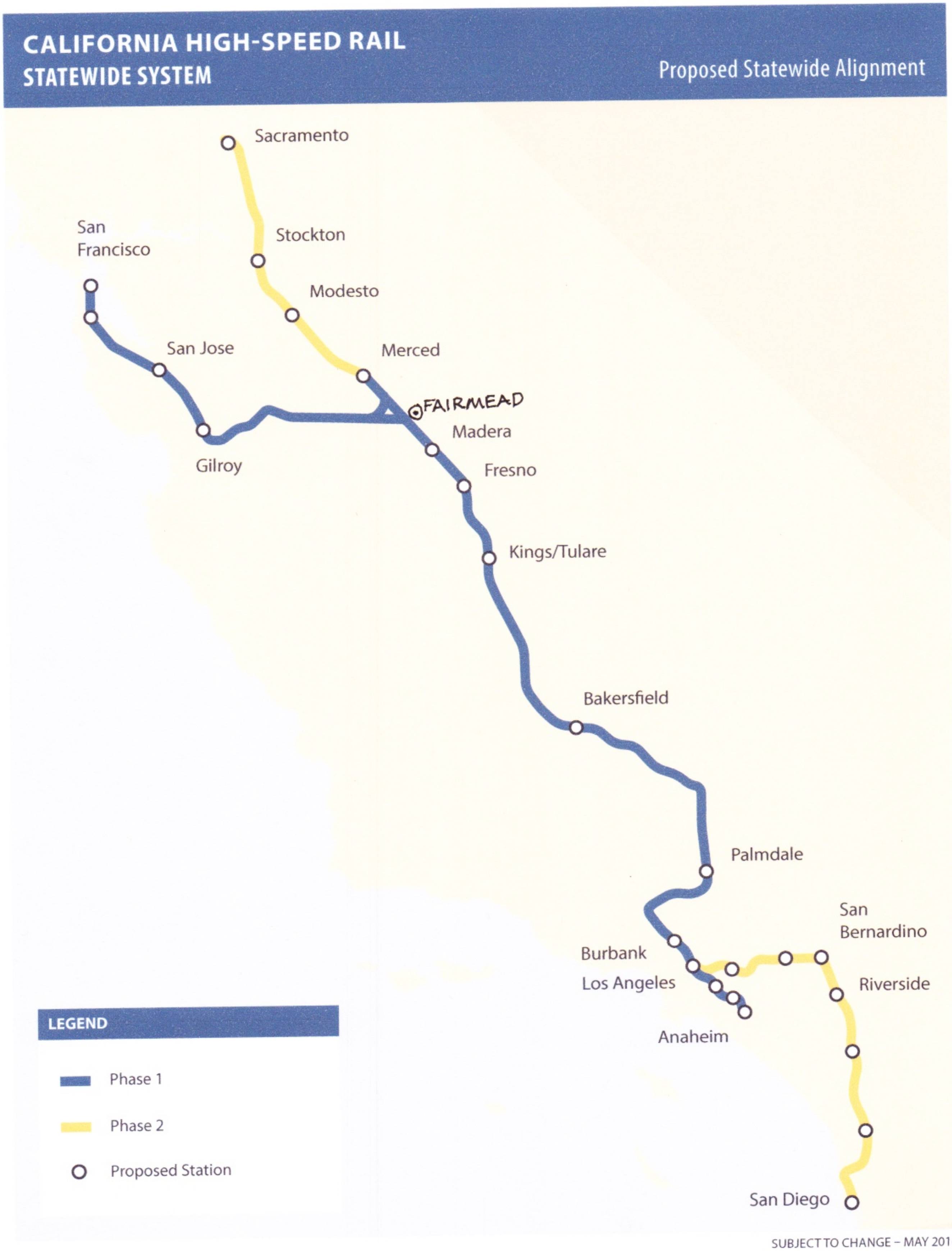
Moving the High Voltage Towers will cost billions of dollars, yet these costs are missing from the budget.

Please see all attachments for further information.

Thank you for your cooperation in this matter.

Susan MacAdams
Track and Alignment Expert
Former High Speed Rail Planning Manager,
Los Angeles County Metropolitan Transportation Authority (Metro)
Track Design and Manager: Metro Red, Blue and Green Lines, Los Angeles
Light & Heavy Rail Track Design and Construction: Baltimore, Boston, Washington DC
susan.macadams@gmail.com

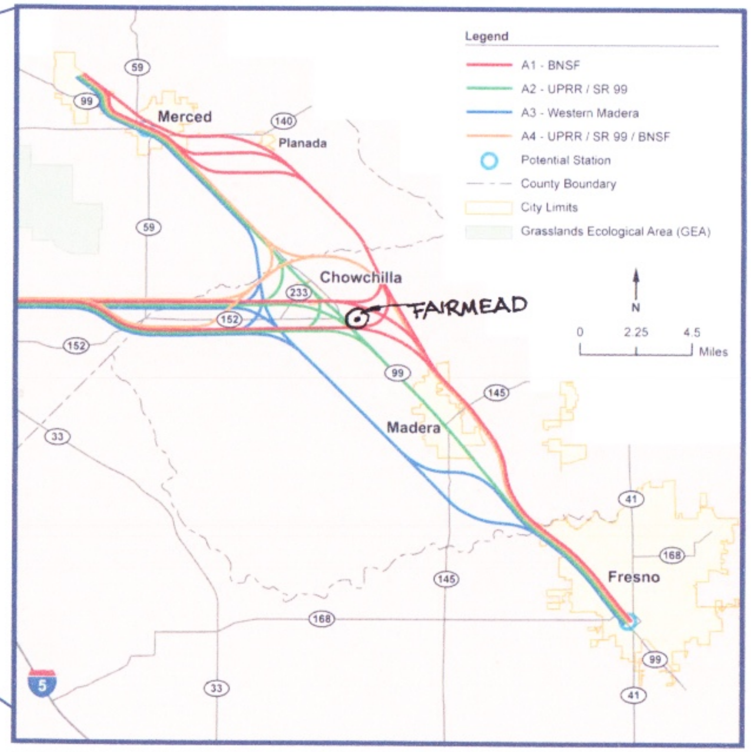
ATTACHMENT 1



ATTACHMENT 2

Merced-to-Fresno Section

Statewide Map



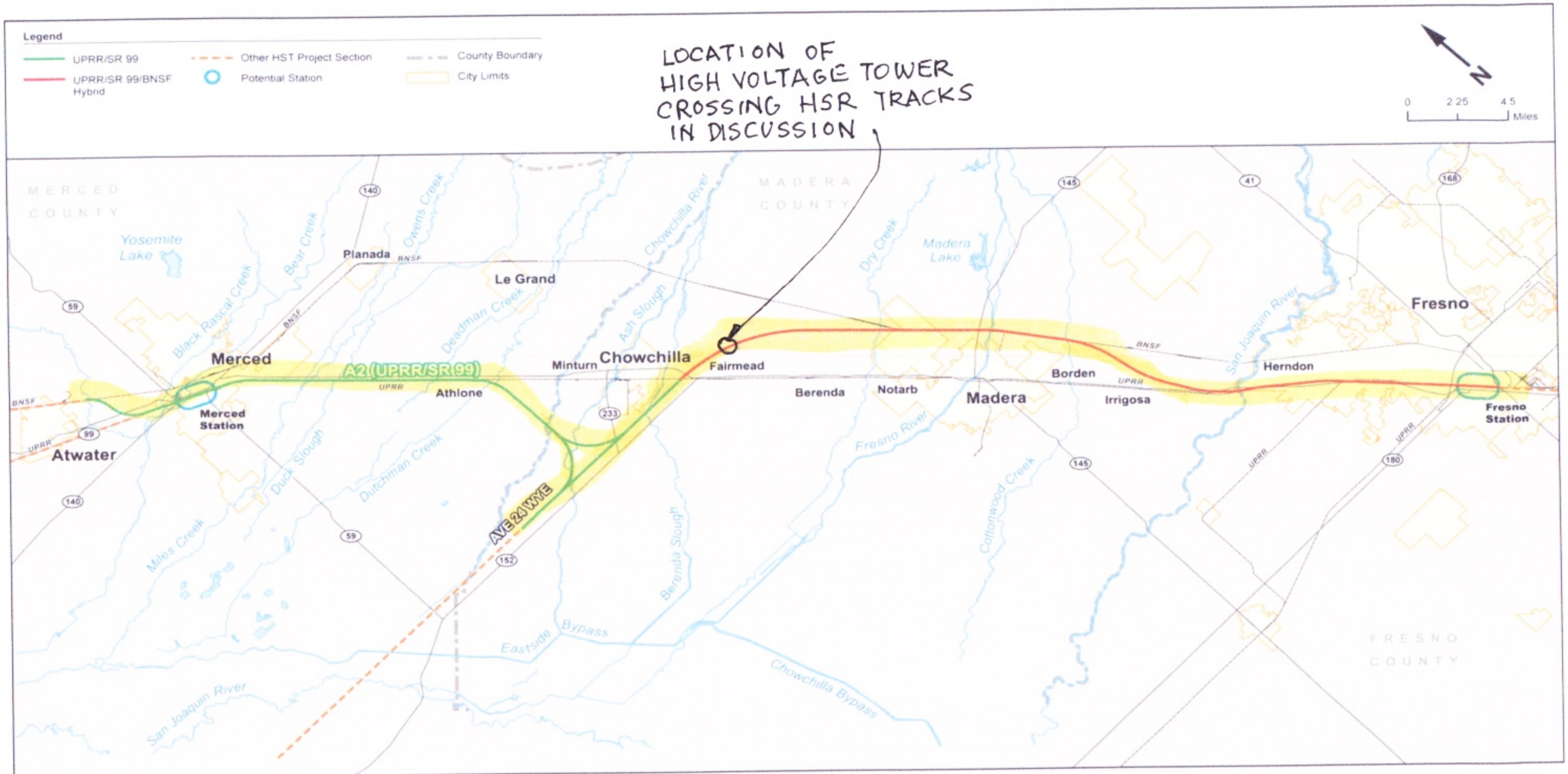
Project Vicinity

CALIFORNIA HIGH-SPEED RAIL AUTHORITY

U.S. Department of Transportation
Federal Railroad Administration

ATTACHMENT 3

A2 (UPRR) / A1 (BNSF) – Ave 24 Wye West Chowchilla Design Option



CALIFORNIA HIGH-SPEED RAIL AUTHORITY

U.S. Department of Transportation
Federal Railroad Administration

ATTACHMENT 4

Electric Transmission Lines
California, 2016

Note: Electric transmission lines shown have a transmission capacity greater than 115 kV

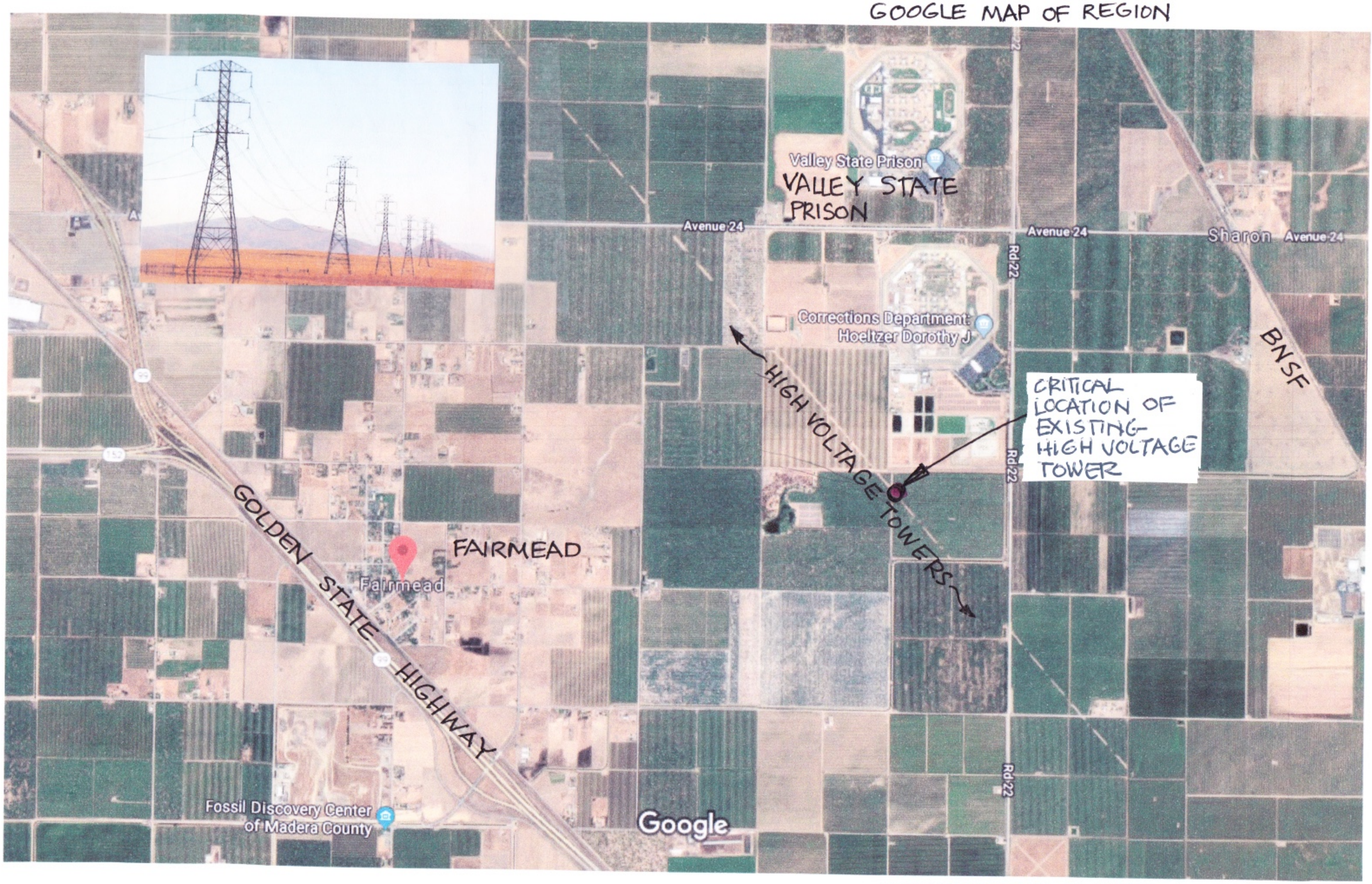
Source: California Energy Commission Cartography Unit, U.S. Census Bureau, Cal-Atlas

DISCLAIMER: The California Energy Commission makes no warranties, expressed or implied, as to the suitability or accuracy of the product for any particular purpose. Any use of this information is at the user's own risk. For further information or suggestions concerning maps/data, contact the Energy Commission Cartography Unit: (916) 654-3902

T:\Projects\CEC\Tline R\Statewide\Web\ElectricTransmissionLines_A.mxd

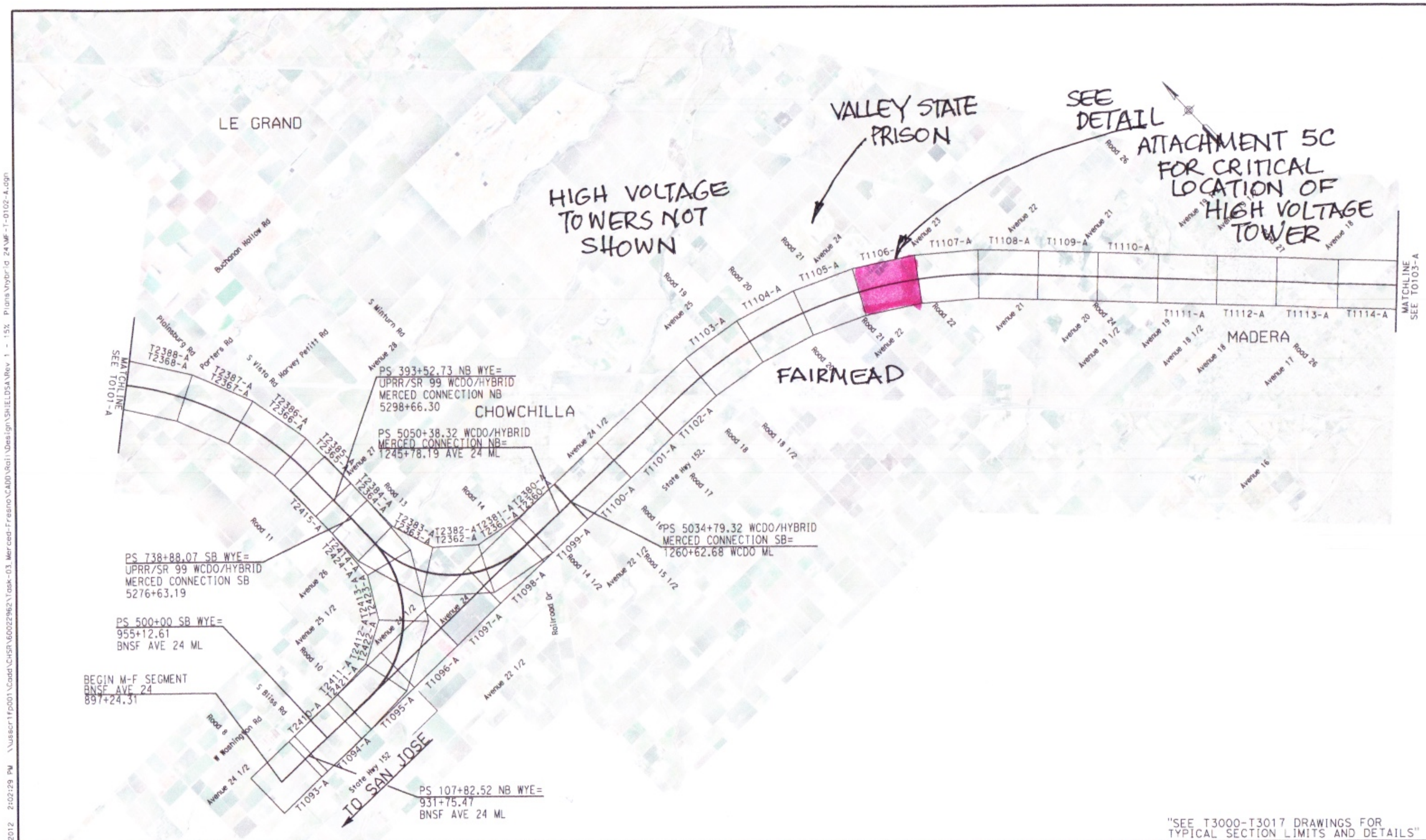
Google Maps Fairmead

ATTACHMENT 5A
GOOGLE MAP OF REGION



Imagery ©2018 Google, Map data ©2018 Google 2000 ft

ATTACHMENT 5B
CHSRA KEY MAP



"SEE T3000-T3017 DRAWINGS FOR TYPICAL SECTION LIMITS AND DETAILS"

REV	DATE	BY	CHK	APP	DESCRIPTION
1	12/12/2011	AS			TRACK REALIGNMENT

DESIGNED BY A. SHIELDS
DRAWN BY H. SULLIVAN
CHECKED BY A. BOONE
IN CHARGE A. BOONE
DATE 07/27/2011

RECORD SET 15% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

AECOM
Technical Services, Inc.
2020 L Street, Suite 300
Sacramento, CA 95811
CH2MHILL

CALIFORNIA
HIGH-SPEED RAIL AUTHORITY

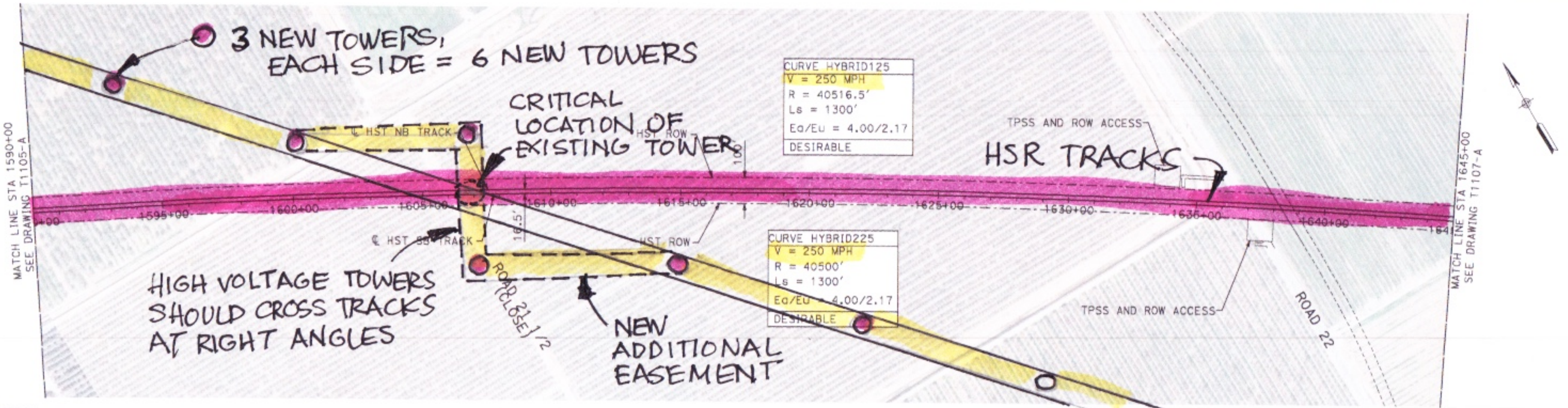
CALIFORNIA HIGH-SPEED TRAIN PROJECT
MERCED TO FRESNO
HYBRID ALIGNMENT
AVENUE 24
KEY MAP
SHEET 2 OF 3

CONTRACT NO. HSR06-007
DRAWING NO. T0102-A
SCALE NO SCALE
SHEET NO. ### OF ###

shieldsa 1/9/2012 2:02:29 PM \\usscr1fp001\Cadd\CHSR\60022962\Task-03_Merced-Fresno\CADD\Rail\Design\SHIELDSA\Rev 1 - 15% Plans\hybrid 24\MF-T-0102-A.dgn

VALLEY STATE PRISON

ATTACHMENT 5C
NEW TOWER LOCATIONS NEEDED
TO CROSS ABOVE HSR CATENARIES

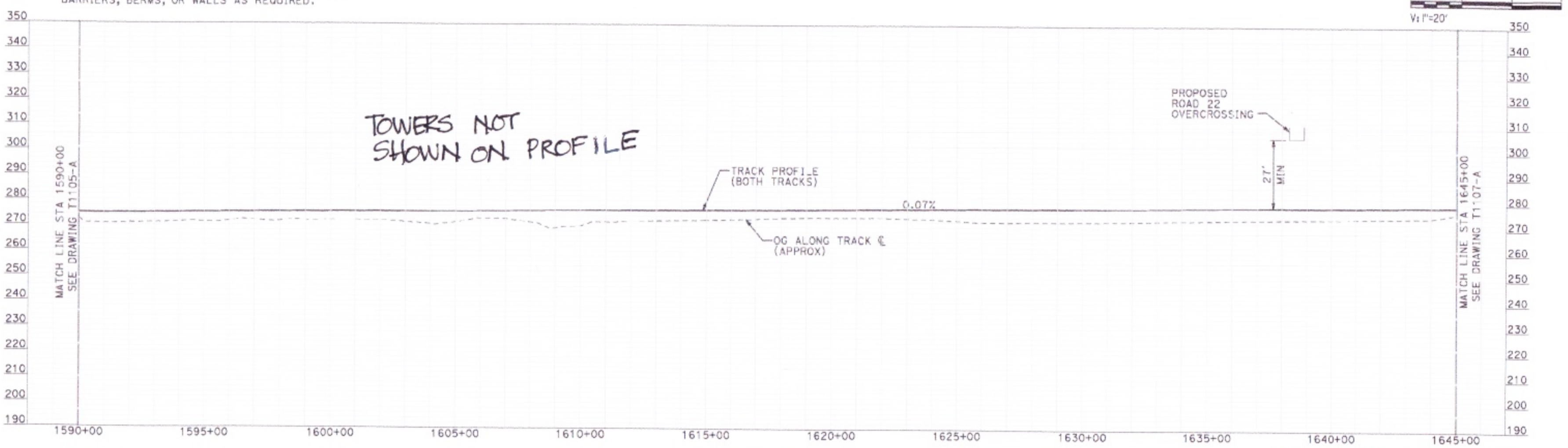


NOTES:
1. ALL UTILITIES SHOWN ARE EXISTING UTILITY LINES BASED ON RECORD DRAWINGS AND ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY.
2. TRACKS CLOSER THAN 102 FT TO THE NEAREST EXISTING FREIGHT TRACKS WILL INCLUDE SAFETY BARRIERS, BERMS, OR WALLS AS REQUIRED.

PLAN

H: 1"=200'

V: 1"=20'



PROFILE

"SEE T3000-T3017 DRAWINGS FOR TYPICAL SECTION LIMITS AND DETAILS"

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY A. SHIELDS
DRAWN BY H. SULLIVAN
CHECKED BY A. BOONE
IN CHARGE A. BOONE
DATE 07/20/2011

RECORD SET
15% DESIGN
SUBMITTAL

NOT FOR
CONSTRUCTION

AECOM
Technical Services, Inc.
2020 L Street, Suite 300
Sacramento, CA 95811

CH2MHILL

CALIFORNIA
HIGH-SPEED RAIL AUTHORITY

CALIFORNIA HIGH-SPEED TRAIN PROJECT
MERCED TO FRESNO
HYBRID

PLAN AND PROFILE
STA 1590+00 TO STA 1645+00

CONTRACT NO. HSR06-007
DRAWING NO. T1106-A
SCALE AS SHOWN
SHEET NO. ### OF ###

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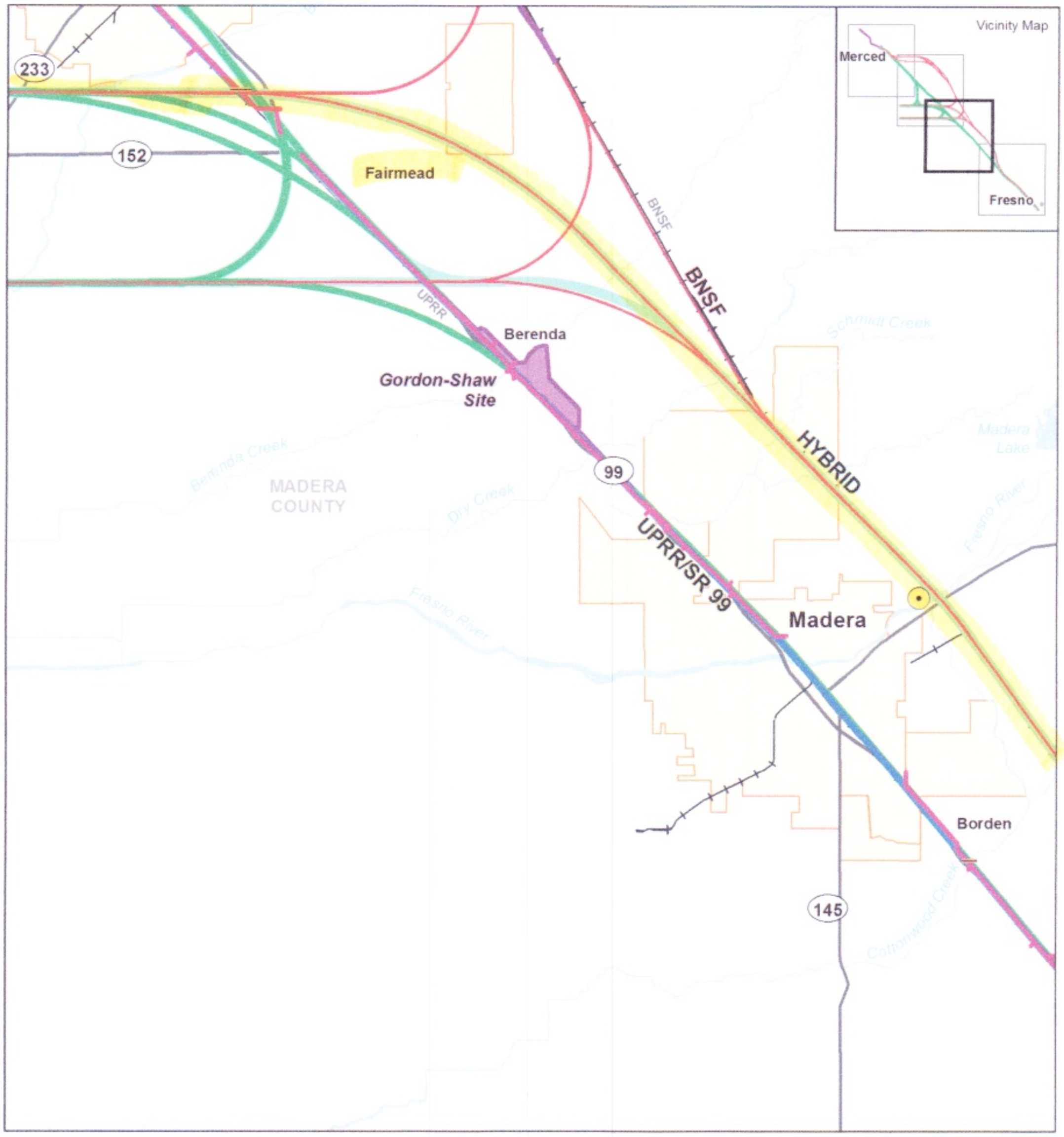
ATTACHMENT 6
HIGH VOLTAGE TRANSMISSION LINE
NOT IDENTIFIED ON MAPS



Source: AECOM (2010), URS (2010). MF_EIS_UT_01-04_c Jul 20, 2011

N
0 2.5
Miles

- UPRR/SR 99 Alternative
- BNSF Alternative
- Hybrid Alternative
- Potential Heavy Maintenance Facility
- Station Study Area
- City Limit
- County Boundary
- Railroad
- Natural Gas Line
- Petroleum and Fuel Pipeline
- Electrical Transmission Line
- Substation

125kV HIGH VOLTAGE
MISSING
FROM MAP

Figure 3.6-5
High-Risk Utilities in the Madera Project Vicinity

ATTACHMENT 7
CATENARIES, OCS

3 SYSTEM DESCRIPTION

3.1 OVERHEAD CONTACT SYSTEM

The Overhead Contact System (OCS) supplies power to the electrically powered rail vehicles at 25 kV, and includes the aerial conductors, insulators, line hardware, support brackets, and support structures and their associated foundations. 25 kV Electrification Systems typically utilize a catenary configuration, which comprises an Energized and current carrying Messenger Wire (MW) to support a Contact Wire (CW) by means of in-span wire hangers.

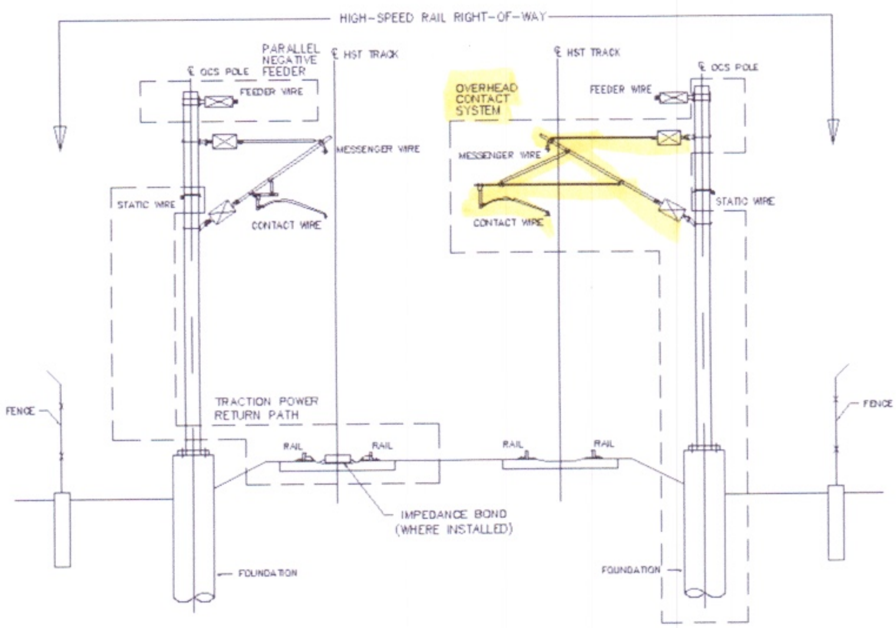


Figure 3-1 Typical 2x25 kV Electrification System

3.2 PARALLEL FEEDERS

In a 2x25 kV Autotransformer Feed System (shown above), a bare parallel Feeder (often termed the negative Feeder) will normally be mounted aerially on insulators on the OCS Poles, and will form a continuous electrical connection between Substation facilities. There is a 180 degree phase difference between the voltages of the parallel negative Feeder and the Catenary System, giving a 50 kV phase-to-phase voltage difference between these conductors.

In a 1x25 kV Direct Feed System, the Feeder (where used) will be a bare paralleling conductor that can be connected at frequent intervals to the OCS to provide localized electrical reinforcement of the circuit. There is no phase difference between the voltages of the parallel reinforcement Feeder and the Catenary System.

ATTACHMENT 8
METRO GREEN LINE
UNDER HIGH VOLTAGE TOWERS

ATTACHMENT 9
GENERAL ORDER 95
CLEARANCES

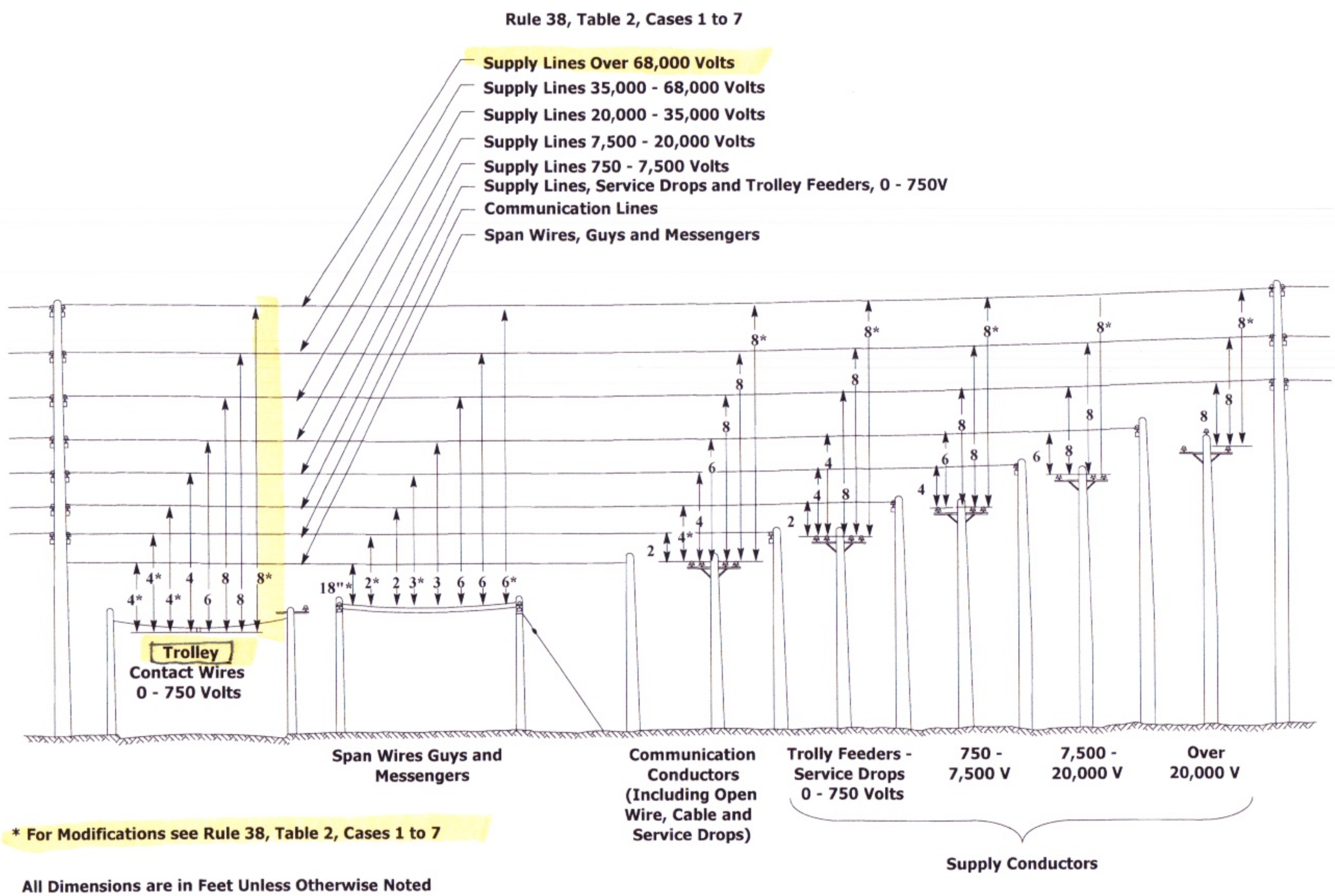


Figure 7 G-7
Clearances of Wires at Point of Crossing

ATTACHMENT 10
GENERAL ORDER 95
CLEARANCES

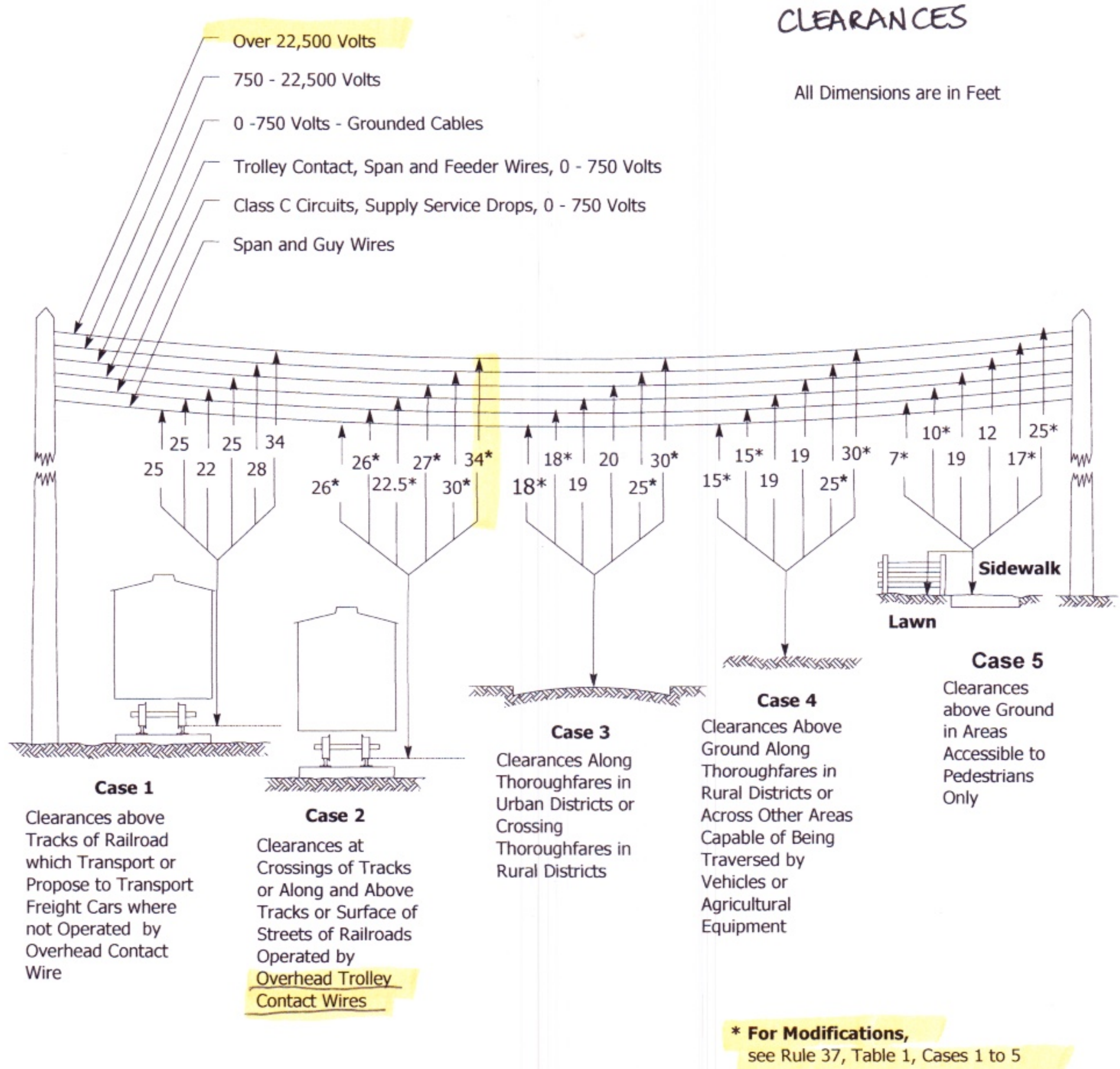


Figure 6
Clearances of Wires Above Railroad Tracks, Highways, Etc.

ATTACHMENT 11
PLACING TRANSMISSION LINES UNDER-GROUND

disposal. Based on estimates that the total volume of C&D material is a maximum of 2.4 million cubic yards before recycling (approximately 7% of the total permitted capacity of the three previously discussed landfills that accept C&D material), the Merced to Fresno HST would have a negligible effect under NEPA on area landfills. Under CEQA, the impact on permitted landfills that would serve the project is less than significant.

As discussed in Section 3.10, Hazardous Materials and Wastes, construction would generate hazardous waste consisting of welding materials, fuel and lubricant containers, paint and solvent containers, and cement products containing strong basic or acidic chemicals. Demolition of older buildings could also generate hazardous waste, such as asbestos-containing materials and lead based paint. The Authority would handle, store, and dispose of all hazardous waste in accordance with applicable requirements, including the Resource Conservation and Recovery Act (see Section 3.10, Hazardous Materials and Wastes). A certified hazardous waste collection company would deliver the waste to an authorized hazardous waste management facility for recycling or disposal. Some in-state landfills, such as Clean Harbors Westmorland Landfill in Imperial County, the Chemical Waste Management Kettleman Hills Landfill in Kings County, and other permitted landfills accept hazardous wastes (DTSC 2007). Because hazardous waste could be disposed of at permitted landfills that have sufficient capacity, potential effects are negligible under NEPA and less than significant under CEQA.

Project Impacts – Common Utilities Impacts

The operation and maintenance of the three project alternatives and an HMF could result in permanent relocation and extensions of utilities; reduced access to existing utilities in the project footprint; and increased demand for water, wastewater, and waste disposal services. None of the project alternatives would physically encroach on the footprint of water or wastewater treatment facilities, water pump stations, or power plants.

Conflicts with Existing Utilities

There are many utilities within or crossing the study area for the proposed HST and associated facilities. The project would not be compatible with most of these existing utilities. The Authority would work with utility owners during final engineering design and construction of the project to relocate utilities or protect them in place. Where overhead transmission lines cross the HST alignment, the Authority and the utility owner may determine that it is best to place the line underground. In this case, the transmission line would be placed in a conduit so that future maintenance of the line could be accomplished outside the HST right-of-way. Where existing underground utilities such as gas, petroleum, and water pipelines cross the HST alignment, the utilities would also be placed in a protective casing so that future maintenance could be accomplished from outside of the HST right-of-way. The project construction contractor would coordinate schedules for utility relocations and protection-in-place with the utility owner to ensure the project would not result in prolonged disruption of services. In compliance with state law (California Government Code 4216), the construction contractor would use a utility locating service and manually probe for buried utilities within the construction footprint prior to initiating ground disturbing activities. This would avoid accidental disruption of utility services. Transmission lines between the transmission power supply stations and the existing substations would be constructed aboveground to industry standards and would not conflict with existing infrastructure. Therefore, the effect of the project on utility providers and their customers would be negligible under NEPA and the impact would be less than significant under CEQA.

PUBLIC WOULD PAY THE ADDITIONAL COSTS OF UNDERGROUND UTILITIES

The HST may conflict with existing stormwater basins; this is potentially a substantial impact under NEPA and a potentially significant impact under CEQA. As feasible, any loss in capacity at the retention ponds would be restored within the existing utility footprint or the HST alignment would be modified to avoid impacts, which would reduce the impact to negligible under NEPA and less than significant under CEQA. Some stormwater basins will require relocation within the study area. Impacts would be negligible under NEPA and less than significant under CEQA.

Where the alignments would conflict with existing electrical substations, there is a potential for a substantial impact under NEPA and a significant impact under CEQA. Where possible, portions of the HST a combination of concrete footings and guide wires. The number of conductors going between each tower depends on whether the transmission line is single circuit (three wires) or dual circuit (six wires).

ATTACHMENT 12

PROBLEMS OF UNDERGROUND TRANSMISSION LINES

Tubular steel towers are relatively new; they consist of a single steel pole anchored into the ground. These can be more visually appealing than their lattice steel counterparts, although historically they have been more costly to construct and can result in increased maintenance costs and requirements.

Clearance Requirements

Clearance requirements relates to a few issues, primarily the height of the wires from the ground and other permanent structures, the distance that must be between two towers in a single transmission line (or the distance between towers from two or more separate transmission lines built within a single transmission corridor), and the proximity of transmission lines to roads and highways. These requirements are mandated by federal, state and (sometimes) local governments and the specific requirements are a function of exactly where the line and towers will be located.

Reliability Standards

Reliability standards are closely related to clearance requirements. In short, this means ensuring the lights will stay on in the event of a tower collapse of other major failure along the line.

Undergrounding

It is possible to bury transmission lines underground instead of building an overhead system connected by a series of steel towers, but,je there are tradeoffs and requirements for public safety and the environment. Beyond the increased cost of undergrounding transmission lines (10 to 30 times greater than overhead construction depending on voltage), the main issues are heat and environmental impacts.

When high-voltage energy flows through a conductor, resistance in the conductor generates waste heat (or transmission losses). The higher the energy transmitted, the more heat is generated. With overhead transmission lines, the air surrounding the lines acts as an insulator and absorbs this waste heat. In underground transmission lines other mediums must be used to dissipate this heat, which to-date has restricted the undergrounding of transmission lines to voltages less than 500-kV except for very short distances.

Another consideration of underground lines is the ground disturbance caused by the tunnels through which the transmission line runs. Instead of impacting the ground only at tower footings, underground transmission construction requires extensive excavation and can disrupt habitats or water resources. Additionally access to the underground transmission line, which is needed for maintenance and repairs, requires construction of "vaults." These vaults are typically 20' x 30' structures (roughly the size of an average living room) that must be buried in the ground every 750-1,000 feet where the conductors are spliced together. The environmental and land disruption impacts of undergrounding transmission lines can greatly exceed that of above ground transmission, and are factors that are weighed in the planning process.

TO BE BUILT BENEATH THE TRACKS

Underground power lines don't cause wildfires. But they're really expensive.

ATTACHMENT 13A

page 1 of 2

By David R. Baker

October 21, 2017
San Francisco Chronicle

Underground power lines don't sway in the wind. Tree branches blown sideways by a gale can't hit them. They don't sit on wooden poles that can fall down.

They would, in other words, seem to be an ideal way to prevent wildfires in a place like California, which has a history of big blazes sparked by overhead power lines tangling with trees. Investigators are now trying to determine whether that combination triggered the wildfires that tore through the Wine Country this month.

Unfortunately, underground power lines are also very expensive.

And if Pacific Gas and Electric Co., whose overhead lines are facing scrutiny as a possible cause of the North Bay fires, were to bury more of its system, that cost would be borne by the company's customers. It would not come out of PG&E's profits. Placing more lines underground could even raise those profits, since under California regulations, utilities make a guaranteed rate of return on the value of all the equipment they own.

"We think it's so expensive that it's really not feasible," said Mark Toney, executive director of The Utility Reform Network watchdog group.

A new underground distribution line across most of PG&E's territory costs about $1.16 million per mile, according to data filed with state regulators during the utility's most recent general rate case. That's more than twice the price of a new overhead line, which costs about $448,800 per mile. Most of the difference comes from the expense of digging a trench for the cable.

Prices rise within cities, where the work is more complex. A 2015 San Francisco report found that recent costs for moving power lines underground in Oakland had averaged $2.8 million per mile, while similar work in San Jose had cost $4.6 million per mile.

And burying high-voltage transmission lines — the kind usually strung from immense steel towers across long distances — can cost as much as $5 million per mile, according to PG&E.

The utility operates more than 134,000 miles of overhead power lines of one voltage or another across Northern and Central California. So while placing power lines underground in areas filled with flammable vegetation may sound sensible, it is far from cheap: It would cost well over $100 billion to do across PG&E's entire territory.

"Do we want to tear up the whole Oakland hills — a high fire hazard area — to do undergrounding?" asked Michael Picker, president of the California Public Utilities Commission. "There's never going to be a perfect solution. A lot depends on how much people are willing to spend to approach the next level of safety."

San Francisco has particularly painful experience with the costs of burying lines.
For 10 years starting in 1996, the city worked with PG&E to place underground 45.8 miles of overhead lines, with the utility estimating a cost of $1 million per mile. Instead, the final price came in at $3.8 million per mile.

California regulations use a formula for allocating some money each year from utility customers' bills to undergrounding projects in cities that want to bury their power lines. San Francisco's 10-

year project ran so far over budget that it used up all the money that would be available to the city through 2032, according to a city report. That brought undergrounding within the city to a halt.

Price is not the only pitfall.

Repair crews have no trouble spotting a knocked-over power pole or downed line. But when an underground line fails, operators first have to figure out where the problem occurred, without being able to see it — though sensors attached to the power lines can help narrow things down. Then they have to dig.

"You may know it's within a certain distance, but you don't know exactly where it is," said Andrew Phillips, director of transmission studies at the Electric Power Research Institute, a think tank serving the utilities industry. "And fixing it is very expensive, and that means the outage time is a lot longer."

There's also the issue of cutting trenches through environmentally sensitive areas. And in more urban settings, workers who don't know the location of an underground line may dig into it, a problem that plagues natural gas pipelines as well. The power research institute's office in Charlotte, N.C., recently lost power for an afternoon after someone accidentally hit an underground power cable in the neighborhood, Phillips said.

"Some guy with a backhoe was working on the traffic light, and he dug into the line — and everyone had to go home," he said.

Most undergrounding takes place in towns and cities, for aesthetic reasons.

Urban streetscapes already contain a maze of infrastructure below the surface — water and sewer pipes, fiber-optic cable — so undergrounding can often be combined with other jobs to minimize the disruption.

PG&E undergrounds about 30 miles of electric lines each year. Other utilities have been more aggressive. San Diego Gas and Electric Co., a far smaller utility, says that 60 percent of its lines are now underground. That even includes small stretches of rural lines running through areas considered particularly prone to wildfires. The city of San Diego also placed a high priority on moving lines underground and set up its own funding system to support the work.

At the current pace, moving all of California's utility lines underground would take 1,000 years, according to the California Public Utilities Commission.

PG&E has replaced hundreds of toppled or damaged power poles in the North Bay since the Oct. 8 windstorm and the wildfires that followed. It remains unclear whether PG&E's equipment may have helped start the fires or whether the fires damaged the equipment.

Either way, PG&E does not consider undergrounding a panacea.

"We serve urban areas, and we also serve really rural areas, so where's the tipping point where undergrounding makes sense?" said PG&E spokesman Keith Stephens. "We want to provide safe and reliable service that's also affordable. So it's a balance of those three things."

David R. Baker is a San Francisco Chronicle staff writer.

Moving power lines underground can help prevent fires— at a price
Miles of overhead power lines in PG&E territory: 134,000
Cost of underground lines, per mile: $1.16 million to $5 million
Miles of power lines PG&E undergrounds per year: 30

Select Language

ATTACHMENT 14
CHSRA & CPUC RULES

About Us Safety Transparency Utilities & Industries Licensing Proceedings Complaints ORA

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California High-Speed Rail Safety: Planning and Operations

The CPUC is one of the entities responsible for safety oversight in the planning, development, construction, and operation of the California High-Speed Rail project. California's high speed rail proposal uses new technologies that are unique to high-speed rail and to the California rail safety program. During the preliminary planning phases, federal and state oversight agencies are conducting proceedings to develop a regulatory and policy framework tailored to the high speed rail project.

ROSB railroad safety inspectors will work to ensure that the California High Speed Rail Authority adheres to all applicable requirements. Specifically, the ROSB railroad safety inspectors perform the following:

- During planning and construction phases, ensure compliance with CPUC rules, decisions, general orders, and statutes regarding clearances, standards for construction and maintenance of walkways, etc. in addition to FRA regulations regarding track and other infrastructure specifications;
- Prior to and during operations, ensure the accuracy of high speed rail train consist records, observe crews performing safety operations, review the accuracy and completeness of safety manuals and security procedures, etc.;
- After construction, perform ongoing rail safety inspections in the five safety disciplines;
- Perform safety audits of the High Speed Rail System Safety Program Plan, which must be a comprehensive document covering all safety issues. ROSB audits will include focused inspections and involves all aspects of construction and testing phases of rail equipment and control systems.

CPUC high speed railroad safety inspectors plan to monitor high speed rail much the way that Crude Oil Reconnaissance Team is monitoring crude oil. ROSB railroad safety inspectors monitor construction progress, in design and in the field.

CPUC monitoring also includes oversight of electrification to power the trains, as well as any interface with conventional railroad infrastructure such as track design and construction processes. In March 2013, the California High Speed Rail Authority petitioned the CPUC to create regulations governing safety standards for the use of 25 kilovolt (kV) electric lines to power high-speed trains.The CPUC opened a proceeding (R13-03-009) to establish uniform safety requirements governing the design, construction, operation, and maintenance of overhead 25 kV railroad electrification systems and the specific safety challenges the system presents. Evidentiary hearings are scheduled to commence in December 2014.

Certain rules for high speed rail are already in place. 49 CFR, Part 213, specifies track requirements for train operations at track classes 6 and higher. Track Classes 6 and higher include all tracks used for the operation of trains at a speed greater than 90 miles per hour (mph) for passenger equipment and greater than 80 mph for freight equipment.

New state and federal regulations will likely be promulgated as high speed rail moves forward. Through the testing phase of HSR, such issues in California will be addressed, as well as lessons learned from other high speed rail programs in the US that may advance faster than in California.

ATTACHMENT 15
QUOTE FROM CHSRA
TO UTILITY COMPANIES

The CHSRA representative's response was, literally, "I don't have to answer you," and no further response was provided.[4]

Another example is CHSRA's non-response to a question regarding its proposal to increase the minimum crossing angle for underground utility facilities, from the standard 45 degrees set in the American Railway Engineering and Maintenance-of-Way Association (AREMA) manual to 60 degrees in CHSRA's draft GO section 5.8.3. This issue was raised in the Joint Utilities' Outline of Issues for the initial Technical Panel meetings on September 24-25, 2013, and was raised again in subsequent Technical Panel meetings. It is repeated in the Joint Utilities' comments on the Technical Panel Report (at Section II.C), and in CIP Coalition's comments (at Section II.B.2.b). To date, CHSRA simply refuses to provide any technical justification or support for its position.

The Safety and Enforcement Division's Technical Panel Report identifies as "some of the topics that are still in disagreement," four areas of issues with CHSRA's proposed draft GO: (1) casing of gas pipelines; (2) definition of agency; (3) lower voltage lines over CHSRA lines; and (4) training rules.[5] The Joint Utilities' comments on the Report identify a number of issues that were not resolved in the Technical Panel process, including: (1) conflicts with GO 95 and GO 128 requirements involving the use of earth as part of the return circuit for electric current; (2) conflicts with GO 95 requirements concerning lower voltage lines crossing over the high speed rail overhead contact system; (3) the impact of high speed rail operations on routine pipeline operations and maintenance; (4) requirements for minimum crossing angle, parallel encroachment, relocation, and encasement of underground facilities; (5) impacts on underground facilities of CHSRA's intended use of earth as part of the return circuit in its operations; (6) minimum clearances from side and overhead structures; (7) prevention or mitigation of inductive interference with power and communications lines; and (8) cost responsibility for impacts to utility facilities.

Many if not all of these issues could involve disputes as to adjudicatory facts, if they are not resolved in the next stage of workshops. For example, what is CHSRA's intent in proposing

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4 In CHSRA's draft GO submitted with the Technical Panel Report on December 30, 2013, the proposed "Principle of Least Cost" is expanded beyond Avoidance or Mitigation of Electromagnetic Interference to a principle of general application at Section 1.5, and the sentence in question appears as "Note 1" to Section 1.5.

5 Technical Panel Report at 3.