## Metropolitan Bakersfield High-Speed Rail Terminal Analysis and Evaluation



Kern Transportation Foundation High-Speed Rail Committee April 2001

# **Kern Transportation Foundation Board Members**

To address growing transportation issues, a group of concerned citizens formed the Kern Transportation Foundation in 1992. A nonprofit public benefit corporation, Kern Transportation Foundation is working with government to develop a plan and to find funding solutions for Kern County's future transportation needs. The Foundation's mission is to promote a modern, balanced transportation system that enhances our quality of life and supports the economic vitality of all communities. Within a public forum, the Kern Transportation Foundation is working to:

- > Create public awareness of current and future transportation needs in Kern County;
- Find creative and innovative ways to provide for and fund our transportation needs;
- > Build the kind of private and public partnership that is necessary to develop and fund a modern, balanced transportation system.

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Kern Transportation Foundation P.O. Box 417 Bakersfield, CA 93302-0417 Phone: (661) 322-2872

Fax: (661) 322-7650

### **Executive Summary**

The Kern Transportation Foundation's High-Speed Rail Committee was formed to evaluate high-speed rail terminal locations for, and routing options through, Metropolitan Bakersfield. This document identifies the process through which the Committee evaluated routing options and potential terminal locations. That process included the following elements:

- Background discussion of previous high-speed rail studies
- Routing options
- Station requirements
- Site identification
- Evaluation criteria
- Focused project listing
- Public outreach
- Conclusions.

In evaluating potential terminal sites, three major routes through Metropolitan Bakersfield were explored: the I-5/Grapevine alignment, the Palmdale alignment and the Aqueduct alignment. For each option, tunnels, grade concerns, travel times and cost estimates were considered. These three routes were used as a basis for seven potential high-speed rail terminals. The site locations were developed through previous high-speed rail studies, community discussions and staff input from the California High-Speed Rail Authority (CHSRA). The locations include:

- Comanche Drive/State Route 58
- Rosedale Highway/Allen Road
- Meadows Field Airport
- 7<sup>th</sup> Standard Road West of State Route 99
- Golden State Avenue/M Street
- Truxtun Avenue/S Street
- Truxtun/Union Avenue.

After identifying potential terminal sites, the Committee devised a set of criteria to evaluate each site's viability. The criteria were established with input from CHSRA. The criteria comprised:

- Infrastructure improvements
- Intermodal connection
- Access to a metro area
- Rail alignment
- Train speed (geometrics)
- Utility availability
- Environmental issues
- Site purchase price

- Parking availability
- Growth-inducing issues
- Access to existing support services.

Of those criteria, infrastructure improvements, intermodal connection, metro-area accessibility, rail alignment and train speed were deemed sufficiently significant by the Committee to weigh by a factor of two. Each alternative was evaluated on a scale of one to five, with one representing the lowest score and five the highest.

Based on scores compiled during the evaluation and screening process, the Kern Transportation Foundation Board of Directors recommended three sites for further consideration: 7<sup>th</sup> Standard Road West of State Route 99, Golden State Avenue/M Street and Truxtun Avenue and S Street/Union Avenue, which were combined into one alternative. The potential for increased domestic air service through the 7<sup>th</sup> Standard Road site was not a factor in the ranking process.

## **Purpose and Needs Statement**

The purpose of Kern Transportation Foundation's (KTF) High-Speed Rail Committee is to screen and evaluate high-speed rail terminal alternatives for Metropolitan Bakersfield and routing options. Among its goals, the committee was to identify high-speed rail terminal locations for further study that best meet the needs of Metropolitan Bakersfield. Criteria for site selection and evaluation included:

- Infrastructure improvements
- Intermodal connection
- Access to metro area
- Rail alignment
- > Train speed (geometrics).

The needs of Metropolitan Bakersfield, as well as the Kern region, have been addressed through this set of evaluation criteria. As a summary report, this document outlines the process undertaken by the Kern Transportation Foundation's High-Speed Rail Committee in evaluating routing options and potential terminal locations for Metropolitan Bakersfield. The process examined the following elements:

- ► Background discussion of previous high-speed rail studies
- Routing options
- > Station requirements
- Site identification
- Evaluation criteria
- Focused project listing
- Public outreach
- Conclusions.

## **Background Information-Discussion of Previous High-Speed Rail Studies**

1. High-Speed Rail Corridor Study-Los Angeles-Fresno-Bay Area/Sacramento – Final Report to the State Legislature, June 1990 (AB-971): This study, commissioned through AB 971 (Costa), addresses certain key findings about the need for a California High-Speed Rail program. The report indicates that the 20 million people living along the proposed high-speed rail corridor require a vastly improved passenger rail service to sustain increasing mobility, lessen impacts on the environment, and maintain economic growth.

The study group found that California has a significant interest in providing its citizens with rail service at least comparable to those of major trading partners, and that the State must take a leading role in improving rail performance. Furthermore, significant reductions in automobile emissions are dependent on a transit rail system that offers faster travel times than cars.

In addition, the State should look to European models for both validation and experience. High-speed trains in France have been easily able to recoup their construction costs, while those in Germany are capable of operating along the same tracks as freight trains, given proper construction and stringent operating practices. Finally, any fully integrated rail system should operate in the San Joaquin Valley along the already established Burlington Northern rail lines.

2. Metropolitan Bakersfield High-Speed Ground Transportation System Terminal Study, March 1994: Commissioned from ICF Kaiser by the Kern Council of Governments, this report states that of the six potential locations considered for a high-speed rail terminal in Bakersfield – downtown, F Street, East Bakersfield, Fruitvale Avenue, Olive Drive and Westside Freeway – the downtown location is the strongest candidate. Selection criteria included: development potential both adjacent and near the site; vehicular and pedestrian links; support of general plan goals; drainage and utilities; seismicity; site availability and potential for expansion. The F Street Amtrak site was selected as second choice.

The consultant agreed with Kern COG's Technical Advisory Committee findings in favor of the downtown site. Both choices would produce better ridership than suburban sites, offer direct accessibility to primary Bakersfield destinations, had the potential to bring more activity to downtown, and already had support services available. The downtown location was singled out over the F Street site for its accessibility.

3. Los Angeles-Bakersfield High-Speed Ground Transportation Preliminary Engineering Feasibility Study, November 1994: Prepared by Parsons Brinckerhoff Quade & Douglas, Inc. for Caltrans District 7, the report examines alternatives for a high-speed rail system that crosses the Tehachapi Mountains. It is divided into six major task areas: technology assessment; alignment alternatives; preliminary engineering; cost estimates (capital and operations); preliminary environmental analysis and a feasibility study report. A number of alignment variations were evaluated in the vicinity of Interstate 5 between Bakersfield and Santa Clarita, as well as through the Antelope Valley.

While none of the alternatives in any of the task areas are endorsed, the study does conclude that developing a high-speed ground transportation system significantly increases the options for handling large volumes of people, is safer, environmentally friendly and has proven technology already available. The costs for such a system between Bakersfield and Los Angeles are significant, ranging anywhere from \$4 to \$8 billion. Accordingly, just as the State's highway system was developed over time, so must high-speed rail, which does not enjoy the priority status of highways, airports or urban transit systems.

4. California High-Speed Rail Corridor Evaluation: Southern California Alternatives, April 1999: This report, which evaluates high-speed rail corridor alternatives in Southern California, divides the alternatives into three categories: San Diego Area, Los Angeles Area and the Tehachapi Crossing. Each corridor is defined within its proper geographical area with key evaluation elements summarized in tabular form.

Evaluation criteria include: capital cost; travel time; operating cost; key constraints and issues (environmental, engineering, operational, right-of-way and institutional); ridership; and revenue.

5. California High-Speed Rail Authority Final Business Plan, June 2000: The California High-Speed Rail Authority's (CHSRA) business plan proceeds from the conclusion that a statewide high-speed rail system is a smart investment for Californians to make, with its estimated \$25 billion cost which is only a fraction of what will be spent on transportation as a whole. Furthermore, the plan states that high-speed rail can only be a success when coupled with other well-maintained transportation modes, and urges appropriate upkeep of highways, airports and other infrastructure.

The report says that the process should begin to move into its environmental review period. Specifically, it recommends that the Governor and Legislature initiate a formal environmental clearance process through a state EIR/federal Tier I EIS on the described network; increase funding and accelerate planning for inner city and commuter rail improvements to complement a high-speed rail system; lobby for increased federal funding in high-speed rail service and technology; and encourage state, regional and local agencies to include high-speed rail in the planning process.

6. California High-Speed Rail Program Environmental Document, January 2001: Currently, the Authority is preparing a program environmental document for the 700-mile high-speed train proposal. The draft EIR/EIS will provide CEQA/NEPA documentation and include project purpose and needs/objectives, project alternatives definition and alignment/station screening evaluation, system alternatives, public and agency comment and consultation, and environmental benefit and impact analysis. Mitigation measures and preferred alternatives also will be addressed. Central Valley alignment issues to be discussed in the draft EIR/EIS are: prime agricultural land preservation, preservation of resources and sensitive environments, and accommodation of sustainable and responsible growth patterns.

Alignment and stations screening is expected to be completed by July 2001. Alignment refinements and environmental technical studies are expected to be completed by June 2002. Public involvement will take place throughout the entire planning process. The Final EIR/EIS is to be completed by June 2003 with construction beginning in 5-7 years. The California High-Speed Rail Project is expected to be constructed by 2016.

## **Routing Options**

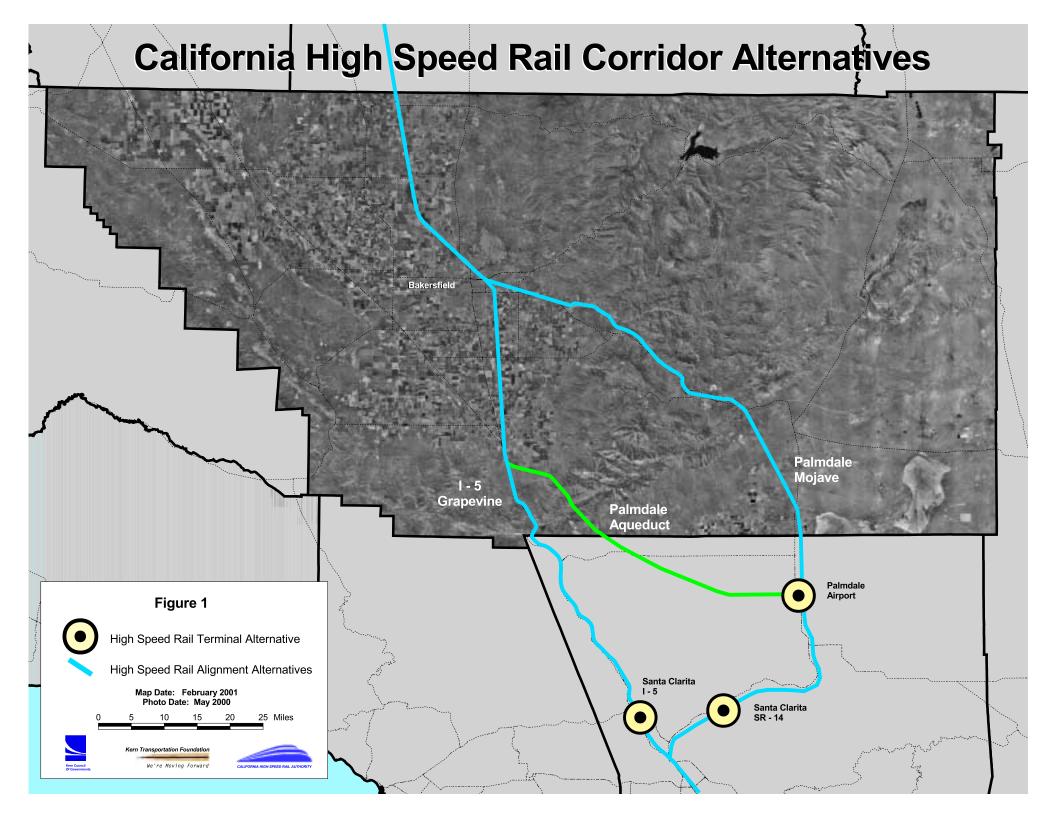
In evaluating the potential high-speed rail terminal sites for Metropolitan Bakersfield, three major routes were explored. These routes include the I-5/Grapevine alignment, Palmdale alignment, and Aqueduct alignment. Figure 1 illustrates the regional routes examined by the KTF High-Speed Rail Committee. This figure was created using data from the CHSRA. As indicated on the map, all of these proposed routes connect with Bakersfield. For each alignment option, tunnels, grade concerns, travel times, and cost estimates were considered. Table 1 summarizes key information pertaining to each route option between Los Angeles and Bakersfield. This information was included in the *California High-Speed Rail Corridor Evaluation* (Parsons Brinckerhoff, April 1999).

Table 1 California High-Speed Rail Corridor Evaluation								
	I-5/Grapevine	Palmdale	Aqueduct					
	Alignment	Alignment	Alignment					
Capital Cost	\$4.615 billion	\$4.852 billion	\$5.103 billion					
Express Travel	45 minutes	54 minutes	54 minutes					
Time								
Route Length	109.9 miles	143.4 miles	145.0 miles					
Tunneling	28 miles	11 miles	15 miles					
Required								
Fault Impacts	San Andreas	San Andreas	San Andreas					
	Garlock	Garlock	Garlock					
		White Wolf						

As part of the KTF High-Speed Rail Committee's alignment evaluation, direct and indirect routes were studied. An indirect system is currently being used successfully in Italy. The California High-Speed Rail Authority has identified this system and is evaluating its use for California. An indirect service system would allow the use of conventional rail, upgraded with an electrified power source, and would provide access to a high-speed rail terminal from the high speed main line. All main lines and many minor lines are electrified.

#### **Station Requirements**

When evaluating potential high-speed rail terminal sites for Metropolitan Bakersfield, several key station requirements were considered. These factors included parking, annual boardings, and existing rail alignments. In 2020, it is projected that annual boardings and alightings for a Bakersfield high-speed rail terminal would be 3 million passengers. Boardings are expected to be 1.5 million per year with an average of 4,110 boardings per



day. Passengers using autos (80%-90%) would number approximately 3,300-3,700 daily. Twenty five hundred vehicles would need to park at the high-speed rail terminal daily. The California High-Speed Rail Authority has indicated that efforts must be made to locate high-speed rail terminals near existing rail alignments or rail corridors. Train speed as it relates to station access and geometrics are also considered to be important by the Authority and their project consultants. Current standards from the Authority include a 1300-foot long platform at the terminals.

#### **Site Identification**

As a result of the high-speed rail studies discussed earlier in this report, seven possible high-speed rail terminals were studied by the KTF High-Speed Rail Committee. These sites were developed as a result of previous high-speed rail studies, community discussions, and staff input from the Authority. The following terminal sites were evaluated by the KTF High-Speed Rail Committee:

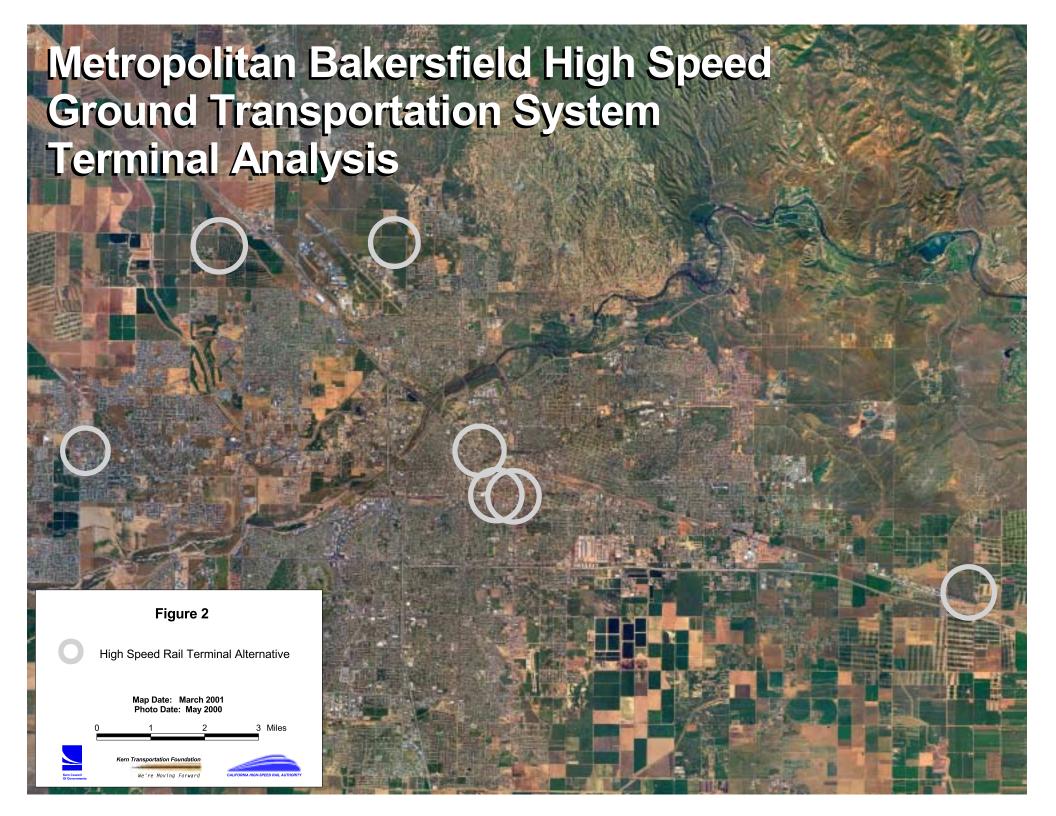
Site	Nominated By:				
Comanche Drive/State Route 58	(Commission Staff)				
Rosedale Highway/Allen Road	(Commission Report)				
Meadows Field Airport	(County Airports)				
7 <sup>th</sup> Standard Road/West of State Route 99	(Alternative County Airport Site)				
Golden State/M Street	(Bakersfield DBA)				
Truxtun Avenue/S Street	(City of Bakersfield/Amtrak)				
Truxtun Avenue/Union Avenue.	(KTF Committee)				

Figure 2 displays the site locations in the context of Metropolitan Bakersfield. These alternatives were nominated by those agencies and organizations listed above.

#### **Evaluation Criteria**

After identifying seven potential high-speed rail terminal sites to examine, the KTF High-Speed Rail Committee, developed a set of criteria to evaluate each site's effectives. This set of criteria was established and defined by the committee with input from the CHSRA and project consultants. As part of the evaluation process, the criteria were revised and updated throughout the study. The criteria consisted of eleven elements, as follows:

- Infrastructure improvements: Infrastructure improvements are defined as the required improvements in the roadway system near the proposed station.
- Intermodal connection: Intermodal connection is the availability of existing transit service and the level of difficulty involved in expanding existing transit service to meet the needs of the terminal.
- Access to metro area: Access to the metro area is defined as access from the proposed high-speed rail station to the existing Metropolitan Bakersfield core.



- Rail alignment: The proximity of the station to existing rail alignments is considered to be rail alignment.
- Train speed (geometrics): Train speed, including geometrics, is the speed capability of the train given the location of the station. Train speeds in urban areas will most likely not exceed 70 to 100 mph while train speeds in outlying areas and stations may increase up to 200 mph.
- <u>Utility availability</u>: Utility availability is defined as whether or not utilities are available at the station location and the adequacy of the available utilities.
- Environmental issues: Environmental issues involve impacts to natural resources, endangered species, agricultural land, cultural resources, as well as noise impacts in urban areas.
- Site purchase price: Site purchase price is the estimated cost of purchasing land and rights-of-way for the terminal location.
- Parking availability: Parking availability is considered to be the existing parking available as well as potential space available for the construction of new parking spaces or structures.
- ➤ <u>Growth inducing issues</u>: Growth inducing issues were defined as the likelihood of the construction of a terminal resulting in urban sprawl.
- Access to existing support services: Access to existing support services, such as hotels, shopping, and restaurants.

Based on their significance, the committee determined that the following factors should be weighted by a factor of two: infrastructure improvements, intermodal connection, access to metro area, rail alignment, and train speed (geometrics). Table 2 represents the evaluation of criteria, with scores and ranking of each site displayed. Each station alternative was evaluated on a scale of one to five with one representing the lowest possible score and five representing the highest possible score. The potential for increased domestic air service through the 7<sup>th</sup> Standard Road site was not a factor in the ranking process. The KTF Board of Directors reviewed the scoring criteria and noted that air service improvements and revenue leakage could yield an additional million or more air travelers using high-speed rail to connect to domestic air service. Inclusion of those criteria could change the scoring outcome. Therefore, the KTF Board of Directors supports the Committee report and wants to ensure that all three potential terminal sites are weighted equally.

Comanche Drive/State Route 58 scored well in the areas of rail alignment and train speed because of its location outside the urban core. The analysis conducted for the Comanche Drive/State Route 58 alternative is for a direct connection only. It also received fairly high scores for site purchase price, parking availability, and environmental issues. Because of its potential to create urban sprawl, lack of existing support services, and poor access to Metropolitan Bakersfield, however it received low scores in the categories of growth inducement, access to existing support services, and access to Metropolitan area.

Table 2
HIGH-SPEED RAIL TERMINAL LOCATION ANALYSIS

Criteria	Comanche Dr. @ S.R. 58		Rosedale Hwy. @ Allen Rd.		Meadows Field Airport				Golden State @ M St. (2)		Truxtun Ave. @ S St. (2)		Truxtun Ave. @ Union Ave.	
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Infrastructure Improvements (1)	6	N/A	4	4	6	6	10	10	10	10	10	10	6	N/A
Intermodal Connection (1)	2	N/A	2	2	6	6	4	4	6	6	8	8	6	N/A
Access to Metro Area (1)	4	N/A	6	6	6	6	6	6	10	10	10	10	10	N/A
Rail Alignment (1)	10	N/A	4	6	2	4	10	10	10	10	10	10	8	N/A
Train Speed (Geometrics) (1)	10	N/A	2	10	8	8	10	10	2	10	2	10	2	N/A
Utility Availability	1	N/A	4	4	4	4	1	1	4	4	4	4	4	N/A
Environmental Issues	4	N/A	2	2	4	4	4	4	3	3	4	4	4	N/A
Site Purchase Price	5	N/A	2	2	4	4	4	4	2	2	2	2	2	N/A
Parking Availability	5	N/A	2	2	5	5	5	5	2	2	2	2	2	N/A
Growth Inducing Issues	1	N/A	3	3	3	3	3	3	4	4	4	4	4	N/A
Access to Existing Support Services	1	N/A	1	1	2	2	1	1	5	5	5	5	5	N/A
Total	49	N/A	32	42	50	52	58	58	58	66	61	69	53	N/A

<sup>(1)</sup> Scores have been weighted by a factor of 2.

<sup>(2)</sup> Preferred alternatives selected by KTF High-Speed Rail Committee.

<sup>(3)</sup> The potential for increased domestic air service through the 7th Standard Road site was not a factor in the ranking process. Inclusion of those criteria could change the scoring outcome.

**Rosedale Highway/Allen Road** was ranked low for both direct and indirect service because of poor intermodal connection potential and access to Metropolitan area, lack of existing support services, and low parking availability. The site also received low scores in the areas of environmental issues, site purchase price, and growth inducement.

**Meadows Field Airport** received relatively high scores for train speed (geometrics) and intermodal connection because of its access to a variety of transportation modes. This site also ranked well because of parking availability. It received low scores in the categories of access to existing support services, growth inducing issues, and access to Metropolitan Bakersfield.

7<sup>th</sup> Standard Road/West of State Route 99 scored very well in the areas of infrastructure improvements, rail alignment, and train speed (geometrics). Both the direct and indirect service options received high scores for these categories. Other strong points of this potential terminal site include few environmental issues and a reasonable site purchase price. The site scored low in the areas of utility availability and access to existing support services, however.

Golden State/M Street scored highly in the areas of infrastructure improvements, rail alignment, and train speed (geometrics). The site also receives high scores because of lack of growth inducement concerns and convenient access to existing support services. The site ranked low in the categories of site purchase price and parking availability, however.

**Truxtun Avenue/S Street** scored well in almost all weighted criteria elements. It scored well for infrastructure improvements, access to Metropolitan Bakersfield, and rail alignment. This potential terminal site also received high scores in the areas of utility availability, environmental issues, growth inducement, and access to existing support services. Categories in which the site scored low were site purchase price and parking availability.

**Truxtun Avenue/Union Avenue** scored highly in the areas of access to Metropolitan Bakersfield and rail alignment. The site also scored well for access to existing support services and few negative growth inducement issues. This terminal location scored low in the criteria of train speed (geometrics), site purchase price, and parking availability.

## **Focused Project Listing**

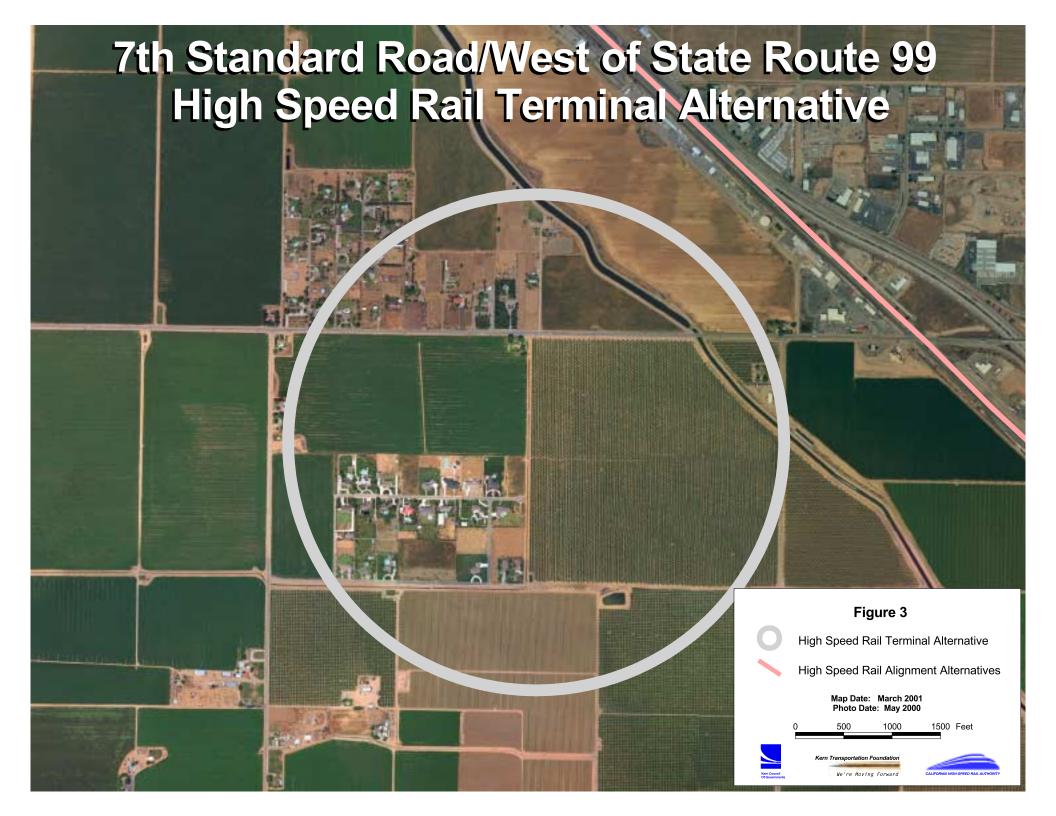
Based on the scores received during the evaluation and screening process, three high-speed rail terminal sites were selected for further consideration: 7<sup>th</sup> Standard Road West of State Route 99, Golden State/M Street, and Truxtun Avenue and S Street/Union Avenue. The remaining sites were dropped from further consideration and study. The final scores of the three sites selected for further study are displayed in Table 2. This diagram illustrates the scores of each site for the respective evaluation categories. Figures 3, 4 and 5 indicate the location of the three potential terminal sites.

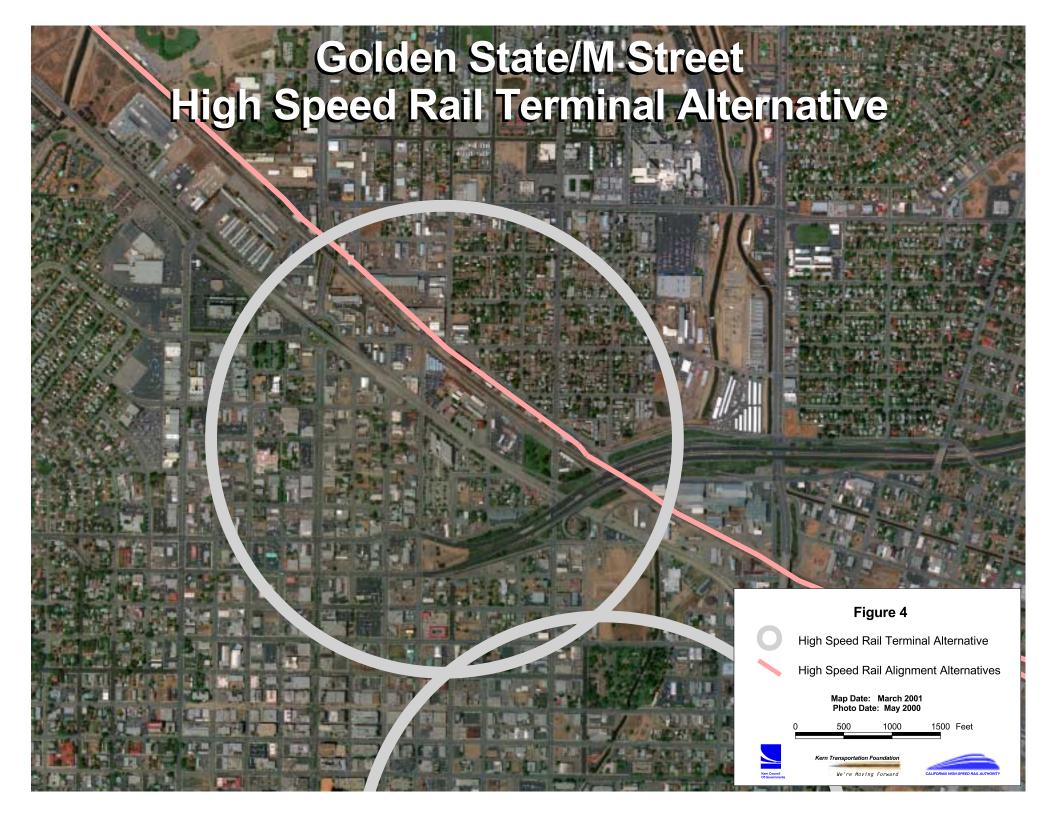
## 7<sup>th</sup> Standard Road/West of State Route 99

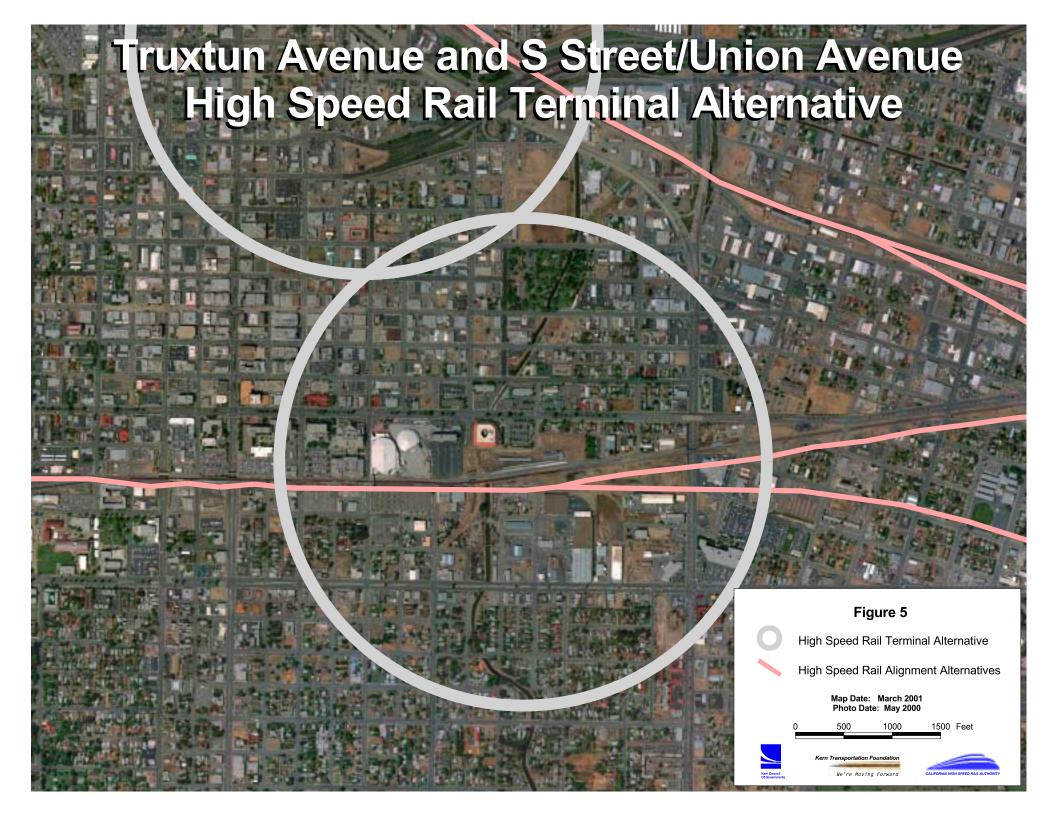
This potential high-speed rail terminal site, shown on Figure 3, would not require construction of new infrastructure, as existing infrastructure is already in place. While the terminal is relatively close to Meadows Field Airport, the intermodal connection and access for this site would need to be upgraded with new transit routes and airport shuttle. Access to Metropolitan Bakersfield is provided by State Route 99 and surrounding streets. Rail alignment and train speed (geometrics) for both direct and indirect service for this site are excellent because of its outlying location. The rail corridor would avoid much of the urban core. In order to construct a terminal at this site, new utilities would have to be provided. Development has already been approved or planned for the land surrounding the site so few environmental concerns exist. The site purchase price is expected to be relatively low. Adequate land is available at the site to provide the required parking for the high-speed rail station. Use of this site would not encourage urban sprawl as it is already planned for development. In fact, a high-speed rail terminal may mix well with future planned land uses. One area in which the site is lacking is access to existing support services. New services would need to be provided in the area to support a high-speed rail terminal.

#### Golden State/M Street

As with the site discussed above, adequate existing infrastructure is available at the Golden State/M Street alternative, shown on Figure 4. Intermodal connections would include the expansion of existing transit routes and the addition of an airport shuttle. Access to Metropolitan Bakersfield is excellent with access readily available. Rail alignment is also excellent because of proximity to existing rail corridors. For direct service the site scored low because of its location in the urban core; however, indirect service (Italian system) would serve the site well. Adequate utilities are currently available at the site and a moderate amount of environmental issues such as noise from the high-speed trains exist. The site purchase price is expected to be fairly expensive and parking would need to be increased to meet the demands of a new high-speed rail terminal. As it is located near the urban core, the Golden State/M Street terminal site has few growth inducement concerns and offers convenient access to existing support services.







#### Truxtun Avenue and S Street/Union Avenue

Current utilities at this site, shown on Figure 5, are adequate to accommodate the construction of a high-speed rail terminal. Intermodal connection possibilities are also present and existing transit service could be expanded to serve the new terminal. Access to the Metropolitan area is outstanding. Because of close proximity to existing rail corridors, rail alignment for the alternative was ranked highly. Train speed for direct service was ranked low because of a mandatory decrease in speed in urban areas, but indirect service would suit the site well. Adequate utilities are currently available at the site and few environmental issues would require mitigation. One environmental issue to resolve is mitigation for noise caused by high-speed trains. The site purchase price is expected to be fairly expensive and parking would need to be increased to meet the demands of a new high-speed rail terminal. A new high-speed rail terminal would most likely require construction of another downtown parking structure. Growth inducement issues are insignificant for the Truxtun Avenue/S Street and Union Avenue terminal. Development of a high-speed rail terminal would enhance Metropolitan Bakersfield and result in increased economic development. Access to existing support services near the proposed site such as hotels, restaurants, and shopping is superior to all other alternatives.

#### **Public Outreach**

The KTF High-Speed Rail Committee plans to present this document and supporting information to elected officials and citizen interest groups throughout the Kern region. Much of this effort will focus on building consensus and support for the three recommended terminal locations in Metropolitan Bakersfield. It would be beneficial to Bakersfield and the Kern region to show unified support for the further study of these terminal alternatives at the CHSRA meeting in July. At this meeting, the Authority board members will be evaluating and screening high-speed rail alignment and terminal alternatives throughout the State.

#### Conclusion

After evaluating and screening the high-speed rail terminal alternatives as discussed above, the Kern Transportation Foundation High-Speed Rail Committee has concluded that the following sites would best meet the needs and demands of Metropolitan Bakersfield; 7<sup>th</sup> Standard Road/West of State Route 99, Golden State/M Street, and Truxtun Avenue and S Street/Union Avenue. Thus, these sites are recommended for further study by the California High-Speed Rail Authority and project consultants. Several other alternatives were considered, but were found to not meet the needs of Bakersfield and the Kern region as detailed in the criteria used for the evaluation. Based on the ranking and scores generated by the terminal criteria, these three sites were selected for further study.

#### **Attachments**

The following agencies and organizations support the findings and recommendations of the Kern Transportation Foundation High-Speed Rail Committee:

➤ Kern Transportation Foundation- Adopted April 16, 2001.