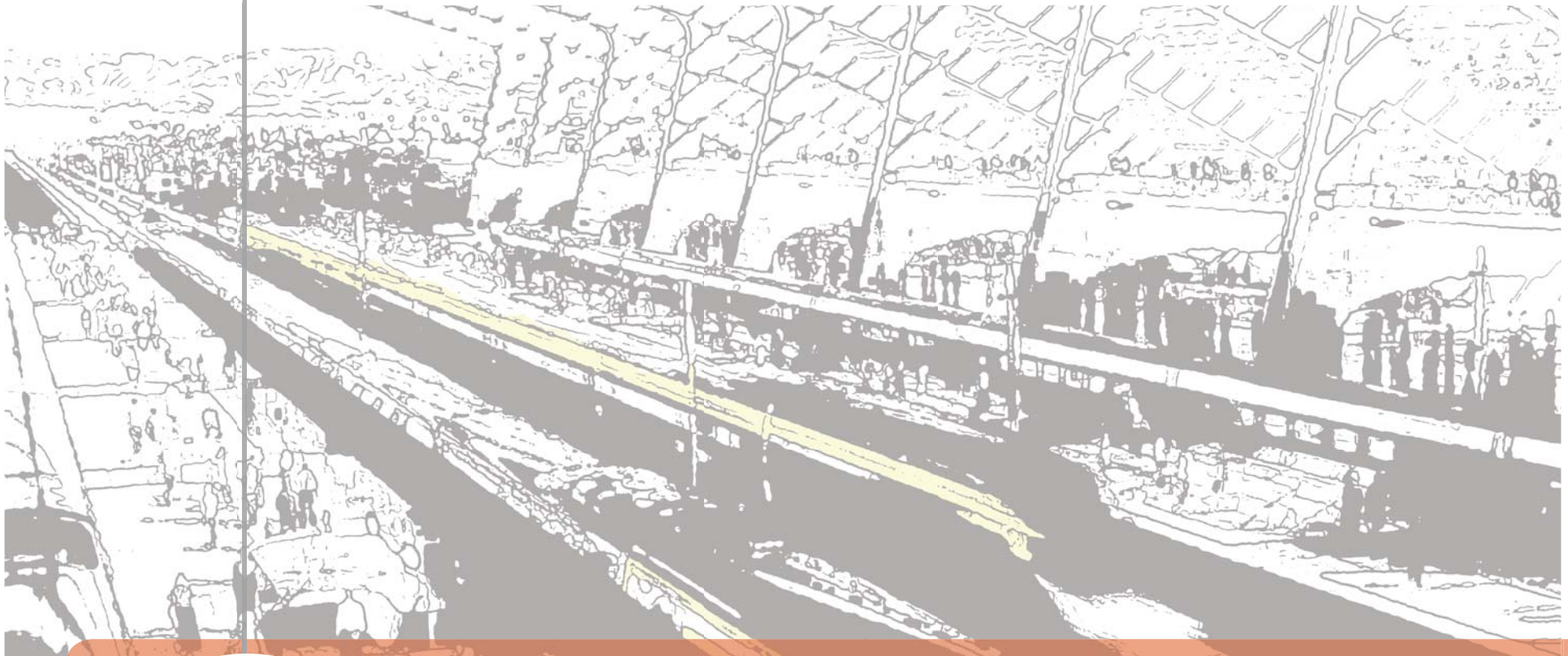


Urban Design Guidelines

California High-Speed Train Project

March 2011

California High-Speed Rail Authority

PB's PlaceMaking Group

Table of Contents

I. Introduction 1
Aiming Higher with High-Speed Rail
Purpose
Report Organization

II. Seizing the Opportunity 4
High-Speed Transit, Urban Design, and Development
Urban Design
Considerations for Urban Design
Lessons Learned from Abroad
Plan Your Most Important Place

III. A Catalyst for Community Building 14
Development Oriented Transit
Transit-Oriented Development
Principles of TOD

Station Area Urban Design Guidelines 26

IV. Assure Community Fit 28
Create a Context Sensitive Solution
Reflect Corridor Geography and Character
Pedestrian Influence Area
Preservation, Infill, and Redevelopment
Station as (Large) Places

V. Create an Urban Station District 34
A New Destination
Core-Center-Edge
A Mix of Uses
Link Station and Development
Network of Interconnected Streets
Emphasize Pedestrians
Streets and Edges
Station Plaza

VI. Connect to Community 44
Manage Station Access
Access Influence Zones
Provide Complete Streets
Promote Bicycle Accessibility
Blend in Local Transit Access
Balance Vehicular Access
Manage Station Parking Form and Function
Structured Parking
"Right Size" Private Development Parking
Surface Lots

VII. Get the Details Right 60
Positive Outdoor Space
Guideway as a Design Opportunity
Well Defined Entries
Wayfinding
Building Size and Scale
A Varied Public Realm
Visibly Sustainable
Aesthetics
Safety and Security
CPTED

VIII. Assuring Good CAHST Project Urban Design Outcomes 78
Partnership is Essential
Zones of Responsibility
Coordination with CAHST Project
Creating a Station District Plan

Resources 89

1. Introduction

Aiming Higher with High-Speed Rail

With the coming of high-speed rail, California has an unprecedented opportunity to strengthen its communities and improve mobility for people throughout the state. The California High-Speed Train (CAHST) project is the largest transportation infrastructure investment in California's history. It is projected to carry up to 100 million passengers annually in 2035. The electrically-powered high-speed trains will link major metropolitan areas throughout California, providing a new sustainable transportation choice, facilitating long-term mobility and economic growth, and supporting California's smart growth initiatives.

For the high-speed train to be more useful and yield the most benefit, it is important that stations be great places. Places where there will be a high density of population, jobs, commercial activities, and entertainment. HST station locations should provide linkage with local and regional transit, airports, and highways – as well as serve as a multi-modal transportation hub. Many of the station sites are located in the heart of or near the downtown central city areas of California's major cities, meeting the system's objectives of minimizing potential impacts on the environment and maximizing connectivity with other modes.

The California High Speed Rail Authority's objectives for station location and development offer an opportunity for the Authority to work cooperatively with local governments, environmental and public interest groups, developers and others to pursue common development objectives. The Authority recognizes that the land use decisions will be made by local communities and the real estate market. HST stations, by their nature will be an effective and powerful tool to influence market conditions, attract jobs to the station areas, and encourage the development patterns described in this document.

The Authority's objective is to build the system in a way that minimizes impacts to the natural and built environment, encourages compact land development around its rail stations, and helps address issues associated with climate change, traffic and airport congestion and automobile dependency. This document is intended to help implement the Authority's vision for the HST system through urban design guidelines that can help shape development around the high-speed rail stations.

www.calatrava.com

"... relate the building to the city"

Santiago Calatrava, Architect

Purpose

High-speed rail is a complex undertaking. The success of the CAHST will be measured in both function and form. The CAHST Business Plan and Environmental Impact Study reports address function: how safely, quickly, and efficiently people are moved between important places in California and how environmental impacts are mitigated. This document is intended to assist local jurisdictions and communities in planning to integrate the CAHST project.

The urban design guidelines presented in this report are based upon international examples where cities and transit agencies have incorporated sound urban design principles as integral elements of large-scale transportation systems. The guidelines:

- Are dynamic and flexible. They can be updated as necessary, particularly as the project gets closer to implementation, and even after implementation.
- Supplement the Authority's on-going environmental review and design process.
- Are descriptive and suggestive. They apply to areas immediately surrounding proposed stations. Principles, examples, and guidance on ways to integrate the CAHST in a context-sensitive manner within California are provided.

The purpose of this report is to provide guidance on the form of the CAHST project: how the system fits into, complements, and creates value for the surrounding station area and corridor communities.

Report Organization

This CAHST Urban Design Guideline report is intended to identify how the unique characteristics of high-speed rail stations can be catalysts for creating places connected to the larger communities in which they are located. This concept is explained and illustrated throughout the document as described below.

Chapter I – **Introduction.** This chapter explains the importance of urban design in the context of high-speed rail and the context in which this report should be used.

Chapter II – **Seizing the Opportunity.** This chapter describes how urban design can allow communities to take advantage of CAHST opportunities. Lessons learned from existing high-speed rail systems are identified.

Chapter III – **A Catalyst for Community Building.** This chapter describes how development-oriented transit and transit-oriented development (TOD) are part of station district design.

Station Area Urban Design Guidelines

Chapter IV - **Assure Community Fit.** This chapter provides specific recommendations for creating great places around CAHST project station areas. It describes techniques for connecting stations to the streets and existing or potential new development within easy walking distance and focuses on capturing benefits from CAHST project system elements to improve their role in “place-making”.

Chapter V – **Create an Urban Station District.** This chapter provides specific recommendations for focusing high density development around the station and linking the station area with the surrounding land uses with an emphasis on the pedestrian.

Chapter VI – **Connect to Community.** This chapter focuses on urban design guidelines to manage the multi-modal nature of the station and to avoid conflicts with automobiles, local transit, bicyclists and pedestrians.

Chapter VII – **Get the Details Right.** This chapter notes the detail elements, such as wayfinding, aesthetics, building scale, and defined entries that create a safe and inviting place.

Chapter VIII – **Assuring Good CAHST Project Urban Design Outcomes.** This chapter briefly discusses the next steps for implementation, including the potential urban design roles and responsibilities of the parties involved with the CAHST project, and suggests a process for assuring good CAHST urban design outcomes.

II. Seizing the Opportunity

High-Speed Transit, Urban Design, and Development

Urban design is the broad over-arching practice that builds communities and creates great places. Urban design addresses built form, how stations are integrated into corridor communities in terms of the transit facility design, and the supporting surrounding land uses. Respecting the environment, promoting economic development, and social equity, all while creating distinct, attractive places of lasting value are key components of good urban design. The application of sound urban design principles to the CAHST project will help to:

- Maximize the performance of the transportation investment.
- Enhance the livability of the communities it serves.
- Create long-term value.
- Sensitively integrate the project into the diversity of communities along the corridor.

The CAHST project is planned to provide intercity high-speed train service on over 800 miles of track throughout California that will connect the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The CAHST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology which will include state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment with an expected express-trip time between Los Angeles and San Francisco of approximately 2 hours and 40 minutes. The system is to include 24 rail stations, all of which will provide convenient access to local public transit services. Other stations, such as San Francisco, Los Angeles, San Diego and Sacramento, will also provide access to regional and intercity bus and rail services for longer distance travel.

http://transbaycenter.org

"Urbanism works when it creates a journey as desirable as the destination."

Paul Goldberger, Architecture Critic, New Yorker

Urban Design

Urban design is the art and science of bringing together the many diverse aspects of place-making to create beautiful, desirable places that function well for residents and visitors alike. It involves, but transcends, many disciplines - such as planning, architecture, transportation, economics, landscape architecture, and engineering – by focusing on realistic and desirable visions for station areas with identification of the skills and resources necessary for realization.

what makes good design?

Places for People
To be successful, places must be well used and well loved.

Enrich the Existing
New development should enrich the best aspects of existing places.

Work with the Landscape
Energy and amenity are maximized when a balance exists between, man-made and natural.

Make Connections
Places need to be easy to get to and integrate well with their surroundings

Manage the Investment
Successful projects are well cared for and economically viable.

Mix Uses and Forms
Stimulating, enjoyable, and convenient places meet a variety of needs and desires.

Design for Change
The future requires flexible places that are able to respond to changing conditions.

Considerations for Urban Design

Planning for CAHST requires "unlearning" many of our conventional notions about transit station design. High-speed rail stations are different than the transit stations that currently exist in California in many important ways: they are physically much larger; serve different trip purposes; and will be multi-modal "hub" stations, with a city center location preference. While many high-speed train passengers will drive to the station, direct connection to local and regional transit and rail, and locations in the heart of downtowns will encourage the use of other modes of travel, including walking and biking. Considerations that must be addressed during the process of designing CAHST stations are:

The role of the station. Consider the role the station will play in the community and how the physical size of the station will affect that role. Is the station a dominant feature of the landscape? Architecturally, should it fade-away? Will the station serve as a new "front door" to the community? What does that imply for the organization of land use, the design of streets, and public spaces?

New transportation hub. Like a small airport without runways, the CAHST stations will need to accommodate large numbers of intermodal connections to the local transportation network of buses, shuttles, taxis, cars, bicycles and pedestrians. Development-oriented transit and TOD, as discussed in the next chapter, can help address the issue of how the station is connected to the community.

- **Multi-modal nature of the station.** Consider how people will be moving in and out of the station, and how the station will be integrated with other modes of transportation. How will people access cars, transit, bikes and the street network? How will wayfinding work?

- **The location of parking.** It will be important to locate and configure station parking so that it doesn't create a barrier between the community and the station. The Authority intends to include all parking identified as necessary for the HST project at market rates. This should provide sufficient financial incentive to build needed parking facilities for HST users, including structured parking.

Community growth. With supportive planning, the accessibility provided by a high-speed rail station can be transformative for some communities. Each community needs to carefully consider how to leverage the coming of high-speed rail and how it fits into their vision for the future. Preparation of new downtown plans or specific plans for the district surrounding the station will be important next steps for most communities.

Lessons Learned from Abroad

How do we strive to optimize the benefits of high-speed rail and integrate it seamlessly into our communities? Because high-speed rail, as the Authority envisions it, is different than what we are accustomed to in the United States, Europe and Asia (e.g., TGV, AVE, ICE, Taiwan, etc.) offer lessons learned on how they integrate high-speed rail into their communities.

Have a Vision

For high-speed rail to enhance a local community, it must relate to the activity patterns and developments in the communities it serves and complement the community's vision. Planning for high-speed rail cannot be done in a vacuum. The larger statewide effort, and local planning effort, must consider how the location of the line fits into the vision for the city as a whole. When cities plan how the development around high-speed rail stations fits within their overall city strategies before construction, opportunities to optimize benefits are available. In some cases, the design of the infrastructure and services has been modified to better fit within the local community, strengthening the success of the community along the corridor.

Focus on Business and Service-Oriented Travel

A significant sector of the high-speed rail travel market is business professionals. Related service sectors (e.g., business, public administration, leisure, commerce, and tourism) should be located within easy access to support these travelers. Redevelopment and regeneration needs to be geared towards the service economy.

Connect the Station

The station environment must be a great pedestrian oriented place with connections, both visual and physical, that are clear and safe leading people to and from the station. Local transit should be well connected with the station, balanced by accommodations for the car. Streets closest to the station should be designed to promote pedestrian use.

One Size Station Does Not Fit All

Stations can serve multiple functions in cities, depending on the vision for the city. They can be focal points, or can blend into the background. By paying attention to this detail, stations can serve to provide an opportunity for "rebranding" a community.

Stations Can be Destinations

The area immediately around a station, or the station itself, can be destinations with multiple functions. They can provide new services or be an architectural landmark providing new experiences. Integration into the city's community vision and other land uses is important so that the station complements, not competes, with other destinations in the city.

It Can Change Your City

The arrival of high-speed rail provides the opportunity for some of the smaller cities on the corridor to become more. Larger cities can re-orient themselves to the station and provide connections to the existing destinations in town. High-speed rail provides the opportunity to tap into new economic development strategies, but they will only succeed if careful planning occurs and thought is given to what the market can support. Places that do not go through the exercise of thoughtful planning have missed the opportunity.

Back to the Future

Rail stations that are being praised around the world are those that have unique architectural attributes. They return to the "romance of rail's past" with grand entrances and a sense of celebration. Because of the locations in the city center, the high-speed rail stations essentially serve as the gateway to the city.

Political Leadership Required

Strong political leadership will help move the local vision forward. A vision needs a political champion who will help move the vision forward and work to overcome hurdles that get in the way.

www. bing.com

Hanover's New Front Door

Hauptbahnhof Main Station, Hanover, Germany. Extensively modernized as part of preparations for EXPO 2000, this station is one of the finest in all of Germany, and demonstrates many high-speed rail urban design best practices. Although this station serves more long distance trains than any other German city (over 600 daily), its connection and relationship with surrounding neighborhoods and local transit services is outstanding. A favorite local meeting place, the refurbished and welcoming Ernst August Plaza acts as the front door to both the station and the city. This 'station square' is free of cars and activated throughout the day and night with cafes, retail, lively water fountains, and connection to trams on adjacent streets. Subtly but effectively lit by an overhead canopy of lights, aesthetic excellence is achieved by the high quality plaza paving, focal sculpture, architectural detailing, ground floor retail, and comfortable seating areas. Passerelle, a 30 year old surface street and underground pedestrian arcade and part of the EXPO 2000 renovations, connects directly to the station providing an effective link to the heart of the city.

High speed rail service (InterCityExpress) became available at the station in 1991, and this national system has grown significantly since. Modern tram service, the Hanover Stadtbahn (S-Bahn), began operation in 1976. The system is a light rail design, but in combination with underground sections in the downtown. The remainder of the system is at street level, and the majority operates within a separate right-of-way. The S-Bahn lines converge on the downtown and the station to provide a well integrated system, offering easy connections between local transit and the InterCityExpress service.

Plan Your Most Important Place

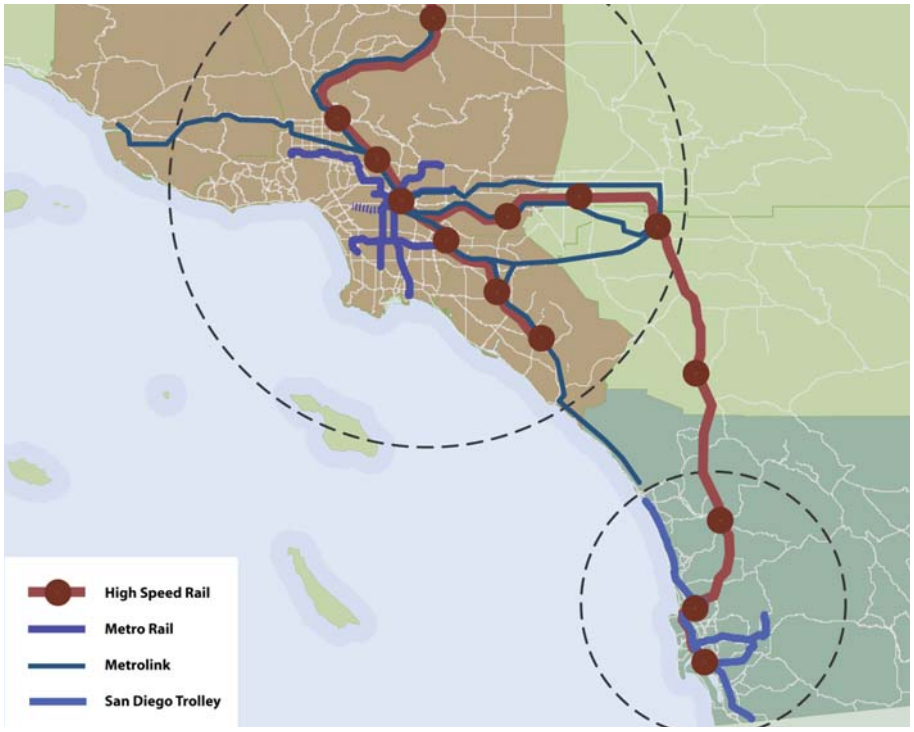
The scale of opportunity surrounding CAHST project stations is unprecedented in modern California history. Like "Union Stations" more than a century ago, high-speed rail stations bring with them opportunities to define where the most important places of the future will be. Successful station areas will reinforce both the surrounding community and the CAHST system. CAHST stations must link with the adjacent community's vision for how it wants to grow, ideally assisting with creation of "livable" higher density, mixed-use and walkable, transit-rich places.

For CAHST, station area development may take many forms – from new communities to redevelopment and infill. Experience from Europe and Asia indicates that development implications of CAHST are much different than with conventional urban transit (such as BART in the Bay Area, or MTDB in San Diego). CAHST presents the opportunity for transformative change at a variety of scales – such as a gradual shifting of the center of a downtown towards the HST station, or the creation of entirely new urban districts. CAHST could serve as the spine of a new "transit region," where you don't need to rely on an automobile to get around.

> "The station becomes like a business card for the city."
>
> Andreas Heym, chief architect responsible for more than 100 new stations worldwide

CAHST + Regional Transit

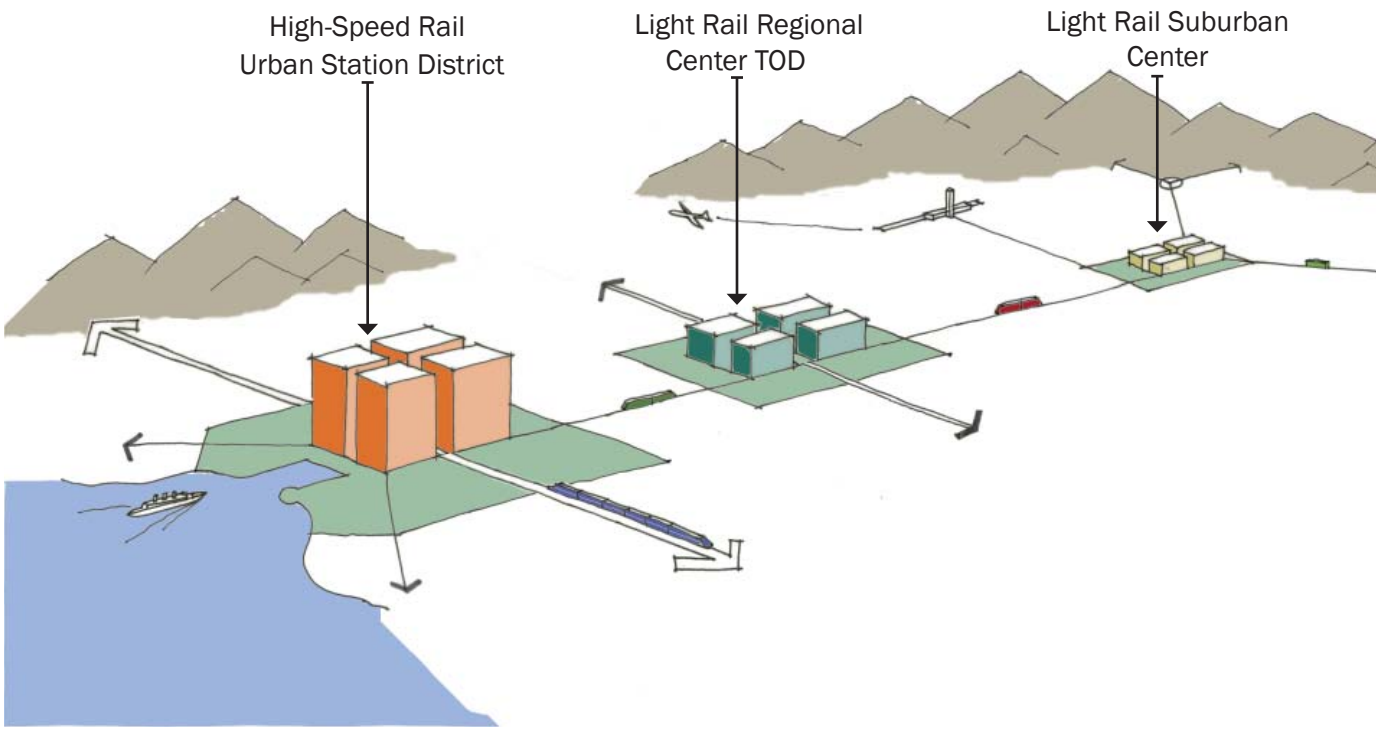
HSR will link major metropolitan areas together allowing users to access a variety of transit system and services.



Changing How California Moves and Grows

CAHST can be a game changer for how California moves between regions and within regions. If global experience is a guide, the coming of CAHST can be an effective catalyst for establishing and expanding high quality transit within the communities it serves.

CAHST stations will serve not only as local destinations and centers of activity, but as places where enhanced local transit systems connect. Development around CAHST stations should not only serve the high-speed train users, but also local commuters. The success of CAHST and its linkage to local transit systems will assist with proliferation of TOD across regions, in addition to areas immediately surrounding HST stations, playing an important role in the overall form of future growth in California.



Transit Connected Regions

HIgh speed rail stations provide the opportunity for leveraging the regional transportation networks and reshaping California communities so you don't need to rely on an automobile.

www.travelwebshot.com

aaroninjapan09.files.wordpress.com

Connecting Old and New

Kyoto Station, Japan. One of the largest railway stations in the world, serving as Kyoto's transportation hub with access to Japan Railways, Kintetsu Railways, the Karasuma Subway Line as well as city buses and long distance/overnight highway buses. The train and subway platforms are located beneath the 15-story, glass plated grey monolith. The building's design is in stark contrast to the temples and shrines that represent traditional Kyoto, and that contrast is intentional. The building, completed in 1997, was designed by Japanese architect Hara Hiroshi's "to convey historical Kyoto through a modern aesthetic" (www.japan-guide.com). The construction of the Kyoto Station set in motion a new era of high-rise developments in the city and has been credited with promoting more contemporary attitudes.

The station seeks to be a symbol of the old and new Kyoto with its grand building and spectacular views of the temples and shrines. An open air observation deck is located on the roof of the station building and a skyway tunnel on the 11th story runs the entire length of the station and provides views of the station and city.

Not only does Kyoto Station serve as a landmark both in physical size and historical significance in the transformation of the city, it is a multi-functional destination with public and private spaces. The complex has a shopping mall, several small museums, three movie theaters, national department store, two parking garages, a game center, hotel, government offices, restaurants and office space. Live concerts and comedy shows provide entertainment at the station on the weekends.

The station is located between two parts of Kyoto. On the north side, Karasuma faces downtown, with the main street leading downtown, and is a busier activity center. The main bus terminal is located on this side as are hotels and office buildings. To the south is Hachijo, which is not as busy but also has hotels, Toji Temple, and highway bus stops.

Get Started, Keep at It

Unlocking the promise of high-speed rail will require consistent, long-term attention. CAHST stations will perform differently than more traditional transit stations.

Seizing development opportunities starts with undertaking a station district plan. Typically this involves a comprehensive community driven process resulting in a vision; a land use and transportation framework; and a clear strategy for achieving two. In California, the preferred vehicle is likely to be the preparation of a specific plan. The specific plan needs to balance land use and transportation goals with environmental and economic interests.

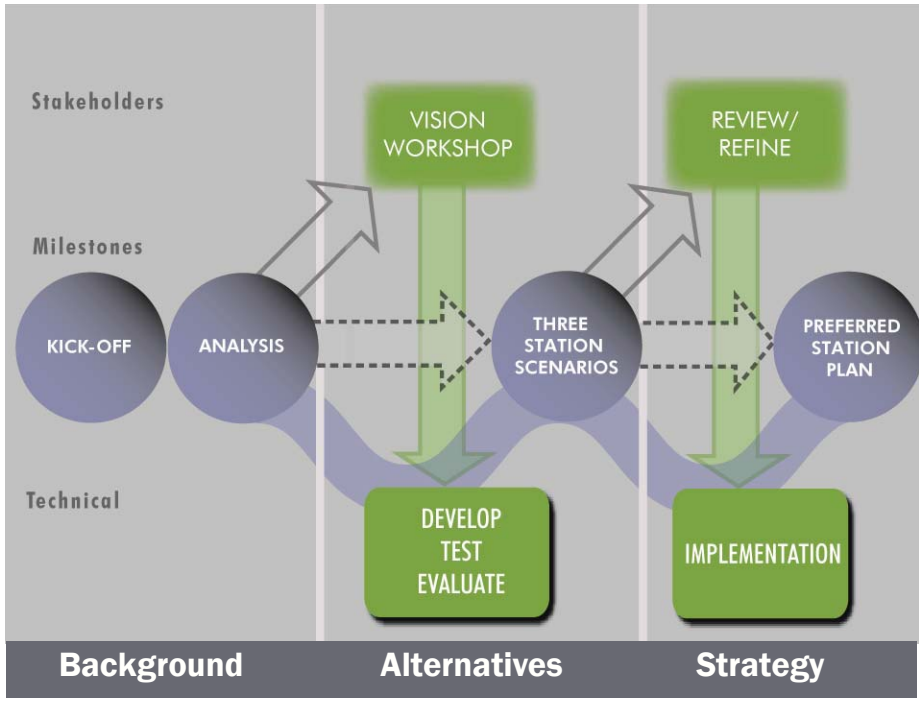
Successful station district plans need to take into account housing production, access and circulation issues, place-making, and the public infrastructure required to create neighborhoods and high quality TOD. The plan will address the type, location, extent, intensity and mix of uses needed to create an active vital transit-oriented district and an implementation and public finance strategy to help close the gap between the vision and what the market will support. The process of completing a station district plan can be thought of as an iterative process involving three steps:

Step 1 – Background: This phase starts by culling through existing plans, understanding emerging trends, collecting best practices and interviewing stakeholders to understand their hopes and fears for the station area. The result is a briefing book and a "foundation quilt" of how the existing plans and policies fit together as a starting point for the next step.

Step 2 – Alternatives: This phase revolves around highly inclusive design charrettes with key stakeholders. The charrettes result in a vision for the station area leading to the development and testing of alternative TOD plans. These alternative scenarios may be further tested and refined with stakeholders.

Step 3 – Strategy: The strategy phase focuses on preparation of a preferred TOD Plan (land use, parks open space, transportation, renderings and 3-D visualization) backstopped with a real estate and implementation strategy to fill the gap between the vision and what the market can support.

Three Steps to a Station District Plan



III. A Catalyst for Community Building

At the center of a Station District Plan, properly planned and designed transit facilities can be instrumental in positively shaping a community's future. They can set the stage by being a catalyst for helping implement the community's vision and create economic value. In doing so, fitting the transit into the community may sometimes require breaking the mold of generally accepted transit design to address the unique characteristics of high-speed rail.

The CAHST serves a different type of travel market and provides a different order of magnitude of locational advantages than urban transit systems. From a development perspective, you might describe CAHST as being analogous to California with one north-south freeway and multiple off ramps at each of the CAHST stations. The locational advantages for some communities along the route of a new CAHST station may result in opportunities for transformative development given supportive planning, careful attention to station design and a growing California economy.

The relationship between the CAHST station and the surrounding community is key. Two essential urban design elements that result in successful integration of transit stations into the surrounding community are Development-Oriented Transit and Transit-Oriented Development.

http://transbaycenter.org

CAHST stations will be the new most important places.

Development-Oriented Transit (DOT)

To maximize functionality and mutual benefit, CAHST stations and surrounding development need to be designed with an eye to each other. If not carefully planned, conventional transit design can separate transit stations from the adjacent community it is intended to serve. Simply having high-speed rail and development adjacent to each other is not enough. CAHST stations should be designed to be welcoming to the public and well connected with the surrounding community. This design perspective is often referred to as DOT.

A DOT design perspective seeks to enhance CAHST system operation, passenger requirements, community fit and future development opportunities. It assumes that it is possible to meet user requirements and maintain cost-effective service while capturing synergies with station areas that exhibit TOD potential, encouraging environmentally friendly practices, and creating lively community spaces to visit and not just travel through.

http://transbaycenter.org

www. google.com

Regeneration in Lille

Lille Station, France. The high-speed rail station planning and design in Lille benefited from strong political leadership, long term vision, and practical action. The new station was built on part of a former barracks near the historic Lille Flanders Railway Station. The site now contains major commercial development, with offices, hotels and a large modern retail center (Euralille). The remainder is a public park, replacing open space used to build the approach lines. The station area is adjacent to the old city center and has formed an extension to it, part of a continuing strategy of development for the area.

Lille has prospered since the arrival of high-speed rail, strongly developing its service economy. The high-speed line has helped catalyze growth. It has complemented an existing strategy; helping attract new businesses to round out the successful service sector economy. The selection of the high-speed rail station location was critical and developed in line with the strategy for the city as a whole to strategically regenerate rundown and disused areas. Strong, well directed political leadership was essential and effective regional and local transit services help tie together the station with its surroundings.

www. maps.google.com

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www. maps.google.com

www. maps.google.com

Transit-Oriented Development (TOD)

Just as a roller coaster on a mountain does not Disneyland make, a high-speed rail station does not necessarily make a successful downtown. But the tremendous value of the new accessibility afforded by high-speed rail can be a powerful community building tool when linked with a vision for the future, an expanding real estate market, strong leadership, and supportive planning and zoning.

Capitalizing on that value starts by creating pedestrian-friendly places that feature good connectivity, an inviting public realm, and a greater mix of land uses along with higher densities. TOD is typically used to describe this technique. TOD is a strategy available to help manage growth and improve quality of life as it provides communities with an alternative to low-density suburban sprawl and automobile-dependent land use patterns.

TOD seeks to align transit investments with a community's vision for how it wants to grow, creating "livable" higher density, mixed-use and walkable transit villages. A successful TOD will reinforce both the community and the CAHST system. For CAHST, TOD will take many forms – from new communities to redevelopment in existing developed areas. The experience from Europe and Asia with development around HST indicates that the TOD implications of CAHST may be much different than with conventional urban transit such as BART in the Bay Area, or MTDB in San Diego. High-speed rail presents the opportunity for transformative change at a different scale – such as a gradual shifting of the center of a downtown to the station.

TODs around urban transit behave differently than traditional development. People living and working in TODs are more likely to walk, use transit, and own fewer cars. TOD households are twice as likely to not own a car and own roughly half as many cars as the "average" household. At an individual station, TOD can increase ridership by 20 to 40 percent and even cause significant change at a regional level. People who live in a TOD are five times more likely to commute by transit than other residents. Locations next to transit can enjoy increases in land values over 50 percent in comparison to locations away from transit stops. With proper planning and implementation it is reasonable to expect these types of relationships will occur around CAHST stations. TOD and CAHST are the bookends of creating places with lasting value. To capture the benefits of TOD, the design of CAHST should take into account the essential principles for successful TOD.

"The future is about green developement, infill, and TOD."

Emerging Trends in Real Estate 2010

Principles of TOD

The fundamentals of TOD apply to CAHST, but they will often play out differently than with other TODs. Transit-oriented development may be described by six core principles, which define the essential characteristics of all successful TODs:

1. **Development density that is greater than the community average.**
2. **A mix of uses.**
3. **Compact, high quality pedestrian-oriented environment.**
4. **An active defined center.**
5. **Limited, managed parking.**
6. **Public leadership.**

The principles directly influence the land use, circulation, and urban form of a place. It is not just enough for development to be near a CAHST station, it needs to be shaped by transit to be a TOD. The TOD is not just the individual parcels surrounding the station, it is the entire district influenced by the station.

MVE

Principle #1: Development Density greater than the Community Average

Density matters in TOD. Density is all about scale, with the goal being to create a compact walkable district. Density within the TODs raises the bar and achieves a higher net average resulting in greater ridership, both within the TOD district and within the walk influence area of CAHST.

Principle Attributes:

- Highest densities immediately around the station, tapering down to transition to adjacent areas.
- Site design for major projects allows for the intensification of densities over time.
- Minimum density allowed should be a percentage of the density maximum.
- Retail and office uses closest to the station.

In Scale with the Community

TGV Station, Nice, France. Directly fronting on a typically narrow, mixed-use commercial and residential street, the Nice TGV station reflects the surrounding scale and character of development. The station building presents a clear and welcoming front door to the community. Buses, taxis, and automobiles are efficiently located near the main entry; yet do not overwhelm the entrance. Pedestrian routes are clearly demarcated, providing a short connection to the local light rail/streetcar station and a highly connected grid network of streets. Station parking is located in a parking structure that is concealed behind a street fronting hotel.

www. maps.google.com

Principle #2: A Mix of Uses

Creating a mix of land uses provides diversity and variety, encouraging people to walk to meet their needs regardless of how they arrive at the TOD. The key is to locate the various compatible uses close together, making them easily accessible to each other in order to improve walkability and reduce automobile use.

Principle Attributes:

- "Active" first floor uses oriented to serve pedestrians along key street edges.
- A mix of uses including residential, commercial, service, employment, and public uses.
- Vertical and horizontal mixed-use.
- Land uses that emphasize pedestrians and de-emphasize motorists within walking influence of the station.
- Prohibition of auto-oriented uses, such as drive-thru facilities, nearest to the station.
- A mix of uses consistent with the character, needs, opportunities, and constraints of the area.

Large but Compact

Nagoya Station, Japan. This station is the world's largest train station by floor area (4,800,000 ft^2). Although it is big, it does not sprawl over 110 acres. The mass of the station has been consolidated in a 20-story podium station, two tall towers atop the station, and underground where the station platforms are located. The podium houses the station concourse, a national department store, retail and entertainment uses. The design of the podium blends in with the low-rise, urban fabric of the city. The 59 story tall hotel tower and the 55 story tall office tower (with a heli-pad on top) rise above the surrounding buildings and create a dramatic profile that has redefined the Nagoya skyline. A glass-enclosed public "sky-street" connects the two towers and provides magnificent views of the city.Nagoya Station serves JR trains to Osaka and Tokyo, Meitestu's local urban network of commuter trains, Kintestu Railway trains, and local buses.

www. bing.com

www.yamasa.cc/ocjs/dombloge.nsf

Principle #3: Compact, High Quality Pedestrian Oriented Environment

Vibrant communities, with or without CAHST, are convenient and comfortable places for pedestrians. Subtle factors, focused on a pleasant environment for the pedestrian, encourage people to walk. Streets must be "calmed" by reducing traffic speeds to be inviting for walking.

Principle Attributes:

- Blocks sized for a 5-minute walk. A maximum of 400 feet, or a circumference of 1,600 feet.
- Entrances oriented to be easily accessible from the public sidewalk.
- Interconnected multi-modal street grid and pedestrian paths connecting to the street grid.
- Streets redesigned to calm traffic.
- Centrally located, secure and convenient bicycle parking.
- Wide sidewalks. The more dense the development, the wider the sidewalk. Mixed-use main streets should be 14-18 feet. High density urban centers should be 16 - 24 feet.
- Lanes, as appropriate, for dedicated service and delivery access point for commercial businesses.
- Street trees to soften the urban environment by blending natural features with built features.
- Pedestrian-scale lighting to ensure safety and to deter criminal activity.
- High quality architectural design and detail conveying a sense of place and relating to the street and the pedestrian environment, including active first floor storefront with windows, awnings, architectural features, lighting and landscaping.

Principle #4: An Active Defined Center

Transit is particularly successful in communities and neighborhoods that have defined centers, creating an 18-hour place by offering multiple attractions and reasons for pedestrians to frequent the area throughout the day and evening. Having a dense mix of uses near transit is important to creating a center, but it must also have a sense of place and community so that people choose to gather there.

Principle Attributes:

- A sense of vitality, a 'people place' with a compact urban form that is oriented toward walking and a mix of uses.
- Responsive to the fundamentals of market supply and demand (i.e., provide the products and services that are desired and needed in the local community).
- Highest density of buildings nearest the station, following the core-centre-edge concept.
- Different locations within a center with different functions, such as residential, retail, employment, civic, cultural and recreation.
- Employment uses closest to the CAHST station. Research on traditional transit, such as light rail and subway systems, has shown that for every 100 feet from the station the share of office workers using transit drops by about one percent.
- Buildings are typically taller than the surrounding area, oriented close to the street with window displays and main entrances.

Principle #5: Limited Parking

Parking to reflect the impact of transit is one of the most challenging aspects of any TOD. By creating a more limited parking supply, and moving parking from surface parking lots to on-street parking and parking structures, residents, shoppers and employees are encouraged to use transit to get to and from the CAHST station and walk within the TOD. Parking in a TOD should consider four fundamental components: size, location, design and management.

Principle Attributes:

- Parking provided on a district basis (i.e., shared uses) rather than building by building.
- Reduced parking requirements, such as parking maximum set at 125% of the parking minimum.
- Parking facilities located behind buildings, in parking structures with ground floor retail, and screened from adjacent land uses.
- On-street parking on all streets except limited access arterials.
- Parking design integrated with the development to relate to the streetscape and circulation routes.
- Paid parking or time-limited free parking.
- Parking should not surround CAHST stations or create a barrier to pedestrians.

Principle #6: Public Leadership

Historically, TOD revitalization supports the strategy that the public sector must take the primary leadership role and the initiative before the private sector is willing to commit time and money. Public leadership is needed as a station area is being developed, as well as throughout the life span of the station area.

Principle Attributes:

- "Political will" aligned with the TOD objectives.
- New and modified policies and by-law language to achieve the TOD goals.
- Corridor strategies to identify priorities, and linkages between station areas & surrounding context.
- Station district plans and improvements incorporated into the City's capital improvements budget.
- Necessary staff and capital resources dedicated to carry out implementation.
- Commitment to innovative development, a flexible approach, and removal of challenges to development.
- Continued relationships with developers to encourage and facilitate TOD.

www. maps.google.com

Connecting Spain

Atocha Station, Madrid, Spain. Located in the heart of Madrid, Atocha is the largest high-speed AVE station, accommodating commuter trains as well as intercity trains from all over Spain. Many travelers arrive at this station since it is conveniently located with many desirable hotel options within an easy ½ mile walk. Originally the first train station in Madrid (1851), it effectively became a shopping mall in 1992 with the addition of a nightclub, numerous cafés, and a one acre tropical garden at the centre of the old building. Atocha station is located at the Plaza of Emperor Carlos V. Two of the Madrid Metro stations, Atocha Renfe, which is actually part of the main railway station, and Atocha nearby, connect to Estación de Atocha. Major Madrid attractions, such as the Reina Sofía museum, the magnificent Real Jardin Botanico, and Parque del Retiro, lie within easy walking distance. The station is reminiscent of a modern airport with a light, spacious, airy feel.

Station Area Urban Design Guidelines

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Relationships between the CAHST project and adjacent development will greatly influence the character and function of station areas, the communities the CAHST project travels through, and the quality of CAHST project user experience. Orientation to the station and integration of transit-supportive development should be managed so that it complements the station area and nearby communities. The CAHST project should make efforts to consider the community context and relationships to adjacent development as part of the CAHST system design process.

The following section is organized by four main chapters. They describe how ideas from the previous section apply to the potential chronology of high-speed rail project development and suggest urban design techniques that will promote successful integration of high-speed rail.

The urban design techniques described include:

- **Assure Community Fit**
- **Create an Urban Station District**
- **Connect to the Community**
- **Get the Details Right**

"We shape our buildings, thereafter they shape us."

Winston Churchill

IV. Assure Community Fit

Create a Context Sensitive Solution

The best fitting clothes are tailor made, designed to fit each unique shape. Similarly, the best high-speed train stations are tailored to each unique community in which they exist. As the transportation infrastructure is tailor designed for each community, the urban design must look beyond the project envelope and consider how it connects, both functionally and visually, to the communities surrounding each station (its "context"). Attention to urban design will allow the CAHST to fit into each of the existing communities it passes through, leverage maximum benefits, and manage the impacts to the character and function of each place.

The character and setting of the areas through which the CAHST will travel should be a starting place for creating distinct station area design solutions. This "context" includes its natural as well as human history; the form of the surrounding development patterns, buildings, and spaces; the presence and/or absence of cultural and civic facilities; its environment and ecology; and the streets and routes that pass through it. Views to and from the station should be considered.

"Architects have been eagerly re-inventing the station as a green "multimodal" hub – incorporating buses, trams, and taxis – at the heart of city life."

William Underhill, "Station Design: Waiting for the Train", Newsweek, Dec.3, 2009

Reflect Corridor Geography and Character

Generally speaking, the CAHST passes through four geographic zones within California. From the Bay Area to the Mexican border, between the Coast Ranges and the Sierra Nevada, and through the Central Valley, each of these broadly defined areas (described on the following page) contains a unique diversity of natural and man-made characteristics. The following influences should be given consideration when formulating urban design solutions that are specific to and reflect the characteristics of each geographic zone.

Cultural Influences

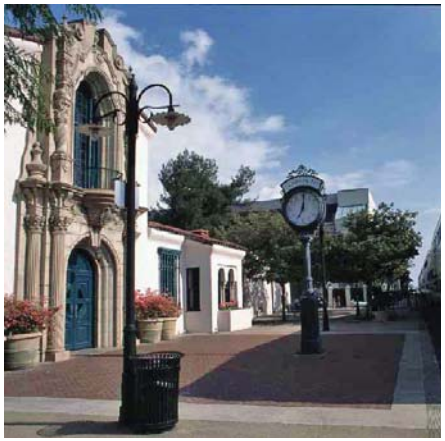
California has been inhabited by humans for at least 10,000 years - beginning with numerous Native American tribes. Waves of newcomers have continued to shape the landscape, beginning with early Spanish and Mexican influences, followed by Europeans and Asians, all drawn by California's promise of resources and opportunity.

Architecture

California architecture is complex. With roots in early Spanish and Mexican influences, eastern American architects migrated with gold-seeking 49ers bringing Victorian styles, followed later by unique modern American architectural ideas of openness and the close relationship between interior and exterior spaces.

Flora and Fauna

California flora and fauna embrace a great diversity of climate and terrain. From the scrub habitats of the Sonoran Desert, to transitional grasslands and woodlands of coastal areas and moist northwestern counties, to the highest alpine elevations that are similar to Canadian and Arctic zones, plant and animal life is abundant and varied with a great diversity of reptiles and mammals.



www.jaksview3.wordpress.com

Bay Area-Santa Clara Valley: Historically a valley of grasslands and woodlands surrounding a great bay and bounded by Coast Range mountains, this area is now heavily urbanized with a high intensity of development. Home to world-class city San Francisco, the area's architecture contains a fascinating variety of commercial, institutional, and domestic buildings. Throughout the Santa Clara Valley, acres of farmland have over time been replaced by suburban development, many dominated by ranch houses. Proposed HSR stations within this region (such as San Francisco, Millbrae (SFO), and San Jose) will likely serve as urban centers that are part of the larger San Francisco- San Jose metropolitan economy. They will be connected closely to regional commute patterns and with regional transit, such as Caltrain, VTA, SamTrans and BART. It is likely that station areas will accommodate high density developments due to their location within the metropolis.

San Joaquin Valley: Historically a flat area of fertile grasslands and occasional woodlands, the Valley contains extensive agricultural development - a significant driver of the California economy. The HSR stations within the valley (such as Stockton, Modesto, Merced, Fresno, and Bakersfield) will likely serve as regional centers within the valley's historic downtowns. Although these downtowns have not experienced significant development pressures in the past (unlike centers in metropolitan areas), they may have great potential for urban infill and redevelopment.

Los Angeles Basin – Inland Empire: A generally flat to rolling highly urbanized metropolitan area with dense development, bounded by chaparral covered mountain ranges and the Pacific Ocean. With the exception of downtown Los Angeles, the majority of the HSR stations in this region (such as Burbank, Ontario Airport, and Palmdale) are located in high density auto-dependent suburban settings comprised of low rise residential development, retail centers and office parks with significant parking lots. These stations are currently linked with regional transit, and are part of Los Angeles metropolitan economy. With the expansion of regional transit, they could become 21st century multi-modal, mixed-use urban hubs. Potential station location in Norwalk, Santa Fe Springs, or Fullerton.

San Diego Region: Oriented towards the Pacific Ocean and bounded by chaparral covered mountain ranges, this metropolitan region contains a high density urban core surrounded by largely suburban development. The nature of development in the San Diego region is significantly influenced by the natural topography of the Peninsular Ranges. The neighborhoods and developed areas are typically located on mesas segmented by canyons left as pockets of natural parkland, contributing to the regions auto-dependent suburban character. The HSR station areas identified will likely have varied levels of development potential, from very high density development in the city core to lower density mixed development.

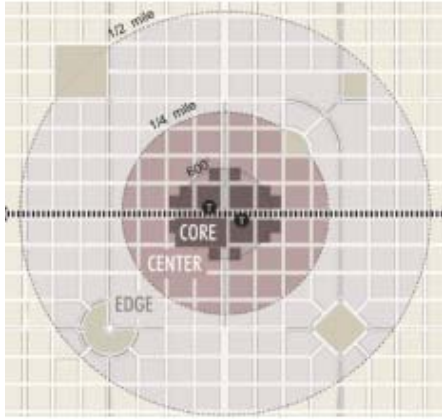
Design should reflect the culture, climate, and history of California.

Pedestrian Influence Area

High-speed train stations tend to be busy places spanning 18-hours a day. Some CAHST stations may see passenger flows that will equal or exceed the volumes of California airports, such as Oakland, San Jose, and Orange County. The stations will also be a focal point of local transit service serving the station. The combination of CAHST, local transit service and transit-supportive development is likely to result in what could be the most heavily used pedestrian zone the community.

Distance, the quality of the urban environment, and the presence of activity matters in planning for pedestrians. While the influence area of the stations is likely to be extensive, the closer a site is to a CAHST station the greater the influence. As a starting point, planning for an urban station district ought to focus on the area within a 1/4 to 1/2 mile of the station. This is where to focus on enhancing the walking environment and the most likely area where TOD will occur. Although individual CAHST stations will not function exactly the same, creating a mix of complementary, transit-supportive land uses within the ½ mile urban station district will be dependent on each communities vision and creating an appropriate planning and implementation context to guide development.

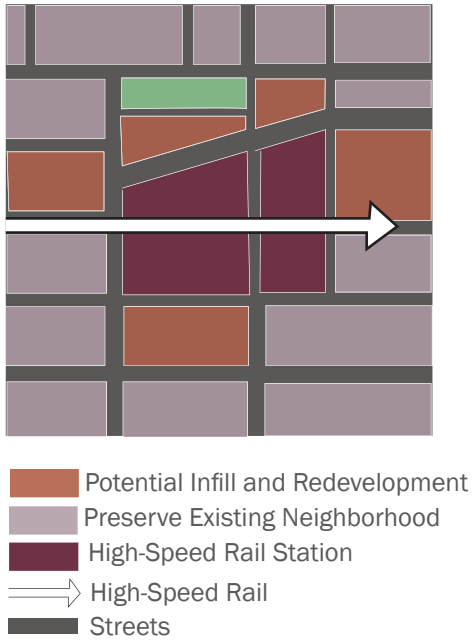
Similar to the design of indoor shopping malls, pedestrians are greatly influenced by the quality of the walking environment. Well designed, comfortable, attractive, safe areas that contain multiple destinations and activity will encourage pedestrian use and mitigate negative perceptions about walking distance. Given the fact that many CAHST project users will be carrying luggage, local circulator buses or a tram may provide an additional level of connectivity between the station and the surrounding station area development district.



Core, Center, Edge Diagram Illustrates Pedestrian Influence Area

Preservation, Infill, and Redevelopment

Careful decisions about what to keep and what to change will be essential when considering how to accommodate the CAHST stations and integrate them into California communities. Some buildings and sites around the CAHST project will be of such significance that their preservation will be essential. Other sites within station areas may be highly desirable for infill or redevelopment, depending on local community objectives. Early identification of these opportunities and preservation sites will greatly assist project planning and facilitate local acceptance – as well as provide inspiration and visual cues for detailed station area design.



Station as (Large) Places

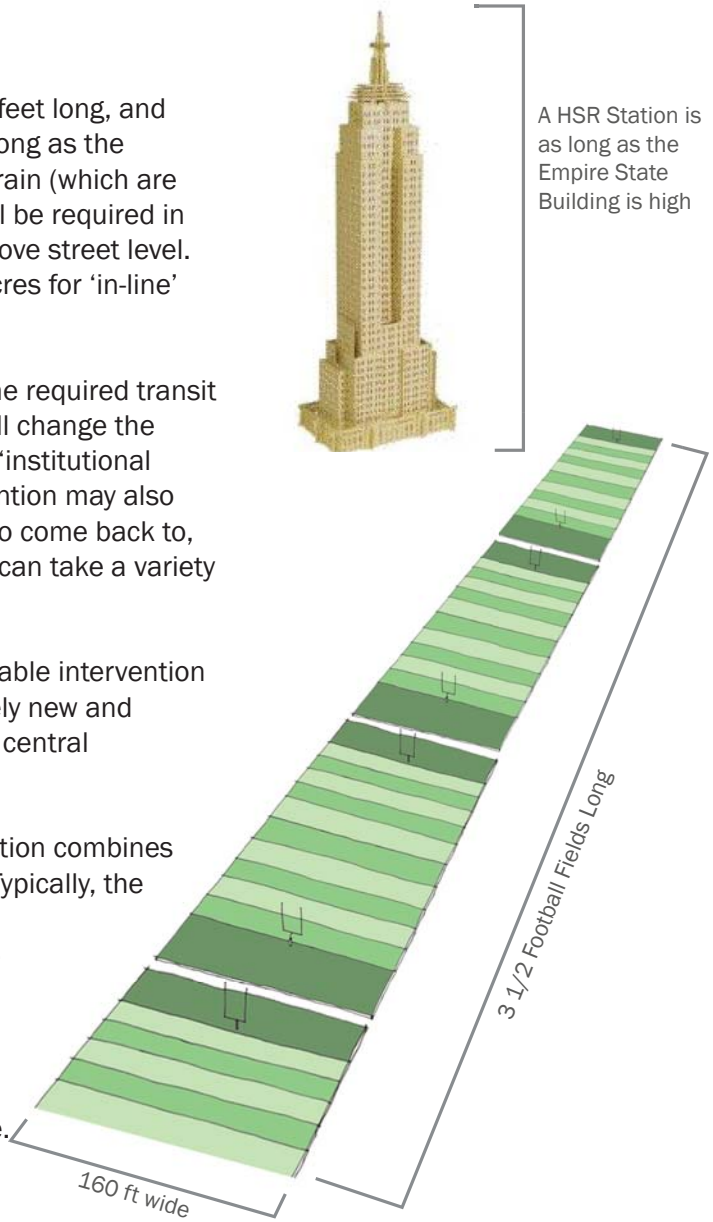
High-speed rail stations are large – the approximate length of a high-speed rail train is 1,320 feet long, and it is likely the station will be longer. This is about three and a half football fields in length; as long as the Empire State building is high; and is four times as long as the longest Sacramento Light Rail train (which are 320' and 4 cars long). In a city with 320 foot long blocks (like Sacramento), five city blocks will be required in some fashion to accommodate the station. In many cases, CAHST stations will be elevated above street level. Combined with supporting facilities, the stations will require a minimum of approximately 6 acres for 'in-line' stations.

High-speed rail stations are multi-modal hubs. Simply accommodating the size and scale of the required transit facilities alone will require careful consideration. Fitting stations into existing communities will change the character of adjacent neighborhoods, especially in smaller cities, forming an all together new 'institutional district' or subarea of the city. However, in combination with other improvements, this intervention may also result in community building opportunities to help create distinct, memorable places: places to come back to, not just leave from. As such, the role of the station within the surrounding community context can take a variety of forms.

Station as Focal Point: In this situation, the station creates a new place. It is a new and desirable intervention in an area that was previously devoid of attraction or quality (or has been planned to be entirely new and different from its previous use). Typically, the station architecture is dramatic, emphasizing its central importance and establishing the desired character.

Station Incorporated into an Existing Place: In this situation, the station character and function combines with adjacent uses creating a balance that, together, allows all elements to define the place. Typically, the station architecture is more subtle, allowing it to blend with other station area elements. This will likely be the situation in highly urbanized areas, such as downtown San Francisco and Los Angeles.

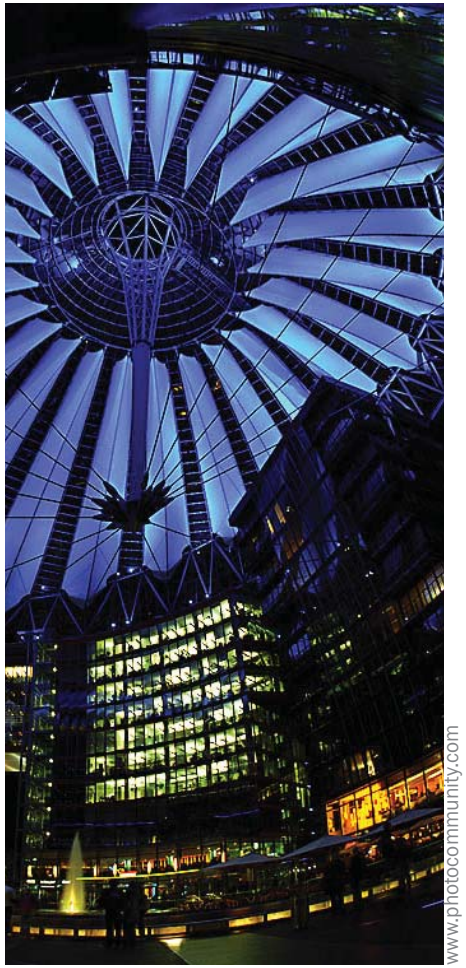
Station Orientation: The main station entry should focus on new, or existing, 'important places' within the community. This 'important place' will likely take the form of a primary street connection to other parts of the community, but could also be a community open space. Whatever the 'important place' is, the station should have a strong visual and pedestrian connection to this place to strengthen the functional relationships between the two. Secondary entries should have similar relationships, only on a smaller scale.



Approximate Length of High-Speed Rail Station

V. Create an Urban Station District

Critical to the success of high-speed rail will be making the stations parts of places that people want to be upon arrival. The level of activity generated by high-speed train stations can support a wide variety of business, tourism, and recreational uses that attract large numbers of people. These uses work best when they are part of a dense, pedestrian focused, 18-hour district offering multiple attractions and reasons for pedestrians to frequent the area throughout the day and evening.



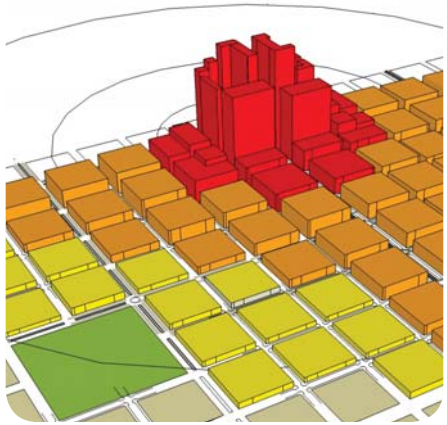
www.photocommunity.com

A New Destination

CAHST stations will likely be the main transit hub for a city, serving both local and regional travel needs. The station will not only serve transportation purposes, but also offer multiple uses (such as retail uses, hotels, etc) reinforcing its role as a destination. HST will serve business and leisure travelers, and to a lesser degree, commuters. By understanding the local market and the opportunities afforded by HST, a development master plan can be created to gain the maximum benefit of land around the station. The station district becomes an urban destination in itself with the highest density of buildings nearest the transit station, following the core-centre-edge concept.

Core-Center-Edge

High-Speed rail stations have been shown to be more successful when located in defined centers, offering multiple attractions and reasons for pedestrians and travelers to frequent the area. Having different zones with distinct characteristics also helps to create a sense of place. The density and buildings are highest in the core near the transit station, moderating somewhat in the intermediate area surrounding of the transit station, and ultimately transitioning in the edge to match the character of surrounding development. CAHST will likely encourage the building of such centers-particularly in the Central Valley.



A Mix of Uses

A mix of uses that support business and tourism travel will leverage the full potential of HST and should remain consistent with the character, needs, opportunities, and constraints of the area. Development opportunities include:

Regional Office and Employment

Regional offices and corporate headquarters within close proximity to the station allow for easy access to regional connections. Branch offices looking to locate outside of higher priced urban centers can retain connectivity and reduce vehicular commuting impacts by locating within the station district.

Hotel and Conference Facilities

Direct access to hotels and conference facilities supports both the business and tourism markets. Providing a mix of uses within the station district can provide the business traveler with the option of extending a stay for leisure purposes.

Regional Sports and Entertainment

Large-scale entertainment faculties can benefit from the large number of transit riders that can access the station district via multiple modes of transportation. Synergies can also be created with hotel and conference facilities nearby.

www.sportsfan4.com

Major Civic Institutions

Museums, government facilities, and other large civic uses can benefit from the regional connectivity by locating within close proximity to the station and can provide a critical public land use component to the station district.

Supporting and Destination Retail

Retail within the station district can both support the station and higher intensity mix of uses around the station, and become a regional 18 hour activity destination in itself. Both need to contribute positively to the street life of the district with storefronts and entries opening onto the street, allowing for potential development of nightlife, shopping, restaurants, retail,rental car businesses etc.

Higher Density Housing

A new station district provides the opportunity for higher density housing, in a range of housing types, that can capitalize on a vibrant, well-connected location. Residential uses can generally be further away from, but well connected to, the station facilities and the intensive activity that is better suited to business and tourism.

Parks and Open Space

Higher density and active uses also require open space that is functional and desirable for the people that live, work, and visit the district. A range of parks and open space should be incorporated into the station district, range: from active, programmed urban plazas to green neighborhood parks for residents.

Link Station and Development

Rather than draw a line around the HST station and keep development outside (much like an airport) the best systems blur this perceived barrier by working with cities, public agencies, and the development community to link the system with adjacent development and further integrate the station into the community. The construction and maintenance of transit and associated facilities can be shared, creating a whole greater than the sum of the parts and a station area that is seamless with its surroundings.

Integrated Development

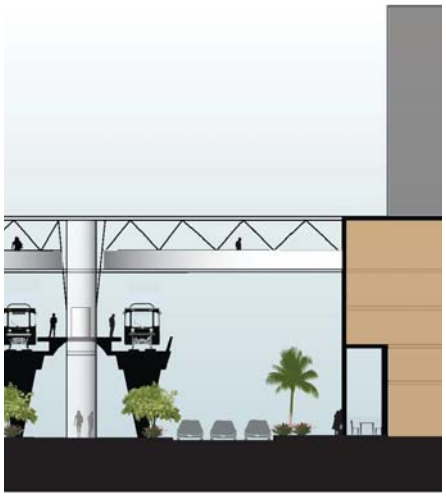
The higher densities desirable around the station can make developing station air rights economically feasible. This works best when station and development are planned cohesively so that direct connections between the two, as part of the station pedestrian environment, can be realized.

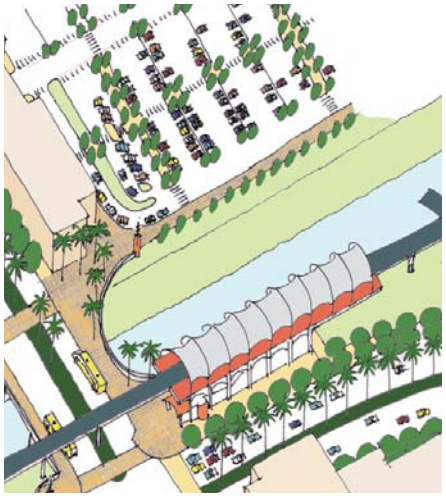
Direct Connections

Some important pedestrian connections may not occur until later in the life of the system. Stations located in areas with high development potential should be designed so that future mezzanine connections can link the station to anticipated development.

Possible Intensification

Station design, site design and station district master plans should allow for transitioning of lower intensity uses, such as surface parking lots, to ultimate projected build out conditions as higher density redevelopment around stations becomes more cost effective.





PB's PlaceMaking Group

Network of Interconnected Streets

The pattern of station area development will be directly influenced by the structure of the transportation network surrounding the station. A coherent organization, like a street grid, provides the foundation for successful station area development and this 'movement framework' should be organized to accommodate all users - especially pedestrians – and create desirable, flexible station areas.

Walkable

The street network should be viewed as public open space and a place for public activity - not just a means of getting from point A to B as quickly as possible. Streets should be safe and attractive places for pedestrians to encourage walking over personal automobile use.

Direct Connections to Many Destinations

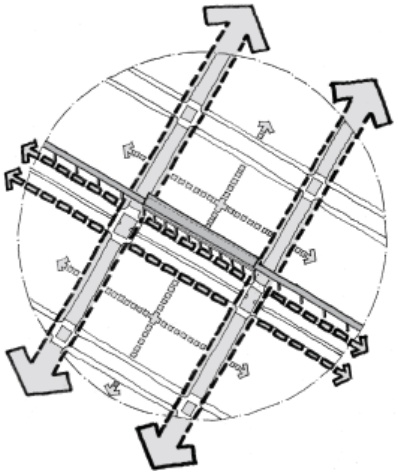
Pedestrians appreciate continuous pedestrian networks, direct routes, and will avoid "out of direction" travel. Street patterns and pedestrian paths should provide multiple and direct connections between the station and the station district.

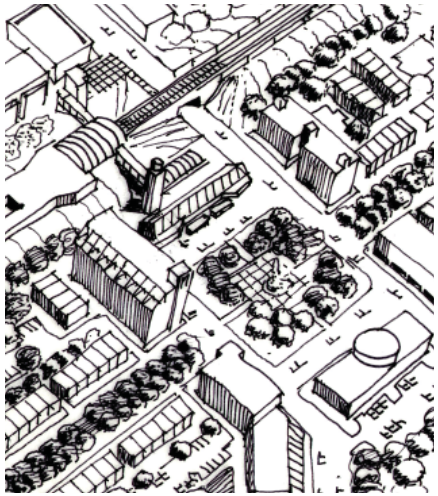
Alley and Service Streets

Alleys and service streets for dedicated service and delivery access should be provided wherever possible to avoid conflicts with pedestrian and vehicular movement. These elements also help minimize the impact of vehicles on the front entries of buildings.

Small Blocks

Small blocks allow direct and convenient connections for pedestrians, tend to slow and disperse traffic, and create streets with a balanced mix of pedestrian and vehicular traffic. Blocks should be sized for a 5-minute walk: a maximum of 400 feet, or a circumference of 1,600 feet. Larger blocks should include intermediate pedestrian connections.





Emphasize Pedestrians

All users of the CAHST will be pedestrians at some point in their trip. The creation of station areas that prioritize pedestrians and their needs will support the use of the CAHST as well as the creation of desirable, livable station area communities. Creating an inviting pedestrian environment that promotes activity around the clock is essential to ensuring the station and its environs become a desirable location for people and supporting development.

Pedestrian Scale

The ground level treatment (sidewalks, streets, landscaped areas) and first floor of surrounding structures – essentially anything within the pedestrian's reach - should be given a high degree of design attention and utilize durable materials. Pedestrian design treatments include awnings and weather protection on buildings; street trees to shade and soften urban surroundings; building facades with doors and windows that are comfortable and inviting; lighting scaled and designed to illuminate pedestrian areas while avoiding harsh glare; and sidewalks and plazas that are pleasant, ample in size, but not so large that they seem empty or unused.

Activity

Land uses within a 5 to 10 minute walk of a CAHST should emphasize pedestrians and de-emphasize motorists. This includes the prohibition of auto-oriented uses, such as drive-thru facilities and/or large format surface parked retail, nearest to transit.

Example of Pedestrian Friendly Station Design

Fruitvale Village,
Oakland, California

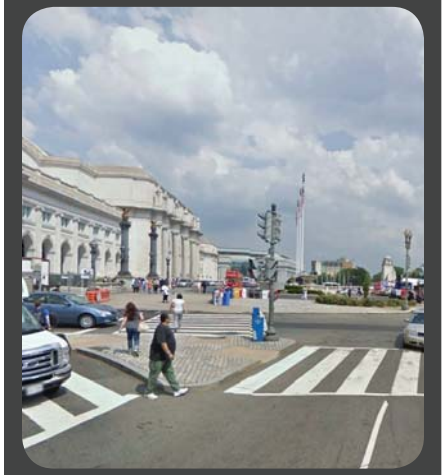
LEGEND

1. Clear visible sight lines to and from station
2. Landscaped areas for shade and visual relief
3. Pedestrian oriented lighting improves aesthetics, safety and security
4. Active uses along edges to increase visibility, security and convenience of public spaces
5. Clear wayfinding signage.

Streets and Edges

Strong, direct relationships between station area streets and the buildings or uses adjacent to them will help create a unified and coherent station district; one with a minimum of 'left over' un-programmed space, or areas dominated by vehicles. Attention to the relationship between streets and adjacent uses will be critical to the creation of a successful CAHST station area districts.

Union Station, Washington, DC



www. maps.google.com

Home of Acela (highest speed U.S train), this station is an example of creating direct pedestrian routes that are clearly demarcated, providing connections to adjacent destinations and a highly connected network of streets.

Calm Streets

Safe, convenient, and comfortable pedestrian travel between the station and surrounding areas should be a first priority. This includes visually clear, direct routes that don't require out-of-direction travel; wide sidewalks buffered from traffic; and clearly marked pedestrian street crossings with adequate signal timing and generous refuge islands and bulb-outs.

Active Street Edges

Buildings should front transit spaces and primary connecting pedestrian streets with inviting entries, windows, canopies, or arcades. These buildings should contain a variety of retail businesses and destinations that attract and support pedestrian use such as residential, commercial, service, and employment. "Active" first floor uses oriented to serve pedestrians along key street edges. Building entrances must be oriented to be easily accessible from the public sidewalk.

Station Plaza

Station plazas will be one of the most important character defining elements of the CAHST project. They are a gateway to and/or from a place and play a critical role in defining the experience of how people connect to transit. Their organization and hierarchy will directly influence success of the CAHST project. Station plazas should be versatile, relate to adjacent land uses, and be functional. They are not “the space left over” when designing the system, and should be viewed as individual design projects, combining a number of mutually supportive objectives. They offer one of the best opportunities for the CAHST project to partner with local communities and adjacent stakeholders to design, create, and maintain a truly unique publically accessible place.

Allow Connection

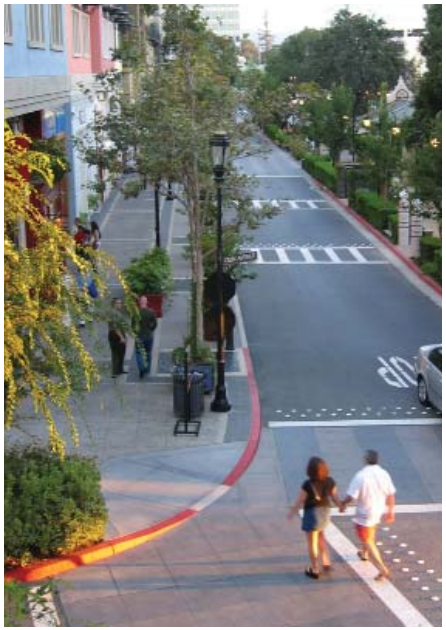
Pedestrian connections to local transit, taxis, bike parking, and routes to adjacent neighborhoods should be conveniently placed close to station entries, but balanced so that pedestrians are always given priority.

Activity Zones

Reinforce transit user experience. Businesses next to stations provide ‘eyes on the plaza’. These zones can also include seating, cafes, outdoor patios, and/or small retail stands.

Aesthetics

Considerations include landscaping and art integration. These elements should be customized to fit with the adjacent community and geographic context.



VI. Connect to Community

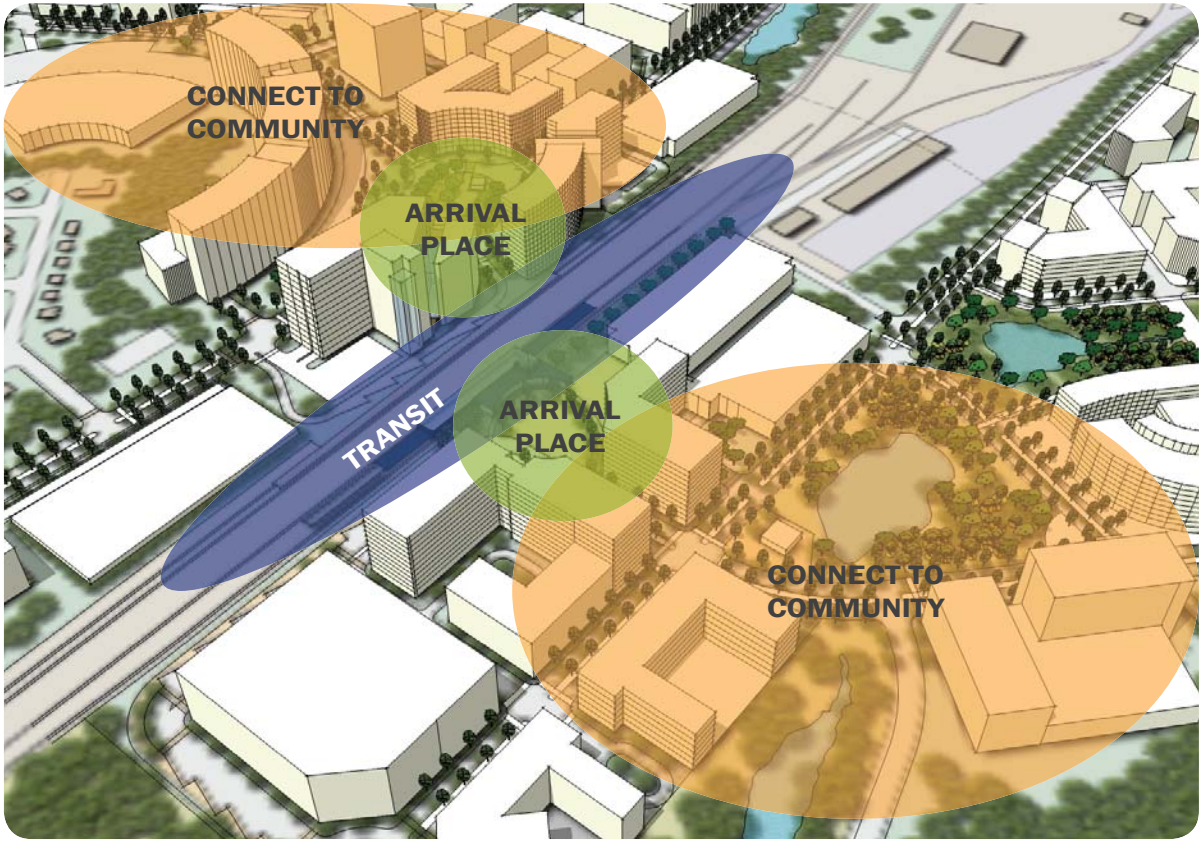
High-speed rail station districts will be dependant upon the successful interaction and movement of people, goods, and services. It will be important to consider how CAHST project station area “movement systems” – the streets, highways, footpaths, bike lanes, public transitways, and parking facilities – are defined and connected to allow users to experience and link to the wider world. These “spaces” in between buildings must successfully address both the movement needs of the station area as well as play a positive character defining role. Careful attention to the provision of adequate linkages, a variety of modal choices, safe routes for all users, effective traffic and parking management, and how streets help define the character of station areas will all be important measures of urban design success.

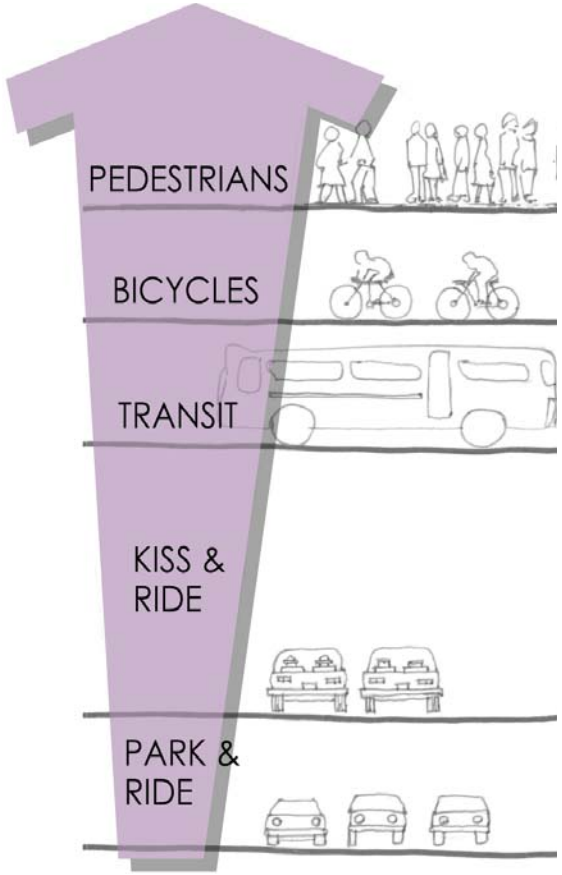
Great places are defined in large part by great streets. Jane Jacobs said it well: “Streets and their sidewalks, the main public places of a city, are its most vital organs.”

Manage Station Access

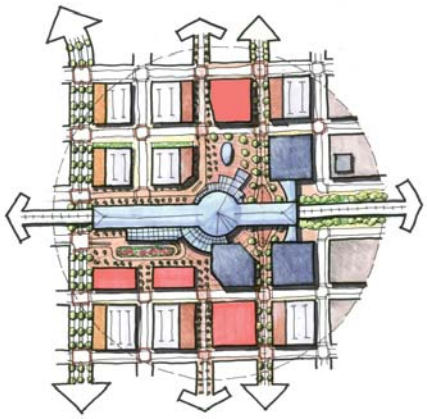
Access needs for CAHST project stations will create a variety of demands on the surrounding transportation network. Initial CAHST project planning indicates significant demand for vehicle access and parking. With this magnitude of demand, there is a risk that access roads and the parking facilities could physically dominate a station and separate it from the community it is serving, or overwhelm the needs of other users. It will be important to prioritize and balance the many modes of access so that all users will be safe and comfortable moving to and from the station and surrounding areas.

The key is making a good CAHST / transit / community / place connections. This will require creating a logical, legible framework that recognizes a hierarchy of access, balances the needs of each access mode, and addresses the scale of the entire Station District. At their best, CAHST stations are one part of a complete urban place. All access modes must function well, but the most important mode at this scale is the pedestrian. Given the large scale of a CAHST station, multiple doors or access points will be likely.



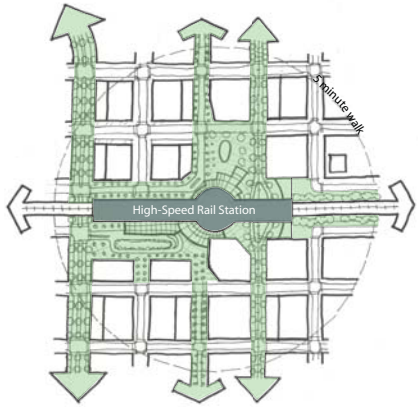


Access Influence Zones



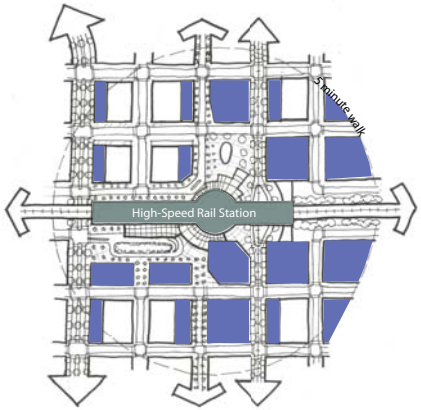
Transit Access Zone

Efficient connection to the station from local transit service must be provided and include relatively easy turning movements for transit vehicles. This zone needs to relate to the station as well as provide clear, direct, safe pedestrian connections to the community. This zone should be connected to nearby major streets.



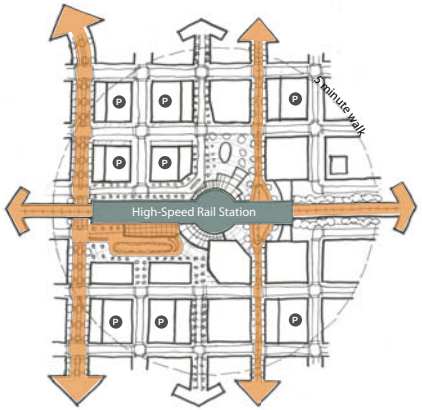
Pedestrian Zone

This is the most important consideration for station access and should be designed and programmed to be of the highest quality. The focal point of this zone is the front door of the station. The associated station entry plaza should be activated 18-hours a day by the adjacent development.



TOD Zone

The zone is logically connected to the pedestrian zone and connects back to the surrounding community. Of primary importance within this zone is the creation of calm, walkable streets that include a high degree of street fronting activity.



Parking Areas

Parking should not dominate the station environment, or separate it from the adjacent community. So that CAHST station parking does not separate pedestrians from the surrounding community, it is recommended that dispersed parking be provided with direct connecting sidewalks and paths to the station which pass through the TOD zone. Like the transit access zone, parking areas should have direct access to nearby major streets.

Provide Complete Streets

When designing for transit and 'pedestrian friendliness', streets need to be great places for walking, commerce, casual interaction and for moving traffic. The relationship between human activities and the physical form of the spaces, framed by streets and buildings, has an enormous amount to do with making a complete street. Coordinating HST stations design with the design of streets adjacent to them should be part of the transit planning and design process.

Interesting Character

Allan Jacobs, in his book "Great Streets", defined a number of criteria representative of streets that go beyond simply moving cars: a symbol of community history; physically comfortable and safe; encouraging participation and entertainment; open access to all; attractive and remembered.

Tame Traffic

Streets that are safe and pleasant for pedestrians are typically characterized by calm traffic and a limited amount of space dedicated to the automobile. Techniques for calming traffic include:

On-street parking. Parked cars help slow traffic also provide a buffer between moving traffic and the sidewalk.

Narrow lanes. Wide lanes encourage faster driving. Minimum lane widths help slow traffic, reduce the amount of street area devoted to the automobile, and shorten crossing distances for pedestrians.

Minimum intersection radii. Narrowing curb radii at intersections slows turning speeds providing additional safety for pedestrian crossings. Additional sidewalk area is also created as are shorted pedestrian crossing distances.

Raised crosswalks. Raised crosswalks can function as speed bumps or speed tables slowing traffic while providing the additional benefit of placing pedestrian crossings at the same elevation as the adjacent sidewalks.

Generous Sidewalks

Increased density demands wider sidewalks. Sidewalks should provide ample zones for walking, street furniture and storefront activities such as cafes, merchandise displays and window shopping. Typical minimum urban sidewalk widths (from curb to edge of sidewalk) are: 10-12 feet for residential neighborhoods; 14-18 feet for mixed-use main streets; and 16-24 feet for high density urban centers.

Las Olas. Fort Lauderdale, FL

Santana Row. San Jose, CA

http://parlezvous208.com/index.html

Champs-Elysees. Paris, France

COMPLETE STREETS DESIGN PRINCIPLES

Complete streets enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. (http://www.completestreets.org)

Work with Basic Street Structure. Simply stated, streets are defined by three main component zones: 1) the roadway itself, 2) the sidewalk area, and 3) the adjacent buildings and/or development. It helps to understand these areas and how they work together when considering street improvements.

Consider Context. Streets are part of the overall community fabric and, at their best, are places of shared use. They physically create and define a network of public open spaces – sometimes referred to as the 'public realm'. How does the idea of a lively, aesthetically pleasing 'public realm' apply to streets? It helps to begin with an understanding of a given street's context and the adjacent land use character.

Streets are for People. The best streets are pleasant for pedestrians. They contain destinations for those walking and prioritize their needs such that vehicles are slowed to allow safer and more comfortable pedestrian crossings. They provide:

- **Architectural continuity**
- **Ground floor transparency**
- **Complementary elements**
- **Diversity**
- **Detailed design and quality construction**
- **Good maintenance**

Manage Access and Parking. The best streets make sure that good access is provided to adjoining land uses, and that parking does not overwhelm the character of the street.

Aesthetics and Definition. Lighting, signage, and planting design can beautify and stage a dynamic street. As a design element, lighting fixtures and signage can provide safety, express themes, and provide direction for travelers. Plants provide outstanding opportunities for spatial definition and the positive expression of landscape character.

Promote Bicycle Accessibility

Bicycles are one of the most sustainable and affordable forms of personal transportation. Encouraging bicycle use to and from the station and providing priority accommodation for bicycles at the station should be a primary project objective and urban design goal.

Reflect Rider Needs

Clearly defined and continuous bicycle lanes, bicycle related signage and signals, carefully placed curb cuts, and provision of elements such as “bike stairs” together create an environment that encourages bicycle use.

Provide Connections

Bicyclists should have a direct path to the station entry, with a minimum of conflict with other traffic and/or disruption to riding. Lower priority travel modes should be arranged to allow bikes to take priority and connect to existing and planned lanes and trails.

Priority Parking

Plentiful bicycle racks, located close to the station entry, in highly visible areas, will encourage bicycle use and promote security. Bike lockers and bike stations allow for secure, long term, weather protected bicycle parking.

Bicycle Stations

Bike stations provide secure, indoor bike parking, changing and shower facilities, and repair and rental shops. They should be visible, inviting, and integrated into the architecture and urban design of the station. Examples include: Tempe Transportation Center in Tempe Arizona, 4th and King Street in San Francisco and Millennium Park in Chicago.

Example of Multi-modal Pedestrian/Bicycle Path

LEGEND

1. Clearly defined bike lanes
2. Bike/ Pedestrian crossings well- defined.
3. Landscape buffer help to separate traffic and create a safe environment for bicyclist.
4. Visible signage to orientate users.

New York City, New York

Blend in Local Transit Access

Local transit provides a more sustainable transportation alternative than automobiles when it is too far to walk or ride a bicycle. Direct and easy connections to local transit service from CAHST project should be a key urban design objective of station area design and planning. The challenge, typically, is to provide local transit facilities that are visually and experientially attractive. Bus transit facilities at stations are extremely important, yet too often create places that are unpleasant for pedestrians. By applying several design techniques and paying attention to details, this all too common urban design problem can be overcome.

Prominent Front Door

To orient the users of local transit and facilitate connection to the CAHST, the main entrance of the station should be visually pronounced, creating a focal feature within the surrounding context.

Convenient, but not Dominant

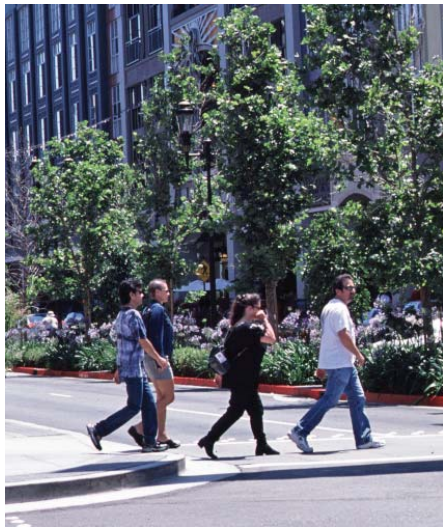
Bus staging areas should be located in close proximity to station entries, but in ways that 1) allow pedestrian friendly site development to occur closest to the station entry and 2) minimize the visual impact of the typically large amount of paving required.

Quality Detailed Facilities

Site furnishings for bus transit patron areas should be of the same high quality design and durable materials used for other station areas. This should be a clear, visual and functional 'message'.

Safe, Clear Connections

Bus patrons should have a direct visual connection between staging areas and the rail transit station, and/or a high quality directional sign system that facilitates the connections between the two areas should be incorporated into the site.



Example of High Quality Bus Facility Design

LEGEND

1. High quality paving materials
2. Curb side access
3. Pedestrian furnishings
4. Landscaping
5. Clear visibility of rail transit station entry
6. Unique bus shelter design

MTA Headquarters
Los Angeles, California

Balance Vehicular Access

Since large numbers of automobiles will require access to the CAHST stations, the design of automobile related facilities will be of critical importance to the character and success of the CAHST project. Good station area urban design will require vehicular solutions that achieve multiple objectives, such as aesthetic benefits, and that respect access requirements of other modes – especially pedestrians. It will be important to define a clear hierarchy for pedestrians,bicycles, and vehicular traffic to allow for safe, accessible and efficient routes to and from the station area.

Accessible, Not Disruptive

Care must be taken regarding how and where automobiles are accommodated to avoid disruptive traffic impacts on pedestrians, especially during evening peak travel periods.

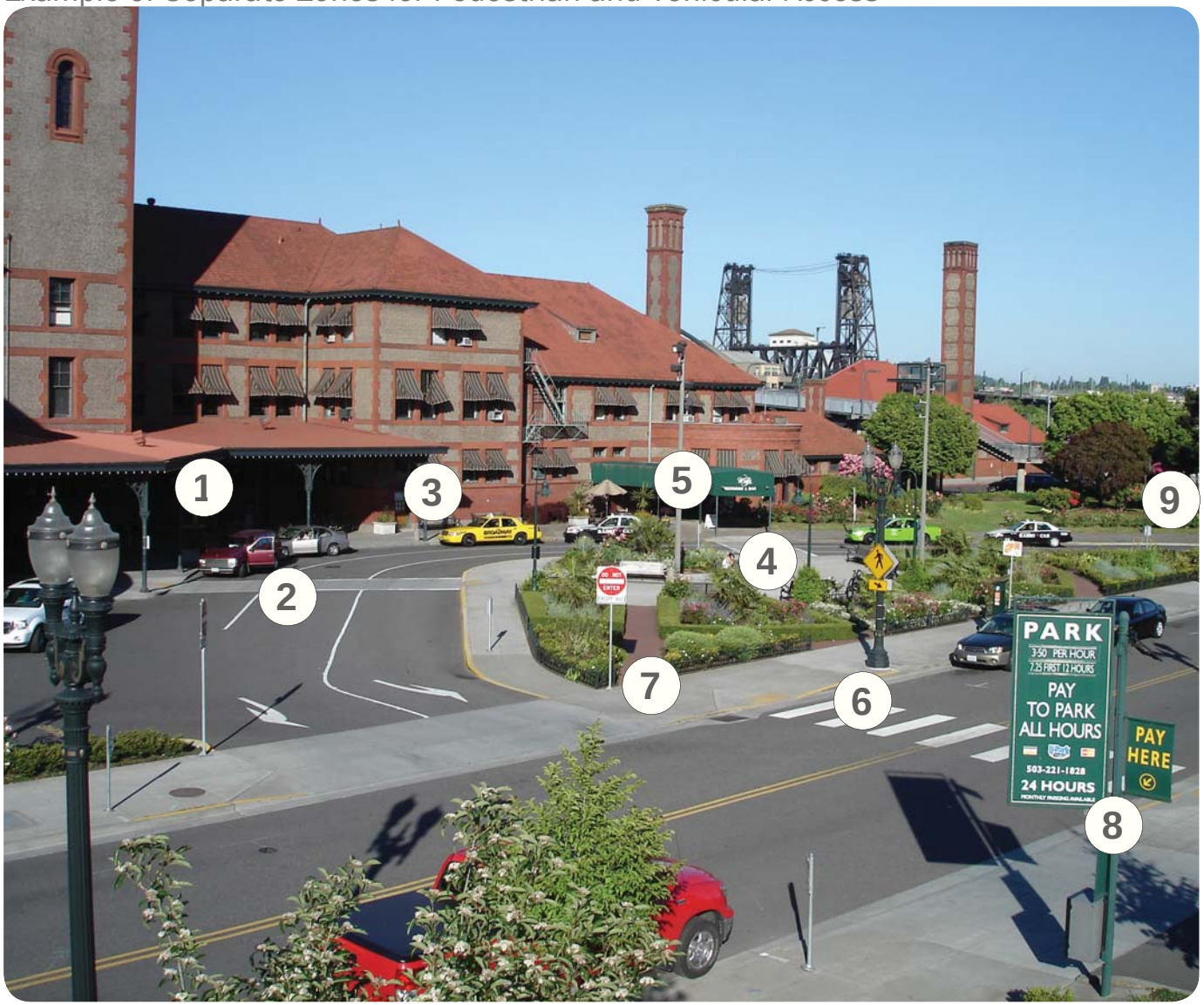
Ease of Drop-off and Pick-up

CAHST project patrons should have easy access to areas where they can be dropped off and/or picked up, ideally with close proximity and a direct visual connection to station entries or pedestrian staging areas. Ideally, vehicular facilities should be configured like streets, not separate “parking lots”.

Taxis and Car-Sharing

Taxis and car sharing complement transit. Parking for car share vehicles should be given priority with on-street spaces, or in parking lots or structures, closest to the station pedestrian entrance. Provision for taxis should be located in an easily visible location without impeding pedestrian access or other modes of transportation.

Example of Separate Zones for Pedestrian and Vehicular Access



LEGEND

1. Station entry and drop-off defined and protected by canopy.
2. Convenient passenger pick-up and drop-off designed as an urban street.
3. Taxis accommodated along the street curb.
4. Combination of landscaping, architecture, and open space define the 'place'
5. Retail provides additional station area activity
6. Clearly defined pedestrian routes
7. Decorative paving
8. Parking located nearby, but not immediately in front of entry
9. Bus transit located nearby, but not immediately in front of entry

Union Station
Portland, Oregon

Manage Station Parking Form and Function

The California High-Speed Rail Authority plans to work with cities to identify potential parking locations for HST stations, and in many cases, may acquire land for parking. Since parking at the HST stations is expected to be profitable, the parking facilities will be privately operated. The location and provision of parking will require a high degree of coordination between the Authority and each local community to address the implications for urban design, finance, TOD, and community fit. While the importance of parking is recognized, it should not dominate the station environment. Large parking lots located between the station and adjacent destinations can reduce real estate value and create an unappealing barrier that pedestrians will likely avoid.

Structured Parking

Given the amount of parking need being projected for HST stations, it is likely that structured parking will be a typical solution to meet station parking needs. Structures should fit with the scale and architectural character of the surrounding community. Pedestrian entries should be visible and prominently located while vehicular entries off of primary pedestrian routes should be avoided. Where parking structures face primary pedestrian streets ground floor commercial space should be provided. Additionally, wrapping the parking structure with a commercial or residential liner building puts an active face on the street above ground level and provides additional development opportunities. Parking structures shared with adjacent development can reduce the cost associated with construction and provide a more efficient and better integrated use of land near the station. Parking structure design should not dominate or degrade the quality of the street for pedestrians. Underground parking should be considered where ever possible.

LEGEND

1. Structured parking designed to match the surrounding architectural character
2. Ground floor retail
3. Housing or office over parking structure
4. Liner building containing housing or office
5. Pedestrian entry is highly visible and emphasized
6. Vehicular entrance is scaled to respect pedestrians

Examples of Well-Designed Parking Structures

PB's PlaceMaking Group

“Right-Size” Private Development Parking

Transit service, increasing density, an effective mix of uses, and a walkable environment can collectively and individually reduce car use. Consequently, the need for parking will be reduced in transit-rich mixed-use neighborhoods. Parking ratios in TODs allow fewer parking spaces than conventional developments (up to 25% lower than standard suburban development are typical), and often have parking maximums to prevent building more parking than is needed (saves development costs and further encourages transit use).

A foundation of station district planning should be the formulation of a district parking strategy. The local jurisdictions and stakeholders should work with the transit agencies to monitor parking in the station area and implement guidelines that help mitigate or avoid parking issues at the station and surrounding neighborhoods.

Locate Strategically

Parking should be treated as a common resource for the uses within areas near a high-speed rail station, rather than thinking about parking as a requirement of each individual building. As station areas become more pedestrian and bike friendly, there will be a reduction in people driving to park and ride facilities.

Share Parking

To the extent practical, sharing of parking facilities should be pursued as an efficient way to manage this expensive station area resource. One example of compatible uses for shared parking is between theaters and office buildings.

Promote Car Sharing

Lower rates of vehicle ownership can be encouraged by planning for prominent and convenient car sharing locations to occur within station areas.

Surface Lots

Given the level of parking demand expected, the value of land for development, and the desire for TOD around stations, HST parking needs can best be met with parking structures. Although not as 'land efficient' as parking structures in accommodating large numbers of parked cars, it is possible surface parking lots may still be utilized to meet some of the parking needs at CAHST project stations. A number of design techniques will insure that surface lots provide more urban design benefit than simply space for parked cars.

Close, but not Dominant

Locating park-and-ride lots away from, but with direct connections to the station, opens that real estate for higher and better development that can benefit from transit adjacency.

Attractive Edges

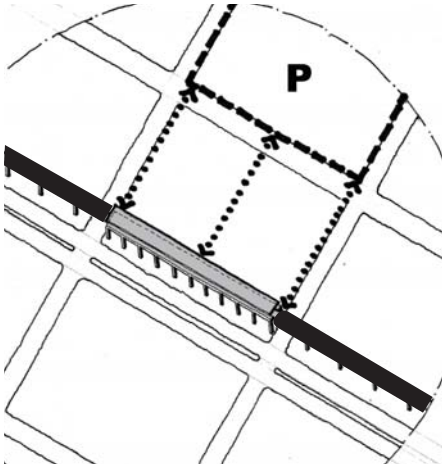
Where parking lots must face the street, a combination of landscaping and attractive fencing can serve as a buffer between the lot and the pedestrian realm. However, care should be taken to allow good visibility to promote safety and security.

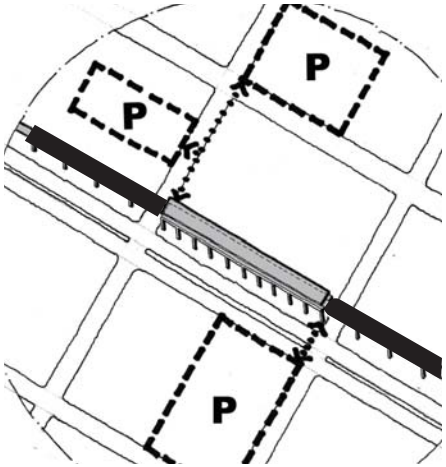
Break Up Large Lots

Consider multiple, smaller parking lots integrated into surrounding development, and surface lots as a street grid to allow for future incremental infill redevelopment. Explore shared parking opportunities with surrounding property owners to reduce the amount of parking, share the cost burden and take advantage of off-peak parking availability. Use pedestrian scaled amenities to create clear sight lines to and from the station: landscaping, low railings, sidewalks, lighting, etc.

Parking Lot Safety

Natural surveillance and pedestrian visibility should be a priority of all car surface lots. Locate car lots in areas that have active building edges and clear sight lines, to provide natural surveillance and enhance the perception of safety for pedestrians. Adequate lighting should be incorporated into surface lots to allow pedestrians to see through car windows and eliminate shadows.





Example of a Well Designed Surface Parking Lot

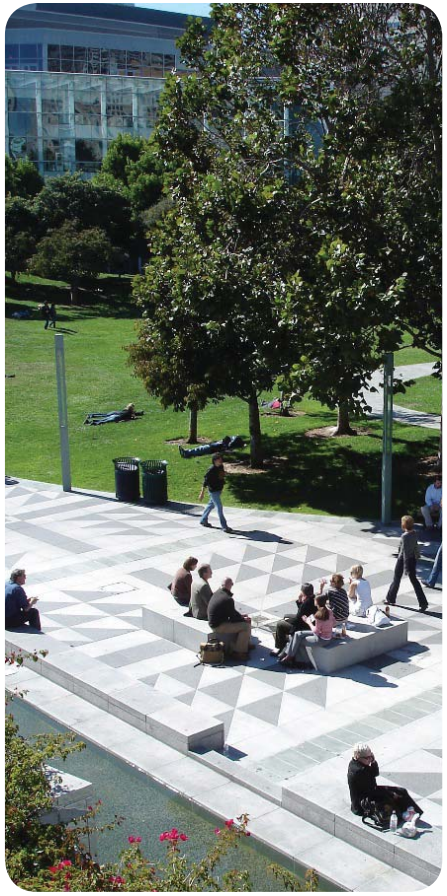
LEGEND

1. Parking lot located behind street facing development
2. Well defined and attractive pedestrian route through parking lot
3. Direct pedestrian connection to station, aligned with street grid or primary pedestrian destinations
4. Lighting scaled for pedestrians
5. Landscaping for stormwater infiltration, shade, and to reduce visual impact

Orenco Station
Hillsboro, Oregon

VII. Get the Details Right

Ludwig Mies van der Rohe, the famous architect, once said “God is in the details”. Detailed design is where much of the actual, final identity and quality of a place is determined. The numerous design decisions about details – such as materials, colors, patterns, corner treatments, etc. - add up to directly inform user’s impressions of the quality of any built place. High quality details demostrate the commitment of project developers; allow citizens to successfully and pleasurably utilize places; create and retain value; and ensure distinctiveness. Good design, good materials, and high quality long-term maintenance will be essential to creating successful places associated with the CAHST project.



“Each material has its specific characteristics which we must understand if we want to use it…”

- Ludwig Mies van der Rohe, Inaugural address, Illinois Institute of Technology, 1938

Positive Outdoor Space

Structures, be they buildings or transportation infrastructure, physically define the edges of outdoor spaces. These 'edges' greatly influence the quality of the outdoor space and determine its shape, size, and permeability.

Building Lines and Setbacks

Common building setbacks or 'build to' lines create a continuity of frontage, spatial definition, and enclosure for outdoor public spaces. Minimal or no setback from street sidewalks facilitate interaction between building and public realm. One desirable exception is that garage entries should be recessed behind the main building line.

Spatial Definition

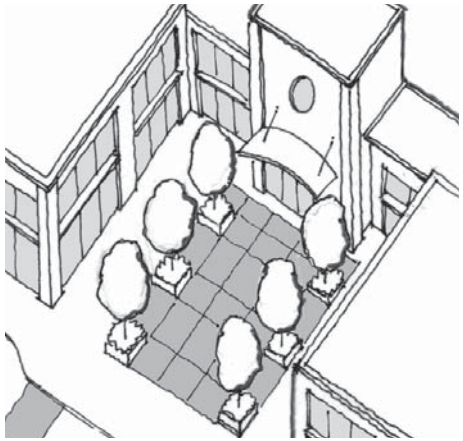
The physical spaces around CAHST project facilities should be clearly defined with little or no ambiguity about their purpose. A combination of elements (such as the station, parking facilities, landscaping, adjacent buildings, etc.) must be viewed together to determine if enough, or too much, enclosure has been provided.

Corners

Corner sites, such as those at intersections, tend to be visually prominent with at least two frontages. Design of buildings and CAHST project facilities should be 'tailored' to address these unique locations. The apex, or point, formed at the corner can be emphasized by height variations and/or special detailing.

Table: Common Setbacks by Generalized Location

Location Type	Setback	Purpose
Central Business Districts	No setback	Active frontages
Inner Urban Areas	0 to 10 feet	▪ Active frontages ▪ Amenity spaces ▪ Small functional spaces ▪ Spill-out for cafes/shops
Outer Urban Areas	Up to 18'	▪ Adjacent to busy arterials ▪ Buffer for residential uses



Example of a Positive Outdoor Space

LEGEND

1. Programmed activity area
2. Landscaping provides shade and protection
3. Active uses along the perimeter of open space provide visual surveillance
4. Defined pedestrian paths
5. Passive activity area

Jamison Square, Portland, Oregon

Guideway as a Design Opportunity

The system guideway will stretch the entire length of the transit corridor and be one of the most visible elements of the system. It represents one of the biggest opportunities to make a high quality urban design statement.

Guideway Structure

Sculptural treatments and/or architectural detailing of the guideway structure can improve upon its aesthetic appeal, reflect local context, emphasize the station entry, and/or help to achieve local urban design objectives.

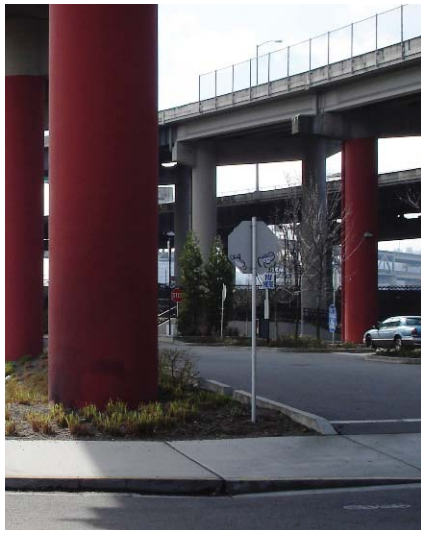
Support Columns

In general, an elegant and consistent approach to column design will help unify the CAHST system. In certain areas, however, the addition of color, textures, and/or sculptural treatments may be appropriate to differentiate the CAHST design to improve upon its aesthetic appeal, reflect local context, emphasize the station entry, and/or help to achieve local urban design objectives.

Program Space Below

Spaces below the guideway are opportunities to create places or locate facilities. In Portland, Oregon spaces under elevated streets provide an open air market, transit station, and trolley storage barn. In San Francisco, Mission Creek Park North is located under a highway.

http://transbaycenter.org



Example of Elevated Guideway / Station Street Crossing

http://transbaycenter.org

LEGEND

1. Sculptural columns
2. Decorative screen
3. Architectural guideway
4. Active pedestrian zone
5. Green roof

Transbay Terminal Visualization
San Francisco, CA

Well Defined Entries

Locating the front door is a critical decision for creating value and helping shape the future pattern of growth in each CAHST project city. These defined entries will lead you to what will likely become the new "most important place" for the community. Facility entrances should have a strong, direct connection to adjacent streets allowing users easy and safe access.

Inviting

Facility entrances should be interesting, welcoming places that are comfortable for users of the high-speed rail as well as others. A balance between purely functional elements with aesthetic measures should achieve overall visual quality and spatial interest.

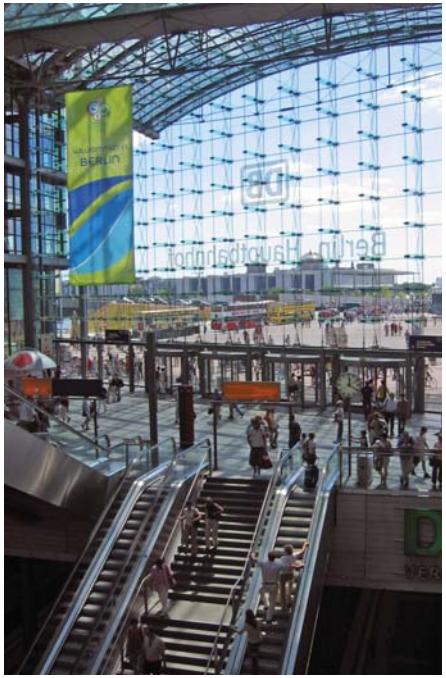
Prominent

The hierarchy of facility entrances should be visually and functionally discernible from surrounding streets and open spaces. Architectural detailing and/or height variations can be used effectively to emphasize facility entrances.

Visible

Facility entrances should be clearly visible from surrounding streets and open spaces. Views to and from the entrances should allow positive orientation for users. Elements that conceal or block views to and from entrances should be avoided.

www. architecturerevived.blogspot.com



Example of Potential Station Entry Treatments

LEGEND

1. Escalator up to station
2. Weather canopy provides protection
3. Visible bike parking
4. Space for retail provides activity
5. Generous pedestrian areas
6. Decorative paving
7. Landscaping

World Trade Center
Portland, Oregon

Wayfinding

Successful wayfinding and connectivity requires linking places both physically and visually. Signage can assist in making successful connections between station district destinations, but additional wayfinding elements, such as changes in pavement colors or art embedded in walkway surfaces, can be applied to assist in orientation.

Views and Connections

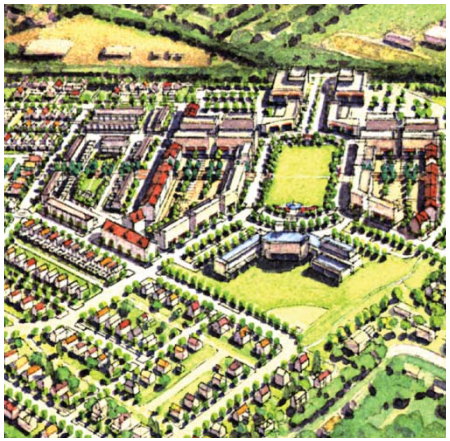
Views to destinations provide a level of comfort and pleasure when walking. View corridors to station area landmarks visually link the station with its surroundings and minimize the need for excessive amounts of signage.

A Legible Structure

Being able to see how a place is organized provides a level of certainty when walking. Direct visual links to and from the station to the surrounding network of streets and other landmarks will help users move about the district.

Consistent and Coordinated Signage

Station area signs should be clear, organized, and unified, addressing all users including automobile drivers, cyclists, and pedestrians. A consistent station district-wide system may include a variety of monument, destination, and wayfinding signs. Individual sign placement should support the overall district organization, such as along main routes or at important nodes, but must be applied consciously to avoid 'visual clutter'.



Building Size and Scale

Since CAHST project facilities will tend to be large, attention must be paid to positively exploiting the opportunities that 'large' creates, or mitigating the potentially overwhelming impact of their introduction into the urban landscape of California.

Height and the 'Big Picture'

Tall buildings and/or structures can play a powerful role in signifying locations of civic importance – such as new CAHST project stations - by providing landmarks. The key is to consider the placement of new station details that may benefit from an emphasis on tall architectural elements, such as main entrances, in the context of existing locally significant landmarks that maybe overshadowed or hidden by tall architecture.

Step Down or Wrap Up

To manage dramatic changes in height between CAHST project facilities and adjacent development, urban design techniques include: 'wrapping' large structures with smaller buildings; 'step' large structures down to match scale of adjacent development; and/or ensure that the ground level adjacent to pedestrian areas is active and interesting with human scale detailing.

A Varied Public Realm

With careful attention, the diversity of station area elements can be orchestrated to create comfortable, stimulating places for people. It is expected that station area designers will need to move freely between spatial organization and details such as furnishings.

Focused Activity Areas

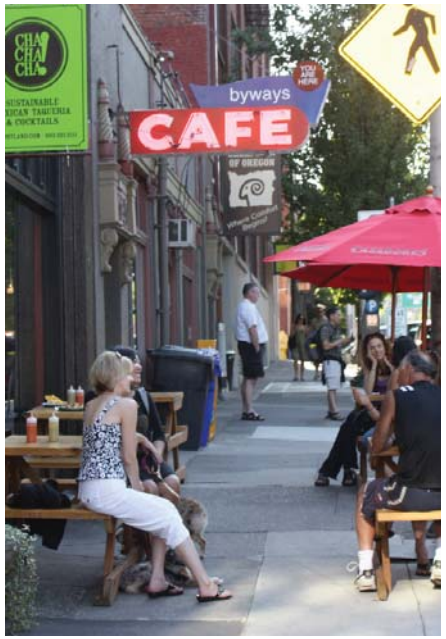
Points of activity, complemented by quiet areas for seating, create the best public spaces. Activity areas should be positioned with consideration to visibility, solar orientation, and usage by children and seniors.

Stimulate the Senses

Places are defined by more than their visual qualities - how a place smells, sounds, and what its surfaces feel like help shape and identify it. The sound of water or music, the smell of flowers or coffee, or the warmth of stone paving can be as memorable as a place's appearance.

Versatility

Spaces can be used by different people in different ways. Places that accommodate a diversity of activities in the same space are more likely to be consistently active.



Visibly Sustainable

Best practice in transit projects now incorporate principles of sustainable design. To achieve 'green transit' it will be important to not only incorporate energy and resource efficiency, waste reduction and pollution prevention, good indoor air quality and natural light to promote user health, and efficiency in design and construction - it will also be important to make project sustainability measures visible and part of the system's overall aesthetic and user experience. Sustainable design as part of the transit system should be made part of the project's 'look and feel'.

Native/Xeric Landscaping

The use of native plants and/or those that are drought tolerant will reduce the use of water, chemicals, and time spent on maintenance. Native plants also provide an appropriate visual connection to the surrounding California landscape.

Stormwater Integration

Bioswales, rain gardens, permeable paving, and/or in-filtration planters are a few techniques that manage stormwater at the surface as well as provide opportunities for aesthetic enhancements. Ecoroofs also offer stormwater benefits.

Solar and Wind Elements

In addition to providing energy for features such as station area lighting, solar and wind power generation components can also be used as architectural design elements that combine sustainability and aesthetics.

Aesthetics

Beautiful places inspire use and garner care and respect. Although difficult to quantify, aesthetic qualities in urban design are typically achieved by a combination of attention paid to design basics (such as color, value, line, space, form, and texture) and programming to animate places.

Richness and Beauty

Lighting, public artwork, landscaping, paving patterns, site furnishings; are all opportunities to create interest and attraction.

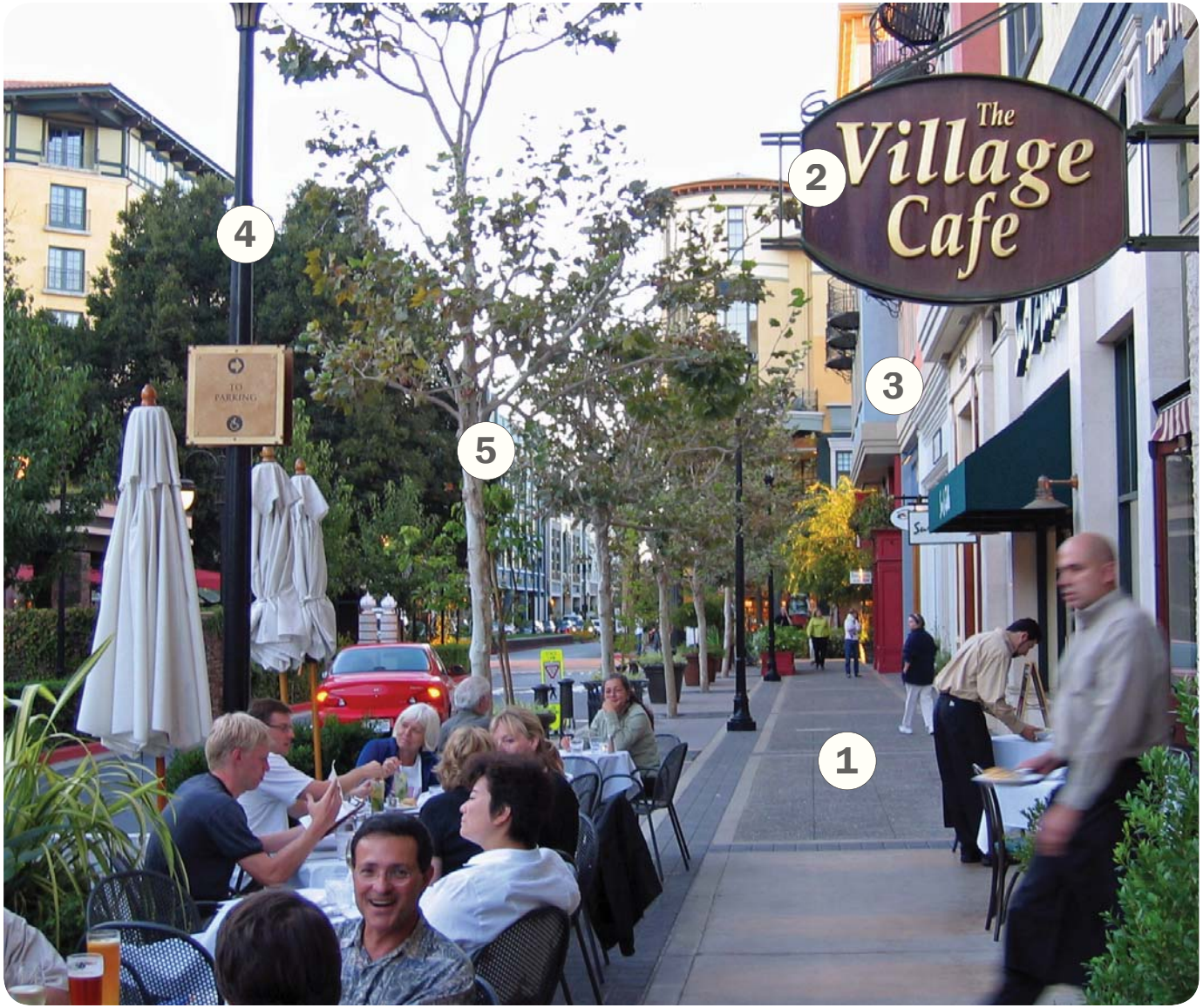
Quality Materials

Durable materials assure that places will withstand the wear and tear of usage, time, and weathering. High quality materials demostrate the commitment of project developers; allow citizens to successfully and pleasurably utilize places; create and retain value; and assist in long term care and maintenance.

Attention to Little Details

Pedestrians notice small details: poetry etched into paving, surface textures, or a railing detail. Strategic placements of finely crafted elements in pedestrian areas help people make intimate connections to places.

Example of an Aesthetically Pleasing Urban Place.



LEGEND

1. Decorative Paving.
2. Sign reflects pedestrian orientation
3. A variety of architectural details, materials, and colors.
4. Ornamental, pedestrian scaled light fixtures.
5. Significant landscaping.

Sanana Row,
San Jose, California

Safety and Security

Personal safety and security is essential for all transit patrons. It will play a large part in both the success of the transit system and in helping create attractive places for people. Patron experiences while using transit will shape their perspective on the user-friendliness and safety of the system. Safe transit places will help increase ridership. Research indicates that the urban design measures described in this guidebook are effective in reducing and often eliminating illegal and undesirable behavior.

Defensible Space

Common concerns regarding transit and public spaces are the fear of excessive loitering and/or vandalism. Creating defensible space that are active and visible places where patrons can see and be seen and providing regular maintenance of facilities to promote a high quality aesthetic and welcoming station area environment can enhance the feeling of safety for users.

Lighting

Well lit environments help orient riders and offer safe passage. Particular care should be given to illuminating potential pedestrian/vehicular conflict points. “Light pollution”, or over lighting, should be avoided.

Example of a Transit Facility Designed with Safety in Mind

LEGEND

1. Lighting is critical to ensure safety for users and transit operators.
2. Provide clearly defined routes with no obstructions or barriers to and from station.
3. Ground floor transparency and building frontages offer active uses near and around transit.
4. Transit facilities should be well maintained and monitored to deter loitering and undesirable activities. Street furniture, lighting, clear sight lines can help create a sense of ownership.
5. Landscaping must be maintained to provide clear sight lines for pedestrians, bicyclist and vehicles.

16th Street Bus Mall
Denver, Colorado

CPTED

Crime Prevention through Environmental Design (CPTED) is a design methodology that focuses on reducing opportunities for crime and mitigating fear of crime to improve quality of life factors. Through the design and management of the physical environment and an increase in public safety and education, CPTED programs have increased community security. Four basic principles of CPTED that should be considered during site planning and design of public spaces include:

Territoriality

Design physical attributes that express ownership, such as fencing, signage, landscaping, and pavement treatments.

Natural Surveillance

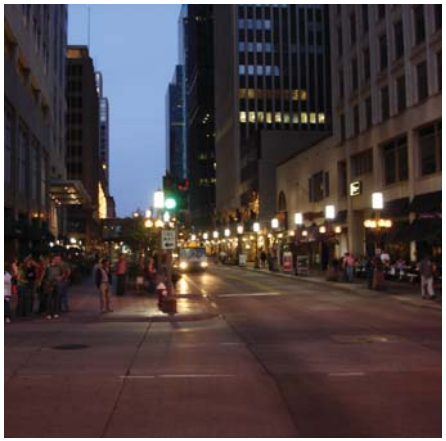
Arrange physical features, activities and people in such a way as to maximize visibility. A potential criminal is less likely to attempt a crime if he or she is at risk of being observed. At the same time, we are likely to feel safer when we can see others and be seen.

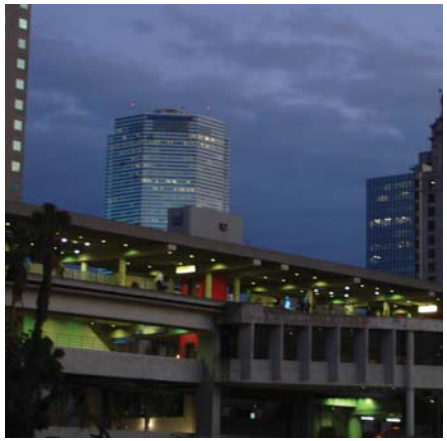
Improve Sightlines

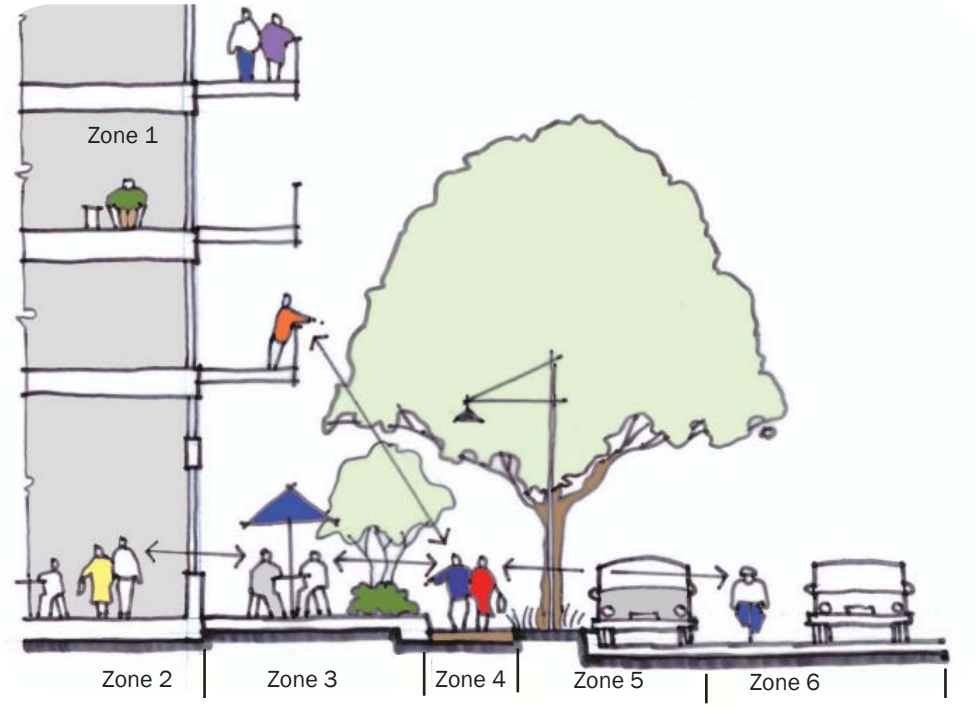
There should be clear views of surrounding areas. Design permeable barriers that do not restrict vision. Avoid features (tall vegetation, fences, etc.) that block sightlines and major access points.

Access Control

Reduce the opportunity and accessibility for crime. The physical guidance of people coming and going from a space by the appropriate placement of entrances, exits, fencing, landscaping and lighting denies a criminal's access to potential victims.







Zone 1 - Building Interior: layout of floor plan should encourage active uses towards windows to encourage more eyes on the street.

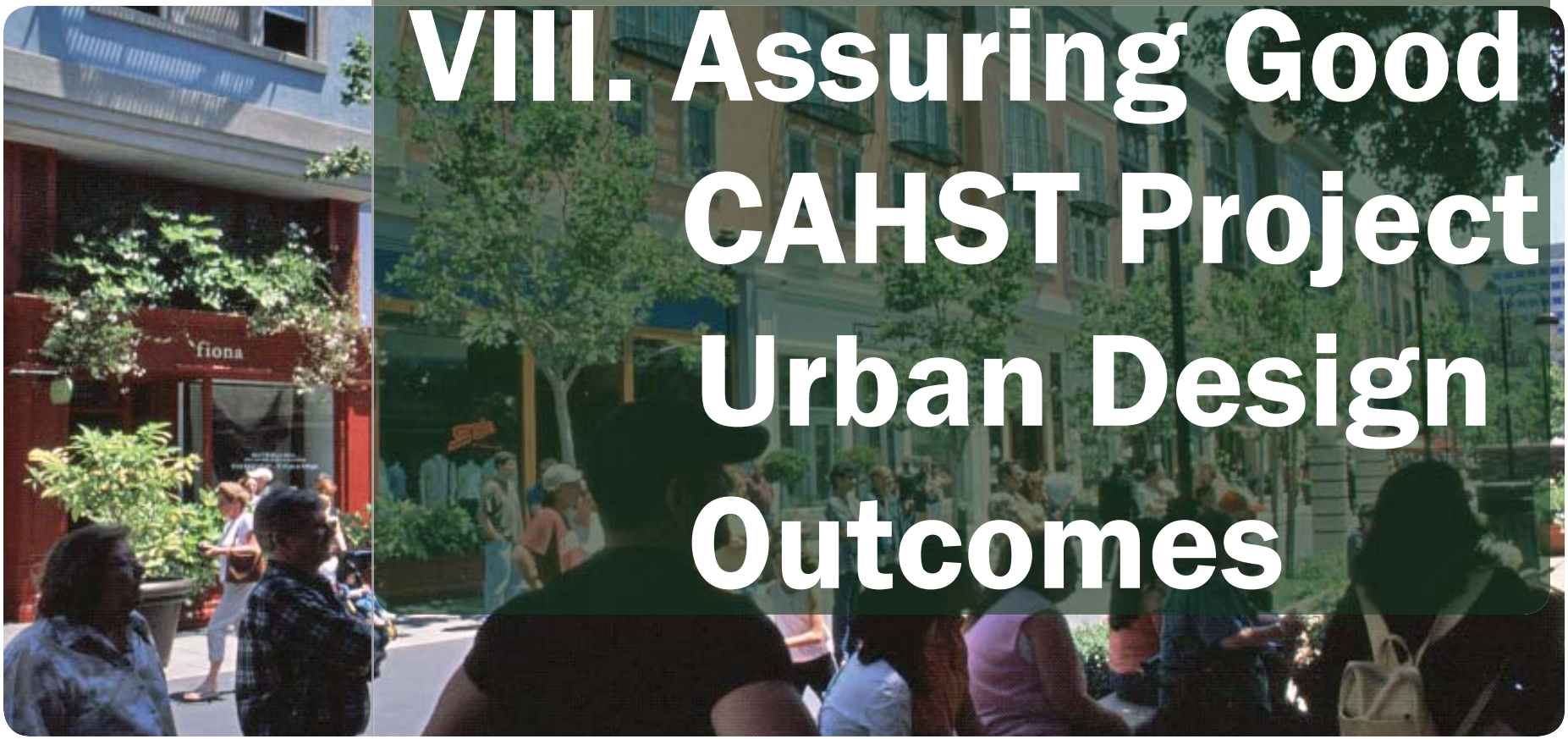
Zone 2 - Building Perimeter: access points and windows should be oriented toward the street and major pedestrian circulation.

Zone 3 - Building Yard: raised planters, plinth wall or fences provide security barrier in the building yard.

Zone 4 - Sidewalk: trees, planters, and other streetscape elements are used to promoted active pedestrian zones.

Zone 5 - Curb Lane: this zone can be designed for on-street parking or drop-offs/pick-up area to encourage active street zones.

Zone 6 - Street: design appropriate lane widths to accommodate appropriate vehicle speed. This can be determined by the uses that are planned to be located at the edges of the street.

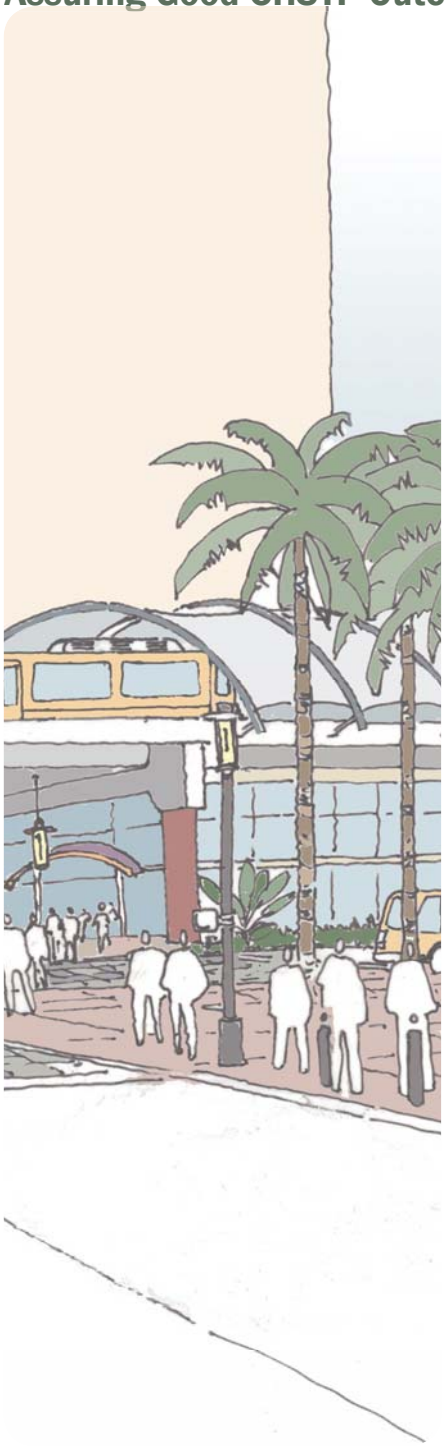


VIII. Assuring Good CAHST Project Urban Design Outcomes

TOD plans, urban design concepts and guidelines will only be as good as the programs to implement them. Just as urban design solutions must be customized to fit each community's unique characteristics and needs, the planning process used to reach consensus and develop a supporting implementation program will vary from place to place. An Urban Station District Plan can serve as the vehicle to tie all the pieces together. This chapter provides the key elements and ideas for creating station districts. Processes and checklists are laid out to lay the foundation of implementation, with the intent that individual communities will adapt them to meet their specific needs. The Denver region provides an example of a comprehensive approach for seizing the opportunity presented from a multi-billion dollar transit investment. By the end of 2010 local governments completed 36 new TOD plans, new zoning codes have been written, urban design strategies are being put into place, and transit station designs have been modified to support the community's vision for growth.

"Most people want to play a part in making better places but they need to be shown that it is achievable and how they can play a role."

Delivering Quality Places, Urban Design Compendium 2



Partnership is Essential

Maximizing community benefit from CAHST depends on cooperation and involvement. As in all partnerships, it is essential that roles, relationships, and responsibilities be defined and commitments made. The many roles and responsibilities of CAHST project stakeholders can generally be organized around three main ideas and objectives: 1) make transit work, 2) create a place, and 3) connect to community.

The Urban Station District Plan provides an overarching framework which encapsulates how 'transit, place and community' are intended to fit together and who is doing what. The attention paid to the 'edges' and interface between improvements made by parties including the California High-Speed Rail Authority, Caltrans, the local community, and private developers will greatly determine the character and function of the station as a 'place'. Typical issues that lie at this 'edge' or interface include:

- Coordination of architectural design of station area infrastructure components with surrounding context.
- High quality pedestrian connections to and from station and into the surrounding community.
- Traffic calming and high quality aesthetic design of station district streets.
- Preservation of important view corridors.
- Design and provision of station district signage and wayfinding.
- Design and provision of station district open space.

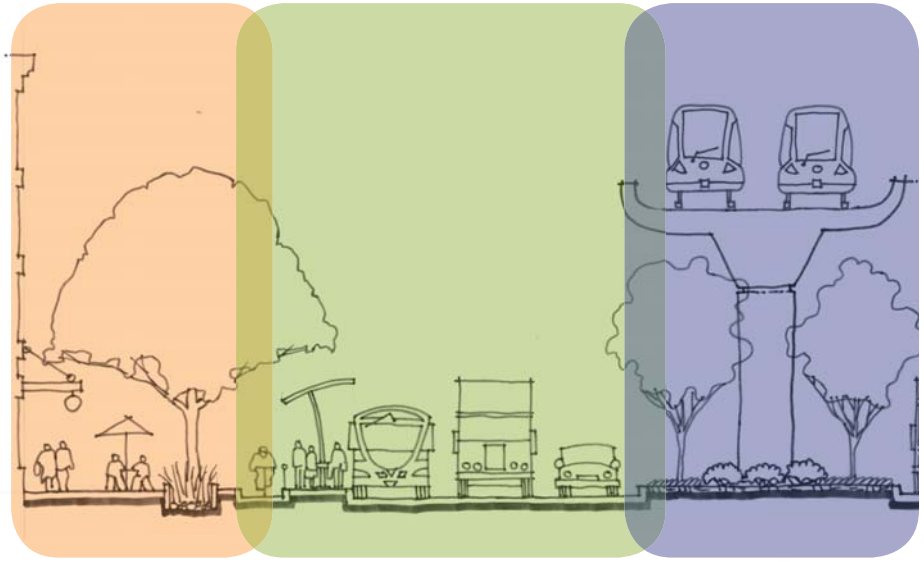
Zones of Responsibility

Great transit can complement and help make a great place. The urban design challenge is to create an environment where multiple stakeholders work together, in ways that they may or may not realize, to achieve multiple qualitative objectives. Achieving a high-quality outcome will require the support and commitment of many. The CAHST project cannot assume responsibility for every element required to make station areas successful – the project has a limited scope and budget. What the CAHST project can do is facilitate a framework which rewards and encourages great places. The challenge is that the best solutions typically cross "boundaries" and require coordination and attention to timing.

The general concept of "zones of responsibility" is a good way to begin to define where different stakeholders will be focusing their attention, yet illustrate how these zones overlap and relate. The most successful projects are those where there is a clear understanding and approach for getting ownership of "the spaces in-between" the zones of responsibility.

Adjacent Development

Adjacent station area development offers the opportunity to connect and coordinate land use with the CAHST investment. Typically, this development will be by private parties, but cities or a state agency could also be the developer. Sometimes cities, or a state agency, may be the regulatory entity responsible for reviewing development proposals in the station areas.

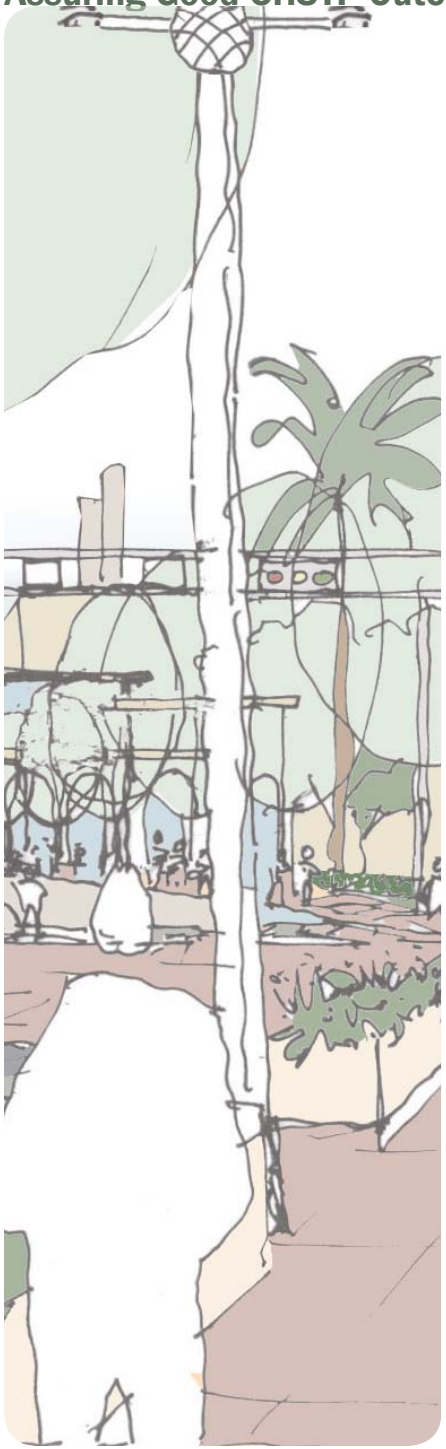


CAHST Project Envelope

The CAHST is primarily concerned with improvements within the project Right of Way (ROW) and at stations, but is also influenced by the character and function of the streets and development adjacent to this ROW. Sometimes the ROW is above streets, or may be integrated with private development. It will be necessary to consider how the project envelope overlaps with adjacent streets and development.

Adjacent Streets

Streets are essential in meeting functional requirements of vehicles in the project area, but streets' role as places of shared use – especially for pedestrians - is also essential. The numerous cities, as well as the California Department of Transportation, should work with the CAHST to make sure that streets near station areas meet the urban design needs of all users, not just motor vehicles. And the CAHST should not ignore the fact that future transit patrons need to cross streets safely if they are to access the CAHST system.



Coordination with CAHST Project

Much CAHST project planning work has already been performed as part of extensive environmental reviews, and continues today with project level refinement. In many places, a preferred station location has already been determined, selected with an eye to its role as a multi-modal hub that could help in local revitalization efforts. The next steps in applying the urban design guidelines are to understand the implications of the CAHST project corridors and alignments. Although the cities that are planned to have HST stations do not have a "blank slate" to determine the location of a HST station in their communities, they should work closely with CAHST project to refine the station designs so that they are mutually beneficial to the community and the operation of high-speed rail. Being active participants in the process to refine the specific HST station designs is the best way for cities to reduce any potential negative impacts and capture the maximum benefits for their communities.

Checklist for High-Speed Rail Station Location Refinement

The ultimate decision on station location is made by the High-Speed Rail Authority. Local governments should pay attention to how tweaking location may impact the community. Fine tuning can have big impacts on creating value and leveraging development. The following checklist can be used to assess the impacts of station locations on your community:

- Is the station location consistent with planning goals and objectives in the community's general plan?
- ☐ What will the passenger traffic associated with the station mean to the surrounding community?
- ☐ Is the station location likely to support an increase in density and creation of a walkable community?
- ☐ Which land uses, beyond the proposed station area, exist to support the higher density mix of uses?
- ☐ What is the condition and capacity of existing infrastructure?
- ☐ Are there key opportunities for redevelopment around the proposed station?
- ☐ Where does the front door of the station belong?
- ☐ What is the market for increased development in the area?
- ☐ Does the existing street network support walking, bicycling, or taking transit?
- ☐ Are there major physical barriers that hinder access to the station or within the surrounding area?
- ☐

Creating a Station District Plan

The locational advantage afforded by CAHST provides an unprecedented opportunity to spur the development of more livable and sustainable transportation hubs across the state, and guide the creation of California's new most important places. An Urban Station District Plan for the area approximately ½ mile from each CAHST station can serve as the organizing strategy to guide public and private actions. The district plan should focus on regional transit connections and the potential for additional transit that will feed into the CAHST station. The district plan is made up of:

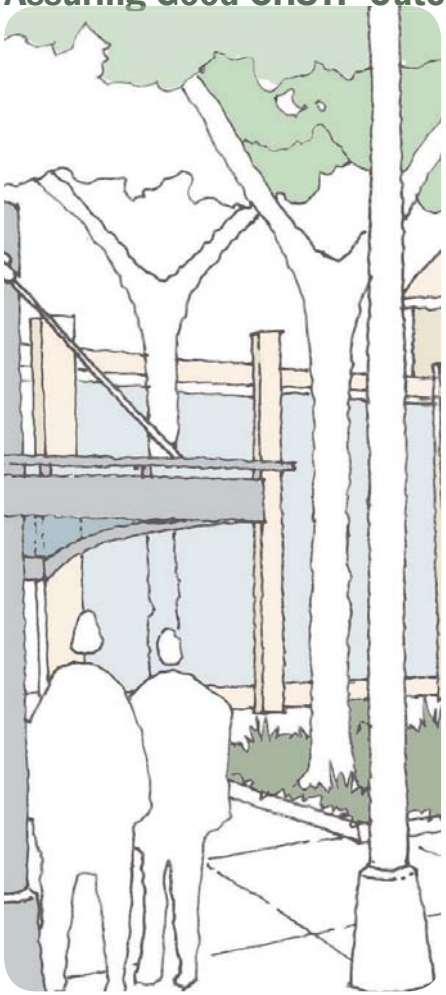
- a graphic and narrative vision for the future
- an integrated land use, transportation and open space plan
- an urban design plan and design standards
- a public finance strategy
- an implementation strategy clearing delineating roles and responsibilities

The implementation strategy provides the framework to make all of this happen: it provides the flexibility, accountability, consensus and resources necessary to achieve the vision. Policies and strategies guide the public and private actions that implement the vision. If done well, the multi-modal CAHST stations will support other opportunities for local transit corridor and district plans.

Perform Urban Design Analysis

Developing a planning strategy for the future of the urban station district should build on existing characteristics

Community Facilitation Process



of the station area and community at large. Land use, site and building design, streets, and parking will all require more detailed attention during the advanced stages of station design, with an eye to supporting high quality places and successful TOD.

Land Use

- ☐ Are key sites designated for "transit-friendly" uses and densities (walkable, mixed-use, not dominated by activities with significant automobile use, such as gas stations and drive-through services)?
- ☐ Are "transit-friendly" land uses permitted outright, not requiring special approval?
- ☐ Are auto-oriented uses discouraged or prohibited near transit?
- ☐ Are higher densities allowed near the station?
- ☐ Are multiple compatible uses permitted within buildings near the station?
- ☐ Are the first floor uses "active" and pedestrian-oriented?
- ☐ Is a mix of uses generating pedestrian traffic concentrated within walking distance of the station?

Site & Building Design

- ☐ Are buildings and primary entrances sited and oriented to be easily accessible from the street?
- ☐ Do the designs of buildings and the spaces around them allow direct pedestrian movement between transit, mixed land uses, the station, and surrounding areas?
- ☐ Is there potential within the station area for the intensification of densities over time?
- ☐ Do buildings incorporate architectural features that convey a sense of place and relate to the street and the pedestrian environment?
- ☐ Are amenities, such as storefront windows, awnings, architectural features, lighting, seating, and landscaping, provided to help create a comfortable pedestrian environment along and between buildings?
- ☐ Are there sidewalks along the site frontage? Do they connect to sidewalks and streets on adjacent and nearby properties?
- ☐ Are there trees sheltering streets and sidewalks? Pedestrian-scale lighting? Places for people to sit and mingle?
- ☐ Are buildings and parks used to provide a focal point or anchor the area?

Street Patterns & Parking

- ☐ Are street patterns based on a grid/interconnected system that simplifies access for all modes?

Facilitating ownership of the 'spaces in-between' is the key to creating great places with transit.

- ☐ Are pedestrian routes buffered from fast-moving traffic and expanses of parking?
- ☐ Is there a cohesive network of bicycle routes?
- ☐ Are parking requirements reduced in close proximity to station, compared to the norm?
- ☐ In high density areas, is structured parking encouraged over surface parking?
- ☐ Is the parking located to the rear or to the side of the buildings?
- ☐ Is secure and convenient bicycle parking available at important destinations?
- ☐ Is parking currently managed in the station area?

Alternatives

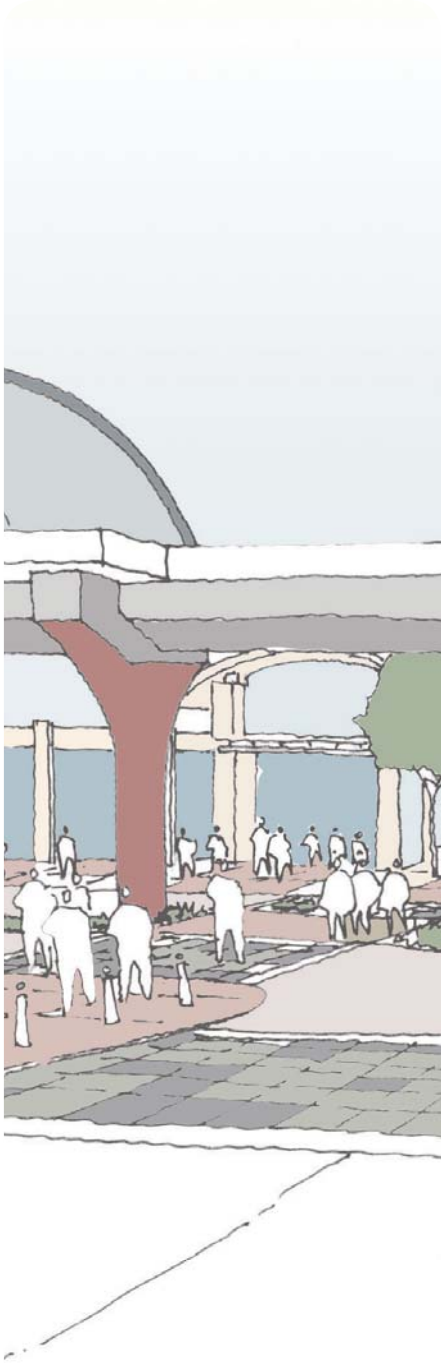
Once the current condition of the station district is understood, the stakeholders should then be collectively involved in determining what the station district plan should include to take full advantage of high-speed rail. This stakeholder involvement may occur in a wide variety of ways, but an important common element is active participation by the stakeholders in creating the plan and implementing strategy. During a design charrette, the public can literally have a hand in sketching the future by working through a three step process of brainstorming, distilling and refining:

Step One: Ask stakeholders to create as many conceptual plans as their imaginations will allow.
Step Two: Distill the conceptual plans into several alternatives that are reviewed and evaluated.
Step Three: Create a preferred Station District Plan.

Station District Plan Elements

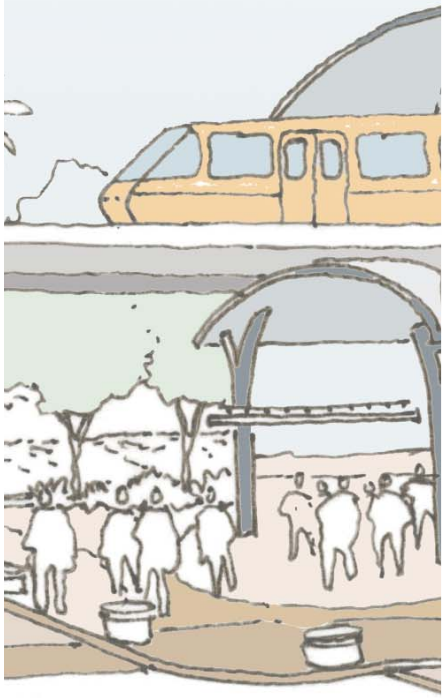
A station district plan created by the public process described above should provide a clear vision and planning policy, design guidelines, roles and responsibilities for implementation. Example elements of what the district plan should include are:

- Community vision.
- Land use, including mix and intensity.
- Transportation, including circulation and parking.
- Urban parks and open spaces.
- Urban design, including guidelines.
- General plan, specific plan (where applicable), and regulatory amendments to support the urban station district plan.
- Implementation strategy, including roles and responsibilities for implementation and, as appropriate, public finance and affordable housing.
- Bike and Pedestrian Access.



Strategy

Comparing existing conditions with a preferred urban station district plan will reveal gaps between what the community “has” and what it “wants” as first steps to answering the implementation question “how



do we get there?" Answering the "how" question requires the creation of an implementation strategy with recommendations for future development and redevelopment within the urban station district. Phased capital improvements, system management, and financing should be addressed. Regional transit connections will also be essential requirements to address.

Developing an Implementation Strategy

The adoption of a station area TOD plan will not mean that it will be automatically implemented. It is the first of many coordinated steps, which will need to be made over several years. Successful implementation of an urban station district plan will require a strong partnership between CAHST project, local government, other government agencies, the private sector, and the community to take full advantage of this public transportation investment and the development potential of the station area.

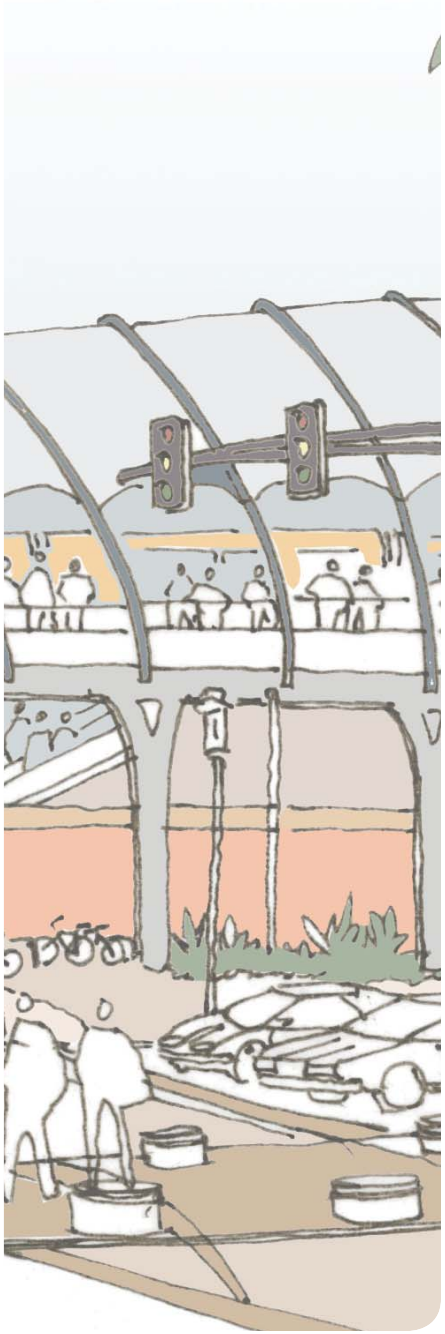
Experience from successful planning programs consistently demonstrates the importance of strong partnerships between all levels of government, the private sector, and the community. Like the plans themselves, the implementation strategy must be tailored to the local community. However, two important elements are recommended: 1) prioritize and implement action items, and 2) form a working group.

Action Items

In order for the station district plan to become reality, the roles, responsibilities and actions of all those implementing the plan need to be identified. Those specific action items also need to be evaluated and

prioritized for implementation. A comprehensive project and activities list could include the specific actions, roles, responsibilities and schedule for the following elements:

- **Planning and Administration**. Clear responsibilities for implementation must be established. This would include assigning responsible staff to draft the necessary plan amendments for adoption and to support the working group; setting project priorities; facilitating coordination between government agencies; and creating appropriate funding mechanisms to implement the plan.
- **Transit-Oriented Development Catalyst Projects.** The activities to encourage catalyst projects could include working cooperatively with property owners; identifying financing and other methods to encourage redevelopment projects; and developing TOD pilot projects to encourage subsequent development that is consistent with the plan vision.
- **Circulation, Streets, Parking, and Supporting Infrastructure.** Prioritizing, financing, and constructing transportation and infrastructure improvements identified in the plan will require the focused attention of the Working Group. Access for all modes will be critical to the successful operation of the HST station. Parking in the station area will need to be monitored to ensure that the station and surrounding uses are all adequately served.
- **Open Space and Public Realm.** Creating a station where people want to be will depend in part on the quality of the public spaces where people relax and interact. These public spaces become increasingly important as the density of the station area becomes greater.



Working Group

To oversee the implementation of the action items, a “Working Group” should be created including various city/county departments, CAHST project, neighborhood representatives, and key members of the private sector. The working group’s primary focus should be to span jurisdictional and agency boundaries to facilitate collaboration and guide the implementation of transit-oriented development in the HST station area. Ideally, the members of the working group should have the authority to speak on behalf of their respective organizations and make decisions.

This group should meet regularly, with technical support from agency staff responsible for day-to-day management of the implementation strategy and individual tasks and projects. Other interests or subcommittees for individual station areas could also be included and formed depending upon the desires of the participants. What is of the utmost importance is to have a focused and organized framework for implementing the plan for a station area.

Weblinks

http://www.reconnectingamerica.org/public/tod
Center for Transit Oriented Development

http://www.railvolution.com/
Rail~Volution resources link includes dozens of TOD PowerPoints

http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_rpt_102.pdf
TCRP 102 Transit-Oriented Development In The United States: Experiences, Challenges, and Prospects. Transit Cooperative Research Program

http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_128.pdf
TCRP 128 Effects of TOD on Housing, Parking, and Travel

http://www.uli.org/ResearchAndPublications/Reports/~/media/Documents/ResearchAndPublications/Reports/TenPrinciples/TP_DevTransit.ashx
ULI 10 Principles for Development Around Transit

http://www.brookings.edu/es/urban/publications/belzertod.pdf
Transit-Oriented Development: Moving From Rhetoric To Reality, Dena Belzer and Gerald Autler, Brookings Institution Center on Urban and Metropolitan Policy

http://transbaycenter.org/media-gallery/image-gallery
Transbay Joint Powers Authority

http://www.calatrava.com
Santiago Calatrava

http://www.oregon.gov/LCD/TGM/modelCode05.shtml
Oregon Department of Transportation

Journals, Books, and Publications

Arlington County, "Development in Metro Corridors 2000," Department of Community Planning Housing and Development, Planning Division, Arlington County, VA.

Arrington, G.B. "Light Rail and the American City: State-of-the-Practice for Transit-Oriented Development". Washington D.C. Transportation Research Circular E-C058, 2003.

Arrington, G.B., and Robert Cervero. *Effects of TOD on Housing, Parking and Travel.* Transit Cooperative Research Program Report 128, Transportation Research Board of the National Academies, Washington D.C., 2008.

Cambridge Systematics, Inc. "Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions". Urban Land Institute. July 2009.

Congress for the New Urbanism, Charter of the New Urbanism, 2000.

Cervero, Robert, et.al. *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects.* Transit Cooperative Research Program, Report 102 Transportation Research Board of the National Academies, Washington D.C., 2004.

Department of Communities and Local Government: London, Preparing Design Codes: A Practice Manual, November 2006.

Dittmar, Hank and Ohland, Gloria. *The New Transit Town: Best Practices in Transit-Oriented Development.* Island Press. Washington, D.C. 2004.

English Partnerships, Urban Design Compendium, August 2000.

Frank, Lawrence, Martin Andresen, and Tom Schmid. "Obesity Relationships with Community Design, Physical Activity and Time Spent in Cars," *American Journal of Preventative Medicine.* Volume 27, Issue 2, pp. 87-96.

Johaentges, Karl; *Hannover: Duetsch/English/Francias*; Kajo-Verlag, Hannover 2009

Livable Communities Act of 2009, Senate Bill 1619. Introduced in United States Senate, August 8, 2009.

Logan Simpson & Dye, Pedestrian Area Policies and Design Guidelines, Maricopa Association of Governments, October 1995.

Metro, Creating Livable Streets: Street Design Guidelines for 2040, June 2002.

Metro, Green Streets: Innovative Solutions for Stormwater and Stream Crossings, June 2002.

Myers, Dowell, and Elizabeth Gearin. "Current Preferences and Future Demand for Denser Residential Environments," *Housing Policy Debate.* Volume 12, Issue 4, pp. 633-659.

National CPTED Association, Atlas Safety and Security Design, and Urban Design Collaborative.

O'Sullivan, Sean, and John Morrall. "Walking Distances to and from Light-Rail Transit Stations,"_*Transportation Research Record: Journal of the Transportation Research Board, No. 1538,* Transportation Research Board of the National Academies, Washington D.C., 1996, pp. 19-26.

Parsons Brinckerhoff. "Factors for Success in California's Transit-Oriented Development". Sacramento: California Department of Transportation, Statewide Transit-Oriented Development Study. 2002.

Parsons Brinckerhoff. "North Fifth Street Transit-Supportive Concept Plan". City of North Las Vegas: Planning and Zoning Department, Transit Oriented Development Strategy. 2006.

PriceWaterhouseCoopers. "Emerging Trends in Real Estate 2009" Urban Land Institute. October 2008.

Puget Sound Regional Council, "Creating Transit Station Communities in the Central Puget Sound Region – A Transit-Oriented Development Workbook", June 1999.

Reconnecting America's Center for Transit-Oriented Development. *Five Years of Progress.*_ 2009.

Reconnecting America's Center for Transit-Oriented Development. *Hidden in Plain Sight: Capturing the Demand for Housing Near Transit.* Sept 2004.

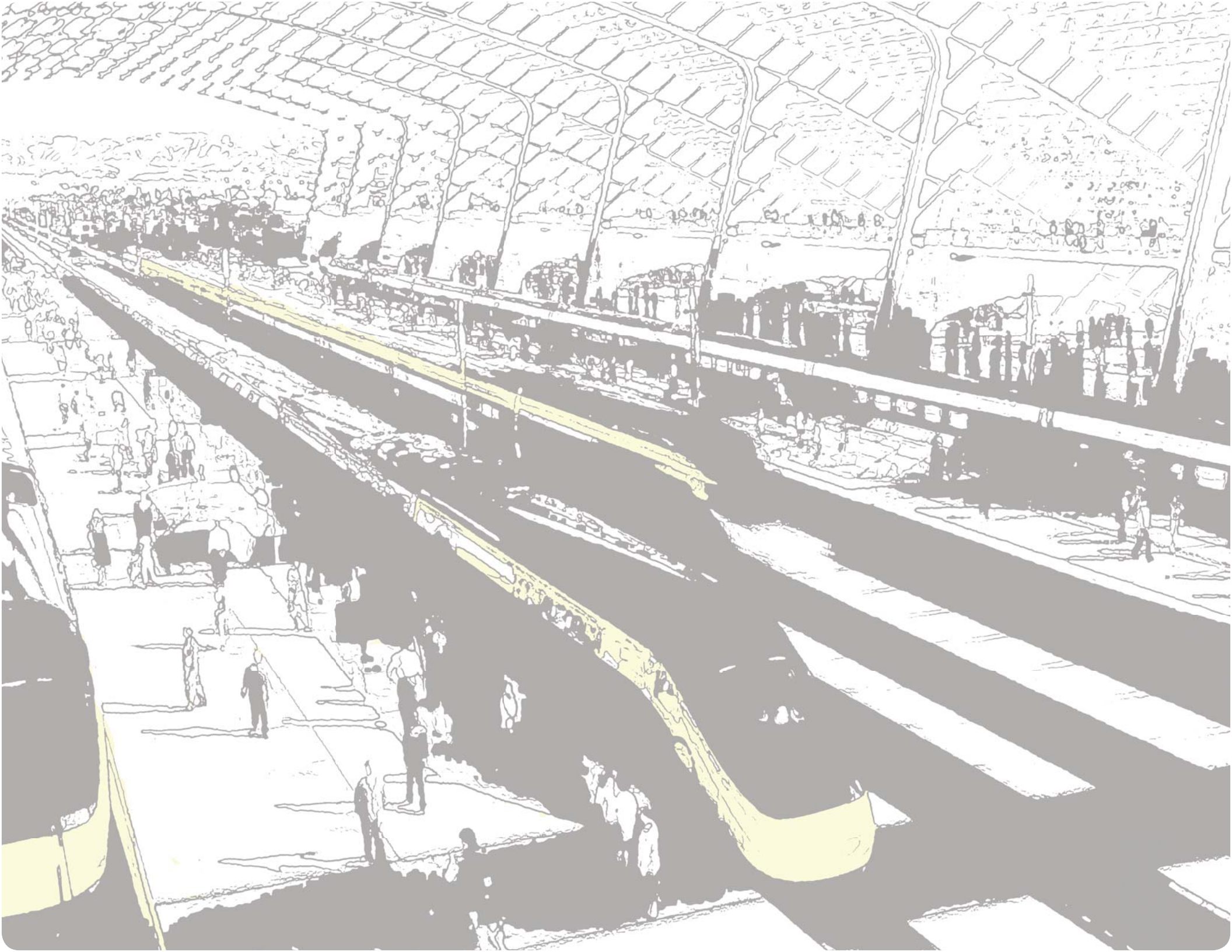
Reconnecting America's Center for Transit-Oriented Development. *Realizing the Potential: Expanding Housing Opportunities Near Transit.* April 2007.

Reconnecting America's Center for Transit-Oriented Development. *TOD 101: Why Transit-Oriented Development And Why Now?* 2007.

Reconnecting America's Center for Transit-Oriented Development. *TOD 202: Station Area Planning: How to Make Great Transit-Oriented Places.* February 2008.

Schmitz, Adrienne and Scully, Jason. Creating Walkable Places: Compact Mixed-Use Solutions, Urban Land Institute, 2006.

Transportation and Growth Management Program, Oregon Department of Transportation, Model Development Code and User's Guide for Small Cities, 2nd Edition.

Transportation and Growth Management Program, Oregon Department of Transportation, Main Street...when a highway runs through it: A Handbook for Oregon Communities, November 1999.

Venner, Marie and Liisa Ecola. "Financing Transit-Oriented Development: Understanding and Overcoming Obstacles," *Transportation Research Record: Journal of the Transportation Research Board, No. 1996*, Transportation Research Board of the National Academies, Washington D.C., 2007.