

Brawley Main Street Plan

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APPENDIX TWO-A: DEFINITIONS AND GLOSSARY

Accessibility: The ability to physically reach desired destinations, services and activities.

Access Management: The management of the interference with through traffic caused by traffic entering, leaving and crossing thoroughfares. It is also the control and regulation of the spacing and design of driveways, medians, median openings, traffic signals and intersections on arterial streets improve safe and efficient traffic flow on the road system.

Amenity Zone: A hardscaped extension of the sidewalk to the back-of-curb, typically used instead of, or alternating with, a planting strip. Provides space for street furnishings (benches, trashcans, etc.) and street trees outside of the unobstructed walking space for pedestrians.

Bicycle Lane: The portion of the street specifically designated for the use of bicyclists by pavement markings or other means of delineation on the street. Provides a clearly marked area of the street for bicycle travel and separates cyclists from motor vehicles, and helps reduce conflicts between motor vehicles and bicycles.

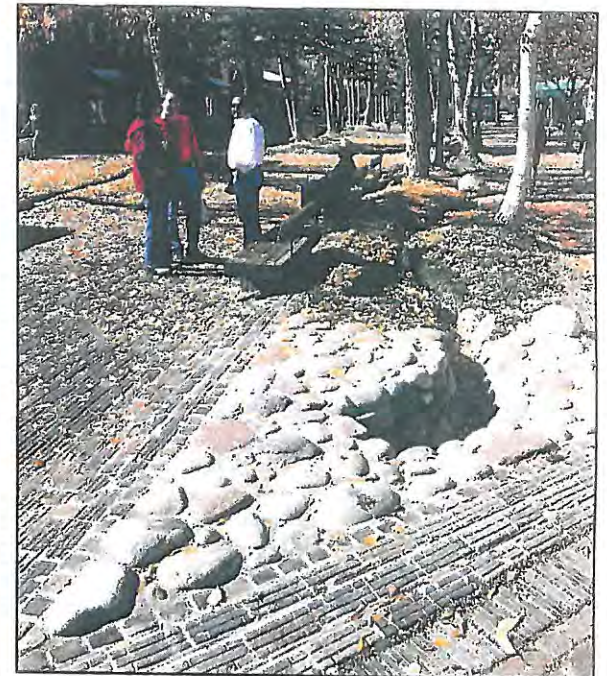
Block Length: The longest dimension of a block, from intersection to intersection. Smart Growth Guidelines recommend relatively short block lengths for most street types. Block lengths help determine the overall “density” of the street network, with shorter blocks generally creating a denser network. Shorter blocks (and a denser network) help disperse traffic through the network, rather than focusing it on a few routes. The fewer route choices, the greater the likelihood that the routes will become congested. A

denser network provides more route choices for all travelers by all modes and helps keep traffic speeds low.

Connectors, Links, Paseos Trails: Any travelway that links pathways, walkways or sidewalks between properties, available for use by all people. In town centers these paseo (passage-way) travelways are highly formalized, while in suburban or rural areas these connecting spaces are quite informal public ways. Many times rural spaces are not paved.

Context Sensitive Solutions: CSS is the result of developing transportation projects that serve all users and are compatible with the surroundings through which they pass—the community and environment. Successful CSS results from a collaborative, multidisciplinary and holistic approach to transportation planning and project development.

Conventional Neighborhood Development (CND) Pattern: Current planning and zoning practices dictate separations of land uses, wide, long curvilinear streets, broken connectivity, with a strong prevalence of single family housing. Due to size, scale, broken connectivity and



lack of neighborhood diversity
Conventional Land Development is not considered walkable.

Traditional Neighborhood Development

(TND) Pattern: Historic planning based on high connectivity, mixed land uses, significant open space, narrow streets, short blocks, diversity of housing stock and walking scale for most travel. New Urbanism is comprised of TND style development. Wheeled uses are restricted to certain ages, speeds or uses.

Crosswalks: The crosswalk generally refers to the most direct pedestrian pathway across a given leg of an intersection, whether marked or unmarked. For the purposes of these Guidelines, however, "crosswalk" refers to the marked portion of the street that is specifically designated for pedestrian crossing, whether at an intersection or a mid-block crossing. Crosswalks clearly define the pedestrian space, enhancing safety and comfort for all users. Crosswalks are an important part of the pedestrian network - they form a continuation of the pedestrian's travel path and enhance pedestrian connectivity. Crosswalks support the overall transportation system because other users, such as motorists, bicyclists and transit users will be pedestrians at some point during their trip and may need to cross the street.

Curb extension: A feature that extends from the sidewalk into the pavement at an intersection or at a mid-block crossing (also sometimes called a "curb bulb", "neckdown" or "bulbout"). A curb extension can be hardscape, landscaped, or a mix of both. Reduces street width both physically and visually, thereby shortening pedestrian. Reduced crossing distance at crosswalks and potentially helping to reduce traffic speeds. Provides increased visibility for pedestrians and

motorists. Moves parked vehicles away from street corners, improving visibility and access for large vehicles.

Curb Radius: The curved section of the curb connecting the curb lines of two intersecting streets. The curb radius measurement is taken from the back of the curb. Defines the space for (and helps direct) vehicle turning movements at intersections. The curb radius dimension can affect ease and speeds of vehicular turning movements.

Healthy Streets: Streets designed specifically to "complete" a street. Speeds are kept under control. The desired speed (e.g. 25 mph) is maintained through design features that include streetscape, use of parking, bike lanes, travel lane widths, wide edge stripes, block lengths, intersection treatments, number of lanes and other controls.

Healthy Intersection: Any intersection where motorist and pedestrian behaviors are highly predictable, safe and comfortable. Effective designs keep motorists in motion at low to moderate speeds. High levels of access are provided on all

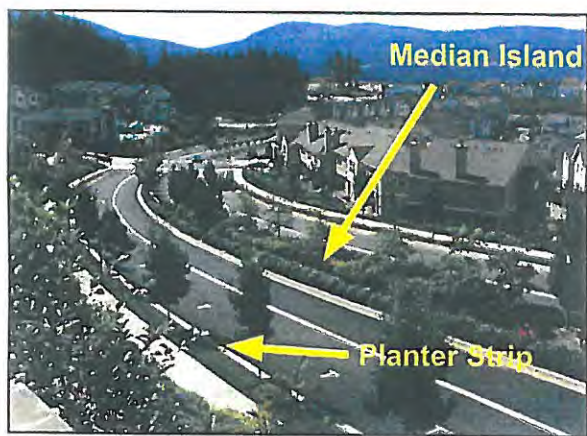




corners. Sight lines are appropriate to the desired and actual running speed.

Leading Pedestrian Interval (LPI): Used at signalized intersections, the Leading Pedestrian Interval (LPI) is a signal phase that provides a pedestrian crossing signal a few seconds before the green signal for vehicles. Allows pedestrians to enter the crosswalk ahead of turning vehicles, thereby establishing their right-of-way. Improves visibility of pedestrians by providing them with a “head start” before vehicles are allowed to move. Reduces potential conflicts with turning vehicles.

Median: A raised barrier that separates traffic flows. Generally used to control access and reduce vehicular turning movements. Separates opposing traffic flows, reducing or eliminating vehicular conflicts. Can be used for access management, by restricting turning movements into driveways or side streets. If properly designed, can provide a pedestrian and bicycle refuge on wider streets. If properly designed, can provide a landscaped element to the streetscape.



On-Street Parking—Generally refers to space for parking cars within the street right-of-way (between the curbs), as opposed to off-street parking areas accessed via driveways. Provides improved access to nearby land uses, especially in higher density neighborhoods and commercial areas. Reduces the need for large, off-street parking areas. Provides a buffer between moving vehicles and pedestrians on the sidewalk. On-street parking can narrow the perceived right-of-way width and help reduce traffic speed.

Planting Strip: An unpaved area within the right-of-way that separates the street from the sidewalk. Serves as a buffer between vehicles and pedestrians. Trees in the planting strip provide shade and additional buffering for pedestrians. This unpaved area can enhance the storm-water drainage system by helping to reduce run-off. If properly designed, the planting strip can soften the appearance of the streetscape, enhance aesthetics, and contribute to an increased sense of safety and identity along the street. Planter strips also allow space to take up elevation changes to driveways for added ADA compliance.

Road Diet: A physical conversion of the street, wherein one or more travel lanes is converted to another use, often to support the use of other modes. A “narrowing” of the motor vehicle travelway. Converts excess vehicle capacity on a street into useable space for other modes. For example, a four-lane street might be narrowed to two lanes, with bike lanes and a median. When a street is dieted to two lanes, this helps to calm traffic, in part by eliminating the opportunity for passing, thus allowing the prudent driver to set the speed. Can enhance aesthetics and livability of adjacent land uses.

Roundabout: A circular island located at the convergence of two or more roadways that takes the place of traffic signals or stop signs. Traffic circulates around the island, rather than through the intersection. Can be used to improve traffic flow, by eliminating the need to come to a complete stop when the intersection is clear and/or reducing the delay if other vehicles are in the intersection. May be used as a gateway feature to a neighborhood or a commercial area. This usually entails the use of landscaping or public art in the island. May be used to improve safety (80-90% reduction in personal injury crashes, and a 50% reduction in pedestrian crashes), and to keep roadways to a lower number of lanes. Small roundabouts, known as traffic circles, mini circles or mini roundabouts, can also be used for traffic calming because, even though relatively free flow is maintained, the island deflects traffic, requiring that motorists slow before entering the traffic circle.

Sight Distance: The length of roadway that is visible to the driver traveling on a street or approaching (or waiting to enter) an intersection. More generally, sight distance refers to the ability of motorists to see one another as they approach an intersection or enter a street. Increased sight distance improves safety for motorists and pedestrians, by providing visibility and increasing the amount of time to respond to other vehicles and pedestrians on or entering the street. Increased sight distance for motorists entering the street allows the motorist to feel more comfortable and better judge “gaps” in the stream of approaching vehicles. Adequate sight distance improves safety for pedestrians and cyclists by making them more visible to drivers and by allowing them to see approaching vehicles, as well.

Street Lighting: Refers to the illumination of a street’s travel lanes. Other portions of the street right-of-way may also be illuminated by the street lighting and/or by pedestrian-scale lighting, which specifically illuminates the sidewalk or other pedestrian areas. Street lighting enhances safety for all travelers, by illuminating hazards, curves, and other travelers in the street. Lighting can also improve safety and security around buildings and in parking areas. This may best be accomplished by a mix of street and pedestrian-scale lighting, depending on the context.

Streetscape: The combination of the physical elements installed within and along the street right-of-way that impact its usability, functionality, appearance and identity. Streetscape elements include medians, trees in planter strips, curb extensions, parking, bike and travel lanes. Colorized, textured or patterned streets, or portions of streets are also considered part of a streetscape. Good streetscapes enhance a street’s functionality and aesthetics. Good streetscapes enhance the community environment by providing access to land uses, locations for social interaction, and sites for locating and maintaining infrastructure and amenities.



Roundabout



Mini Circle



Sight Line and Curb Extension



Street Lighting



Streetscape

Street, Roadway: Public ways designed to carry all types of movements; including pedestrians, bicycles, motor vehicles. All space inside curbs or paved edge.

Highway: Total right-of-way of a public way; some or all of which may be paved. Sidewalks and many trails are included in highway rights-of-way.

Posted Speed: Actual signed and legal maximum speed of a roadway section.

Design Speed: the design speed of a roadway is the speed selected by the street designer to allow for various geometric features, including sight lines. There has been a general practice to use a higher design speed (5-10- mph higher than the posted legal) speed)). This has the unintended consequence of creating comfort to travel faster, and hence induce speed.

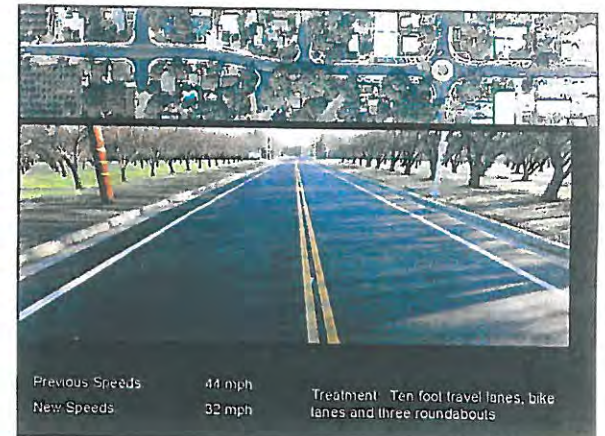
Desired Speed: That speed appropriate to the land use and travel setting. Many specialists recommend that street elements (lane widths, number of lanes, trees, building placements) should create a comfort level for the speed desired for the mission of a roadway, including pedestrian comfort and safety.

85th Percentile Speed: A term used to explain a new posting of a speed along a roadway based on that percentage of motorists (85 percent) traveling at or below this speed. If 85 percent of motorists are at or below 40 mph, it is general practice to post the speed at this level. Citizens are often concerned when this happens, since they know it is difficult to write a ticket in their neighborhood until a motorist exceeds the posted speed by 6-9 mph. Often the 85th percentile speed and the desired speed can be 5-15 mph apart.

Running Speed: Long term actual speed of motorists using a roadway section. Many specialists call for working out designs to get the running speed and desired speed within 1-3 mph of one another.

Traffic Calming and Traffic Management:

Any single or series of treatments used to distribute traffic volumes and control the speed of traffic. Most traffic calming should be visual (treescapes, on-street parking, lane widths and striping). Horizontal deflection (curb extensions, medians are used to slow traffic in some cases where visual effects are insufficient, and in fewer cases Vertical deflections (speed tables, raised intersections and speed humps) are used to control speed.



Walkways: All pathways, sidewalks, trails, bridges, and connections, whether improved or not allowing a person to travel from one area to another.

Sidewalks: Formal designated place for walking; most often along a roadway. No motorized vehicle of any kind is permitted to use sidewalks. Bicycles and other nonmotorized

Walkable: Streets and places designed or reconstructed to provide safe and comfortable environments for pedestrians, and are safe and easy to cross for people of all ages and abilities. Walkable streets and places provide a comfortable, attractive and efficient environment for the pedestrian including an appropriate separation from passing traffic, adequate width of roadside to accommodate necessary functions, pedestrian-scaled lighting, well-marked crossings, protection from the elements (such as, street trees for shade, awnings or arcades to block rain), direct connections to destinations in a relatively compact area, facilities such as benches, attractive places to gather or rest such as plazas and visually interesting elements (such as, urban design, streetscapes, architecture of adjacent buildings).

Walkable Communities: Walkable communities are desirable places to live, work, learn and play, and therefore a key component of smart growth. Their desirability comes from two factors. First, locating, within an easy and safe walk, goods (such as housing, offices and retail) and services (such as transportation, schools, libraries) that a community resident or employee needs on a regular basis. Second, by definition, walkable communities make pedestrian activity possible, thus expanding transportation options and creating a streetscape that better serves a range of users—pedestrians, bicyclists, transit

riders and drivers. To foster walkability, communities must mix land uses and build compactly, provide connectivity, a diversity of land use and ensure safe and inviting pedestrian corridors.

Additional Sources of Definitions:

Victoria Transport Policy Institute. TDM Encyclopedia Glossary. May 10, 2005. www.vtpi.org/tdm/tdm61.htm.

Federal Highway Administration. FHWA Functional Classification Guidelines, Section II. Concepts, Definitions, and System Characteristics. April 2000. www.fhwa.dot.gov/planning/fcsec2_1.htm.

Metropolitan Transportation Commission (San Francisco Bay Area). Arterial Operations Program Ped/Bike Safety Toolbox. April 2003. www.bayareatrafficsignals.org/toolbox/Tools/BikeBlvd.html



APPENDIX TWO-B: FUNDING AND FEDERAL PROGRAMS

Bicycle and Pedestrian Provisions of the Federal-aid Program

Section 217 of Title 23 of the U.S. Code calls for the integration of bicycling and walking into the transportation mainstream. Importantly, it enhances the ability of communities to invest in projects to improve the safety and practicality of bicycling and walking for everyday travel.

In 1991, Congress passed landmark transportation legislation, the Intermodal Surface Transportation Efficiency Act (ISTEA), that recognized the increasingly important role of bicycling and walking in creating a balanced, intermodal transportation system.

The National Bicycling and Walking Study, published by the U.S. Department of Transportation in 1994, translated this renewed interest in nonmotorized travel into two specific goals: to double the percentage of trips made by foot and bicycle while simultaneously reducing the number of crashes involving bicyclists and pedestrians by 10 percent.

Subsequent legislation provides the funding, planning, and policy tools necessary to create more walkable and bicycle-friendly communities.

A bicycle transportation facility is “a new or improved lane, path, or shoulder for use by bicyclists and a traffic control device, shelter, or parking facility for bicycles.” The definition of a pedestrian includes not only a person traveling by foot but also “any mobility impaired person using a wheelchair.” *23 USC Section 217 (j)(1)*

Funding Sources for Bicycle and Pedestrian Projects

Bicycle and pedestrian projects are broadly eligible for funding from almost all the major Federal-aid highway, transit, safety, and other programs. Bicycle projects must be “principally for transportation, rather than recreation, purposes” and must be designed and located pursuant to the transportation plans required of States and Metropolitan Planning Organizations.

Federal-aid Highway Program

National Highway System funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System, including Interstate highways. *23 USC Section 217 (b)*

Surface Transportation Program (STP)

STP funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as maps, brochures, and public service announcements) related to safe bicycle use and walking. TEA-21 added “the modification of public sidewalks to comply with the Americans with Disabilities Act” as an activity that is specifically eligible for the use of these funds. *23 USC Section 217 (a)*

Transportation Enhancement Activities (TEAs)

Ten percent of each State’s annual STP funds are set-aside for TEA projects. The law provides a specific list of activities that are eligible TEAs and this includes “provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists,” and the “preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails).” *23 USC Section 109 (a)(35)*

Hazard Elimination and Railway-Highway Crossing programs

Another 10 percent of each State’s STP funds is set-aside for these projects, which address bicycle and pedestrian safety issues. Each State is required to implement a Hazard Elimination Program to identify and correct locations which may constitute a danger to motorists, bicyclists, and pedestrians. Funds may be used for activities including a survey of hazardous locations and for projects on any publicly owned bicycle or pedestrian pathway or trail, or any safety-related traffic calming measure. Improvements to railway-highway crossings “shall take into account bicycle safety.” *23 USC Section 152*

Congestion Mitigation and Air Quality Improvement Program

These funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as maps, brochures, and public service announcements) related to safe bicycle use. *23 USC Section 217 (a)*

Recreational Trails Program

These funds may be used for all kinds of trail projects. Of the funds apportioned to a State, 30 percent must be used for motorized trail uses, 30 percent for nonmotorized trail uses, and 40 percent for diverse trail uses (any combination). *23 USC Section 206*

Federal Lands Highway Program

Provisions for pedestrians and bicyclists are also eligible under various categories of this program, in conjunction with roads, highways, and parkways. Priority for funding projects is determined by the appropriate Federal Land Agency or Tribal government. *23 USC Section 204*

National Scenic Byways Program

These funds may be used for “construction along a scenic byway of a facility for pedestrians and bicyclists.” *23 USC Section 162 (c)(4)*

Job Access and Reverse Commute Grants

These grants are available to support projects, including bicycle-related services, designed to transport welfare recipients and eligible low-income individuals to and from employment. *TEA-21 Section 3037*

High Priority Projects and Designated Transportation Enhancement Activities

Identified by Section 1602 of TEA-21, these include numerous bicycle, pedestrian, trail, and traffic calming projects in communities throughout the country.

Federal Transit Program

Title 49 U.S.C. (as amended by TEA-21) allows the **Urbanized Area Formula Grants, Capital Investment Grants and Loans, and Formula Program for Other than Urbanized Area** transit funds to be used for improving bicycle and pedestrian access to transit facilities and vehicles. Eligible activities include investments in “pedestrian and bicycle access to a mass transportation facility” that establishes or enhances coordination between mass transportation and other transportation. *49 USC Section 5307*

TEA-21 also created a **Transit Enhancement Activity** program with a one percent set-aside of Urbanized Area Formula Grant funds designated for, among other things, pedestrian access and walkways, and “bicycle access, including bicycle storage facilities and installing equipment for transporting bicycles on mass transportation vehicles”. *49 USC Section 5307(k)*

Highway Safety Programs

Pedestrian and bicyclist safety remain priority areas for **State and Community Highway Safety Grants** funded by the Section 402 formula grant program. A State is eligible for these grants by submitting a Performance plan (establishing goals and performance measures for improving highway safety) and a Highway Safety Plan (describing activities to achieve those goals). *23 USC Section 402*

Research, development, demonstrations and training to improve highway safety (including bicycle and pedestrian safety) is carried out under the Highway Safety Research and Development (Section 403) program. *23 USC Section 40.*

Federal/State Matching Requirements

In general, the Federal share of the costs of transportation projects is 80 percent with a 20 percent State or local match. However, there are a number of exceptions to this rule.

- Federal Lands Highway projects and Section 402 Highway Safety funds are 100 percent Federally funded.
- Bicycle-related Transit Enhancement Activities are 95 percent Federally funded.
- Hazard elimination projects are 90 percent Federally funded. Bicycle-related transit projects (other than Transit Enhancement Activities) may be up to 90 percent Federally funded.
- Individual Transportation Enhancement Activity projects under the STP can have a match higher or lower than 80 percent. However, the overall Federal share of each State's Transportation Enhancement Program must be 80 percent.
- States with higher percentages of Federal Lands have higher Federal shares calculated in proportion to their percentage of Federal lands.
- The State and/or local funds used to match Federal-aid highway projects may include in-kind contributions (such as donations). Funds from other Federal programs may also be used to match Transportation Enhancement, Scenic Byways, and Recreational Trails program funds. A Federal agency project sponsor may provide matching funds to Recreational Trails funds provided the Federal share does not exceed 95 percent.

Planning for Bicycling and Walking

States and Metropolitan Planning Organizations (a planning agency established for each urbanized area of more than 50,000 population) are required to carry out a continuing, comprehensive, and cooperative transportation planning process that results in two products.

- A long range (20 year) transportation plan provides for the development and integrated management and operation of transportation systems and facilities, including pedestrian walkways and bicycle transportation facilities. Both State and MPO plans will consider projects and strategies to increase the safety and security of the transportation system for nonmotorized users.
- A Transportation Improvement Program (TIP) contains a list of proposed federally supported projects to be carried out over the next three years. Projects that appear in the TIP should be consistent with the long range plan.

- The transportation planning process is carried out with the active and on-going involvement of the public, affected public agencies, and transportation providers.
- Bicyclists and pedestrians must be given due consideration in the planning process (including the development of both the plan and TIP) and that bicycle facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation facilities except where bicycle use and walking are not permitted. Transportation plans and projects must also consider safety and contiguous routes for bicyclists and pedestrians. Safety considerations may include the installation of audible traffic signals and signs at street crossings. 23 USC Section 217 (g)

Policy and Program Provisions

State Bicycle and Pedestrian Coordinators

Each State is required to fund a Bicycle and Pedestrian Coordinator position in its State Department of Transportation to promote and facilitate the increased use of nonmotorized transportation, including developing facilities for the use of pedestrians and bicyclists and public educational, promotional, and safety programs for using such facilities. Funds such as the CMAQ or STP may be used for the Federal share of the cost of these positions. In most States, the Coordinator position is a full-time position with sufficient responsibility to deal effectively with other agencies, State offices, and divisions within the State DOT.

Protection of Nonmotorized Transportation Traffic

The Secretary shall not approve any project or take any regulatory action that will result in the severance of an existing major route, or have an adverse impact on the safety of nonmotorized transportation traffic and light motorcycles, unless such project or regulatory action provides for a reasonable alternate route or such a route already exists.

Users of a Bicycle and Pedestrian Facility

Motorized vehicles are not permitted on trails and pedestrian walkways except for maintenance purposes, motorized wheelchairs, and--when State or local regulations permit--snowmobiles and electric bicycles. Electric bicycles are defined for the purposes of this Act as a bicycle or tricycle with a low-powered electric motor weighing under 100 pounds with a top motor-powered speed not in excess of 20 miles per hour.

Facility Design Guidance

The design of bicycle and pedestrian facilities is determined by State and local design standards and practices, many of which are based on publications of the American Association of State Highway and Transportation Officials (AASHTO) such as the *Guide to the Development of Bicycle Facilities* and *A Policy on Geometric Design of Streets and Highways*.

The Federal Highway Administration developed guidance on the various approaches to accommodating bicycles and pedestrian travel, in cooperation with AASHTO, the Institute of Transportation Engineers, and other interested organizations. The guidance included recommendations on amending and updating AASHTO policies relating to highway and street design standards to accommodate bicyclists and pedestrians.

Bridges

When a highway bridge deck on which bicyclists are permitted or may operate at each end of the bridge is being replaced or rehabilitated with Federal funds, safe accommodation of bicycles is required unless the Secretary of Transportation determines that this cannot be done at a reasonable cost. *23 USC Section 217 (e)*

Railway-Highway Crossings

When improvements to at-grade railway-highway crossings are being considered, bicycle safety must be taken into account. *23 USC Section 130*
Research, Special Studies, and Reports

TEA-21 continues funding for highway safety research (Section 403), the National Cooperative Highway Research Program (NCHRP) and Transit Cooperative Research program (TCRP), all of which have funded research into pedestrian and bicycle issues. In addition, the legislation creates a number of new research areas, special studies, reports, and grant programs including:

- A new Surface Transportation-Environment Cooperative Research Program is established to evaluate transportation control measures, improve understanding of transportation demand factors, and develop performance indicators that will facilitate the analysis of transportation alternatives.
- \$500,000 is made available for the development of a national bicycle safety education curriculum.
- \$500,000 per year is made available for grants to a national not for profit organization engaged in promoting bicycle and pedestrian safety to operate a national clearinghouse, develop informational and education programs, and disseminate techniques and strategies for improving bicycle and pedestrian safety.
- \$200,000 is made available for a study of the safety issues attendant to the transportation of school children to and from school and school-related activities by various transportation modes. TRB is identified as the manager of the study, which must be done within 12 months and the panel conducting the study must include bicycling organizations. (Section 4030)
- A study of transit needs in National Parks and related public lands includes a requirement that the study assess the feasibility of alternative transportation modes. (Section 3039)
- The Bureau of Transportation Statistics is charged with establishing and maintaining a transportation database for all modes of transportation that will include "information on the volumes and patterns of movement of people, including local, interregional, and international movements, by all modes of transportation (including bicycle and pedestrian modes) and intermodal combinations, by all relevant classifications. (Section 5109)

Conclusion

Bicycling and walking are important elements of an integrated, intermodal transportation system. Constructing sidewalks, installing bicycle parking at transit, teaching children to ride and walk safely, installing curb cuts and ramps for wheelchairs, striping bike lanes and building trails all contribute to our national transportation goals of safety, mobility, economic growth and trade, enhancement of communities and the natural environment, and national security.



Three-in-one trash can: functional, attractive, and inspirational.

All of these activities, and many more, are eligible for funding as part of the Federal-aid Highway Program. Federal legislation clearly confirms the place of bicycling and walking in the mainstream of transportation decision-making at the State and local level and enables communities to encourage more people to bicycle and walk safely.

For More Information

The Transportation Equity Act for the 21st Century, PL-105-550. Available from the Government Printing Office or on-line at www.fhwa.dot.gov/legregs/legislat.html

Title 23, United States Code. Available from the Government Printing Office



Woodland, California: 4-lane state highway is now a 2-lane main street

APPENDIX TWO-C: CONTEXT-SENSITIVE SOLUTIONS IN DESIGNING MAJOR URBAN THOROUGHFARES FOR WALKABLE COMMUNITIES

Principles for CSS in Urban Walkable Communities

The 225 page 2006 document shown to the right was created through the cooperative effort of the Federal Highway Administration (FHWA) Office of Infrastructure, Office of Environment and Planning and the and the U.S. EPA (Office of Policy, Economics and Innovation. It was assembled by professional planners and engineers and published by the Institute of Transportation Engineers (ITE).

It provides recommended policies for bringing back walkability to communities.

"This report provides guidance on how walkability principles can be applied in the design of networks and major thoroughfares in places where the qualities of walkable communities are a high priority objective. This report supports excellence in transportation with additional principles specific to context sensitivity in these places. These principles are:

1. Urban circulation networks should accommodate pedestrians, bicycles, transit, freight and motor vehicles, with the allocation of right-of-way in individual streets determined through the CSS process.

2. The larger network, including key thoroughfares, should provide safe, continuous and well designed multimodal facilities that capitalize on development patterns and densities that make walking, transit and bicycle travel efficient and enjoyable.

3. Thoroughfare design should complement urban buildings, public spaces and landscape, as well as support the human and economic activities associated with adjacent and surrounding land uses.

4. Safety is achieved through thoughtful consideration of users' needs and capabilities, through design consistency to meet user expectations and selection of appropriate speed and design elements.

5. Thoroughfare design should serve the activities generated by the adjacent context in terms of the mobility, safety, access and place-making functions of the public right-of-way. Context sensitivity sometimes requires that the design of the thoroughfare change as it passes through areas where a change in character is desired.

6. System-wide transportation capacity should be achieved using a high level of network connectivity and appropriately spaced and properly sized thoroughfares, along with capacity offered by multiple travel modes, rather than by increasing the capacity of individual thoroughfares."



A Document on Context-Sensitive Solutions produced by the Institute of Transportation Engineers (ITE)



Walkability along North American collector and arterial roads has historically run the gamut of "challenging and discouraging", to "supportive." Unfortunately only a few of these places were planned for walking.

APPENDIX TWO-D: CRASH TYPING

A crash type describes the pre-crash actions of the parties involved. When crashes in a database are “crash typed,” a pattern often emerges that helps safety officials identify what the problem is and what countermeasures are generally related to each crash type. The six crash types in the diagram to the right are some of the most common pedestrian crash experiences.

Other crash types include Working/Playing in roadway, Backing Vehicle, Bus-related, Crossing an Expressway, and Unique Midblock. For more details on the crash types and related countermeasures, see Chapter 3 of “PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System” or find the “Crash Analysis” section in the on-line version at

<http://www.walkinginfo.org/pedsafe>.

1. Dart/Dash

The pedestrian walked or ran into the roadway at an intersection or midblock location and was struck by a vehicle. The motorist's view of the pedestrian may have been blocked until an instant before the impact.



2. Multiple Threat/Trapped

The pedestrian entered the roadway in front of stopped or slowed traffic and was struck by a multiple-threat vehicle in an adjacent lane after becoming trapped in the middle of the roadway.



3. Through Vehicle at Unsignalized Location

The pedestrian was struck at an unsignalized intersection or midblock location. Either the motorist or the pedestrian may have failed to yield.



4. Turning Vehicle

The pedestrian was attempting to cross at an intersection, driveway, or alley and was struck by a vehicle that was turning right or left.



5. Through Vehicle at Signalized Location

The pedestrian was struck at a signalized intersection or midblock location by a vehicle that was traveling straight ahead.



6. Walking Along Roadway

The pedestrian was walking or running along the roadway and was struck from the front or from behind by a vehicle.



APPENDIX TWO-E: 22 BENEFITS OF PAVED SHOULDERS AND BICYCLE LANES

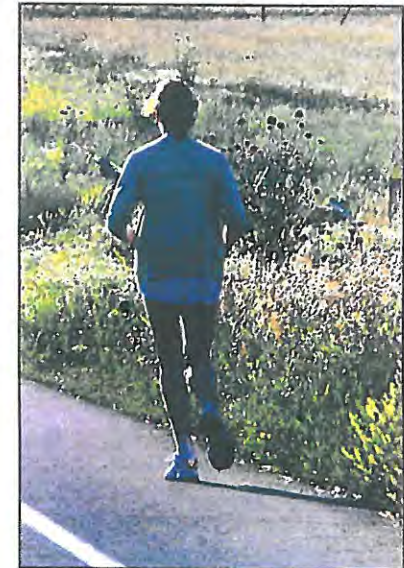
Prepared by Michael Ronkin, Bicycle and Pedestrian Program Manager & Members of the Preliminary Design Unit, Oregon Department of Transportation

Before the 1971 "Bike Bill" was passed, and the terms "shoulder bikeways" or "bike lanes" were commonly used, the Oregon Highway Division advocated (1) building paved shoulders when constructing roads and (2) adding paved shoulders to existing roads. These were often referred to as "safety shoulders." There are good reasons for this term.

The following reasons are what AASHTO has to say about the benefits of shoulders in three important areas: safety, capacity and maintenance. Most of these benefits apply to both shoulders on rural highways and to marked, on-street bike lanes on urban roadways. See other side for other benefits specific to urban areas.

Safety - highways with paved shoulders have lower accident rates, as paved shoulders:

1. Provide space to make evasive maneuvers;
2. Accommodate driver error;
3. Add a recovery area to regain control of a vehicle, as well as lateral clearance to roadside objects such as guardrail, signs, and poles (highways require a "clear zone," and paved shoulders give the best recoverable surface);
4. Provide space for disabled vehicles to stop or drive slowly;
5. Provide increased sight distance for through vehicles and for vehicles entering the roadway (rural: in cut sections or brushy areas; urban: in areas with many sight obstructions);
6. Contribute to driving ease and reduced driver strain;
7. Reduce passing conflicts between motor vehicles and bicyclists and pedestrians
8. Make the crossing pedestrian more visible to motorists;
9. Provide for storm water discharge farther from travel lanes, reducing hydroplaning, splash and spray to following vehicles, pedestrians and bicyclists; and
10. Provide added separation between motorists and pedestrians, creating greater comfort and safety for pedestrians.





Capacity - highways with paved shoulders can carry more traffic, as paved shoulders:

1. Provide more intersection and safe stopping sight distance;
2. Allow for easier exiting from travel lanes to side streets and roads (also a safety benefit);
3. Provide greater effective turning radius for trucks;
4. Provide space for off-tracking of truck's rear wheels in curved sections;
5. Provide space for disabled vehicles,
6. Provide space for mail delivery
7. Provide space for bus stops; and
8. Provide space for bicyclists to ride at their own pace;



Maintenance - highways with paved shoulders are easier to maintain, as paved shoulders:

1. Provide structural support to the pavement;
2. Discharge water further from the travel lanes, reducing the undermining of the base and subgrade;
3. Provide space for maintenance operations and snow storage;
4. Provide space for portable maintenance signs;
5. Facilitate painting of fog lines.



APPENDIX TWO-F: 22 BENEFITS OF URBAN STREET TREES

By Dan Burden, Senior Urban Designer
Glattig Jackson and Walkable
Communities, Inc. May, 2006

U.S Forest Service facts and figures and new traffic safety studies detail many urban street tree benefits. Once seen as highly problematic for many reasons, street trees are proving to be a great value to people living, working, shopping, sharing, walking and motoring in and through urban places.

For a planting cost of \$250-600 (includes first 3 years of maintenance) a single street tree returns over \$90,000 of direct benefits (not including aesthetic, social and natural) in the lifetime of the tree. Street trees (generally planted from 4 feet to 8 feet from curbs) provide many benefits to those streets they occupy. These trees provide so many benefits that they should always be considered as an urban area default street making feature. With new attentions being paid to global warming causes and impacts more is becoming known about the many negative environmental impacts of treeless urban streets. We are well on the way to recognizing the need for urban street trees to be the default design, rather than a luxury item to be tolerated by traffic engineering and budget conscious city administrators.

The many identified problems of street trees are overcome with care by designers. Generally street trees are placed each 15-30 feet. These trees are carefully positioned to allow adequate sight triangles at intersections and driveways, to not block illumination of the street from overhead lamps, and not impact lines above or below ground. Street trees of various varieties can be used in all climates, including semi-arid and even arid conditions.

The science of street tree placement and maintenance is well known and observed in a growing number of communities (i.e. Sacramento, and Davis, CA; Eugene, Oregon; Chicago, IL; Seattle, Redmond, Olympia and Issaquah, WA; Charlotte, NC). Although maintenance and care of trees in urban places is costly, the value in returned benefits is so great that a sustainable community cannot be imagined without these important green features.



Properly placed and spaced urban street trees provide these benefits:

Increased motorized traffic and pedestrian safety (contrary to popular myths). See the article below for details on mode safety enhancements. Note especially the compilation of safety benefits detailed in, *Safe Streets, Livable Streets*, by Eric Dumbaugh Journal of the American Planning Association, Vol. 71, No. 3, Summer 2005. One such indication of increased safety with urban street trees is quoted from this document:

"Indeed, there is a growing body of evidence suggesting that the inclusion of trees and other streetscape features in the roadside environment may actually reduce crashes and injuries on urban roadways. Naderi (2003) examined the safety impacts of aesthetic streetscape enhancements placed along the roadside and medians of five arterial roadways in downtown Toronto. Using a quasi-experimental design, the author found that the inclusion of features such as trees and concrete planters along the roadside resulted in statistically significant reductions in the number of mid-block crashes along all five roadways, with the number of crashes decreasing from between 5 and 20% as a result of the streetscape improvements. While the cause for these reductions is not clear, the author suggests that the presence of a well defined

roadside edge may be leading drivers to exercise greater caution."

1. Reduced and more appropriate urban traffic speeds. Urban street trees create vertical walls framing streets, and a defined edge, helping motorists guide their movement and assess their speed (leading to overall speed reductions). Street safety comparisons show a reduction of run-off-the-road crashes and overall crash severity when street tree sections are compared with equivalent treeless streets. (Texas A and M conducted simulation research which found people slow down while driving through a treed scape. These observations are also noted in the real world when following motorists along first a treed portion of a street, and then a non treed portion. Speed differentials of 3 mph to 15 mph are noted.



2. Create safer walking environments, by forming and framing visual walls and providing distinct edges to sidewalks so that motorists better distinguish between their environment and one shared with people. If a motorist were to significantly err in their urban driving task, street trees can deflect or fully stop a motorist from taking another human life.

3. Trees call for planting strips, which further separate motorists from pedestrians, buildings and other urban fabric.

4. Increased security. Trees create more pleasant walking environments, bringing about increased walking, talking, pride, care of place, association and therefore actual ownership and surveillance of homes, blocks, neighborhoods plazas, businesses and other civic spaces.

5. Improved business. Businesses on treescaped streets show 20% higher income streams, which is often the essential competitive edge needed for main street store success, versus competition from plaza discount store prices.

6. Less drainage infrastructure. Trees absorb the first 30% of most precipitation through their leaf system, allowing evaporation back into the atmosphere. This moisture never hits the ground. Another percentage (up to 30%) of precipitation is

absorbed back into the ground and taken in and held onto by the root structure, then absorbed and then transpired back to the air. Some of this water also naturally percolates into the ground water and aquifer. Storm water runoff and flooding potential to urban properties is therefore reduced.

7. Rain, sun, heat and skin protection.

For light or moderate rains, pedestrians find less need for rain protection. In cities with good tree coverage there is less need for chemical sun blocking agents. Temperature differentials of 5-15 degrees are felt when walking under tree canopied streets.



8. Reduced harm from tailpipe emissions.

Automobile and truck exhaust is a major public health concern and contains significant pollutants, including carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NOx), and particulate matter (PM). Tailpipe emissions are adding to asthma, ozone and other health impacts. Impacts are reduced significantly from proximity to trees.



9. Gas transformation efficiency.

Trees in street proximity absorb 9 times more pollutants than more distant trees, converting harmful gasses back into oxygen and other useful and natural gasses.

10. Lower urban air temperatures.

Asphalt and concrete streets and parking lots are known to increase urban temperatures 3-7 degrees. These temperature increases significantly impact energy costs to homeowners and consumers. A properly shaded neighborhood, mostly from urban street trees, can reduce energy bills for a household from 15-35%.

11. Lower Ozone. Increases in urban street temperatures that hover directly above asphalt where tailpipe emissions occur dramatically increase creation of harmful ozone and other gasses into more noxious substances impacting health of people, animals and surrounding agricultural lands.

12. Convert streets, parking and walls into more aesthetically pleasing environments. There are few streetmaking elements that do as much to soften wide, grey visual wastelands created by wide streets, parking lots and massive, but sometimes necessary blank walls than trees.

13. Soften and screen necessary street features such as utility poles, light poles and other needed street furniture. Trees are highly effective at screening those other vertical features to roadways that are needed for many safety and functional reasons.

14. Reduced blood pressure, improved overall emotional and psychological health. People are impacted by ugly or attractive environments where they spend time. Kathlene Wolf, Social Science Ph.D.



University of California gave a presentation that said "the risk of treed streets was questionable compared to other types of accidents along with the increased benefit of trees on human behavior, health, pavement longevity, etc." She noted that trees have a calming and healing effect on ADHD adults and teens.

15. Time in travel perception. Other research and observations confirm that motorists perceive the time it takes to get through treed versus non-treed environments has a significant differential. A treeless environment trip is perceived to be longer



than one that is treed (Walter Kulash, P.E.; speech circa 1994, Glatting Jackson).

16. Reduced road rage. Although this may at first seem a stretch, there is strong, compelling research that motorist road rage is less in green urban versus stark suburban areas. Trees and aesthetics, which are known to reduce blood pressure, may handle some of this calming effect.

17. Improved operations potential. When properly positioned and maintained, the backdrop of street trees allow those features that should be dominant to be better seen, such as vital traffic regulatory signs. The absence of a well developed Greenscape allows the sickly grey mass of strip to dominate the visual world. At the same time, poorly placed signs, signals, or poorly maintained trees reduces this positive gain, and thus proper placement and maintenance must be rigidly adhered to.

18. Added value to adjacent homes, businesses and tax base. Realtor based estimates of street tree versus non street tree comparable streets relate a \$15-25,000 increase in home or business value. This often adds to the base tax base and operations budgets of a city allowing for added street maintenance. Future economic analysis may determine that this is a break-even for city maintenance budgets.

19. Provides a lawn for a splash and spray zone, storage of snow, driveway elevation transition and more. Tree lawns are an essential part of the operational side of a street.

20. Filtering and screening agent. Softens and screens utility poles, light poles, on-street and off-street parking and other features creating visual pollution to the street.

21. Longer pavement life. Studies conducted in a variety of California environments show that the shade of urban street trees can add from 40-60% more life to costly asphalt. This factor is based on reduced daily heating and cooling (expansion/contraction) of asphalt. As peak oil pricing increases roadway overlays, this will become a significant cost reduction to maintaining a more affordable roadway system.



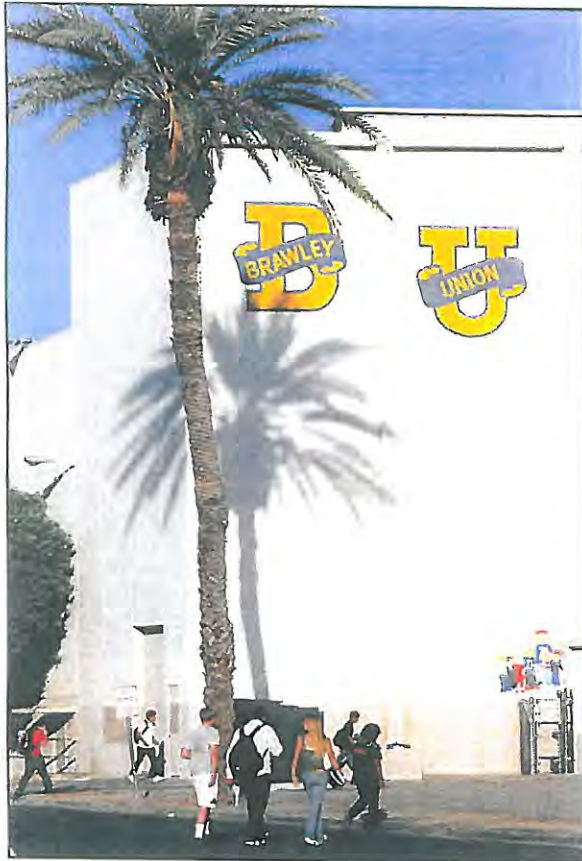


22. Connection to nature and the human senses. Urban street trees provide a canopy, root structure and setting for important insect and bacterial life below the surface; at grade for pets and romantic people to pause for what pets and romantic people pause for; they act as essential lofty environments for song birds, seeds, nuts, squirrels and other urban life. Indeed, street trees so well establish natural and comfortable urban life it is unlikely we will ever see any advertisement for any marketed urban product, including cars, to be featured without street trees making the ultimate dominant, bold visual statement about place.



APPENDIX TWO-G: STREET TREE SELECTION GUIDE

The following material is excerpted in its entirety from the document "Desert Southwest Community Tree Guide: Benefits, Costs, and Strategic Planting" with permission from the U.S. Forest Service Center for Urban Forest Research at UC Davis. This is Chapter 7 of the document, which is available from the Urban Forest Center website at <http://www.fs.fed.us/psw/programs/cufir/>.



TREE SELECTION LIST FOR DESERT SOUTHWEST COMMUNITIES

Desert Southwest landscapes

In this chapter, recommended trees and their attributes are presented to help select the right tree for specific planting situations throughout the Desert Southwest region.

For the purpose of this chapter, desert southwestern communities include the lower desert regions of southern California, central and southern Arizona, southern Nevada, southern New Mexico and the deserts of southwestern Utah. We have selected these areas as they share many similarities in climate, rainfall, soil conditions, water quality, horticultural practices and have within their borders some of the fastest growing cities in the nation.

Reliable information on the selection, growth and care of landscape trees in the desert southwest comes from scientific research and field experience gathered in a relatively small number of cities and institutions. Within this region the major metropolitan areas include the Coachella Valley, California (Palm Springs/Palm Desert), Phoenix and Tucson, Arizona and Clark County, Nevada (Las Vegas, Henderson, Boulder City). Institutions like the University of Arizona, Tucson, Arizona, Desert Botanical Garden, Phoenix, Arizona, College of the Desert, Palm Desert, California, University of Nevada, Las Vegas, Nevada, the various municipal water conservation authorities and professional and trade organizations have been instrumental in the development and dissemination of information on desert landscape horticulture.

Historically the population growth of this region was significantly driven by immigration of people from other, less arid parts of the country. Landscape designs at all levels, residential, commercial and municipal, attempted to deny the presence of the desert in favor of a more lush and non-indigenous landscape palette. In the last two decades a desert landscape aesthetic has emerged. Driven in part by the need to conserve scarce water, these designs are ultimately inspired by a desire to create a unique and inviting sense of place and to help build communities that embrace rather than mask the beauty of the surrounding deserts.

What is the geographic scope?

The Desert Southwest is a large and enormously diverse region with elevations ranging from near or below sea level (Coachella Valley) to 3,000 feet (914 m) and temperature extremes from single digit winter lows and occasional snow to summer highs of 110 to 115 degrees oF (43-46 oC). The harshness of these conditions is often amplified by low relative humidity coupled with high winds. Additionally, dramatic temperature swings of 30 to 40 degree oF (-1-4 oC) can occur within a single day in the transitions from spring to summer and fall to winter.

Soils can be generally characterized as alkaline and containing little (typically less than 1%) organic matter. Water penetration and water holding capacity of soils varies widely, sometime within very small areas. Blow or dune sands commonly found in California's Coachella Valley afford rapid water penetration with limited water retention. By contrast some southern Nevada soils have a calcareous cap layer that almost precludes water penetration and must be fractured or removed prior to tree planting. In alluvial areas, like central Arizona's Salt River Valley, loam and sandy clay loam soils can be found but these are not typical of the region as a whole.

Annual rainfall ranges from 2 to 3 inches (51-76 mm) in the Lower California desert and southern Nevada to 8 to 12 inches (203-305 mm) in parts of southern Arizona. Water conservation efforts through out the region are focused on landscape water use, as the overwhelming majority of landscape trees, shrubs and turf are irrigated. The demand to use water efficiently in the landscape has encouraged the introduction, and in many instances re-introduction, of increasing numbers of desert native and desert adapted trees, the use of state-of-the-art irrigation technologies and the application of organic and inorganic surface mulches.

What are the selection criteria?

The trees described below are a reasonably complete, but not an exhaustive listing, of trees adapted to the Desert Southwest. Species listed are well-documented, widely used, and generally available for purchase by the public. Given the region-wide issues associated with water conservation in the landscape, particular emphasis was given to desert native and desert adapted species but other "traditional" landscape trees are also included.

HOW TO MATCH THE TREE TO THE SITE

Selection and placement of landscape trees

Proper placement of trees in the landscape is key to vigorous growth, reduced maintenance and long-term survival. Environmental and physical factors surrounding landscape trees can have dramatic effects on tree health, and appearance. These factors may include reflected heat and light, wind, shade, availability of water, presence or absence of hardscape elements, and the horticultural requirements of the surrounding landscape.

In desert climates, the potential detrimental effects of reflected sunlight and heat on trees cannot be exaggerated. Mirrored or tinted glass used on many mid-rise and high-rise commercial building, large masonry and stucco framed walls and asphalt, paved surfaces reflect and "re-radiate" tremendous amounts of heat. These physical elements in the landscape can, in the protracted heat of a long summer day, add stress and increase transpiration of trees.

Another common problem is mixing trees and shrubs that have widely differing water requirements. This typically involves trees with low water requirements planted either in turf or with high water demanding under-story shrubs. Dense shade generated by mature specimens may adversely affect the growth of surrounding turf and reduce growth and flowering of under-story shrubs and ground covers.

Consider the mature height and width of trees when placing them in the landscape and allow sufficient space between trees to optimize long-term growth without the risk of tangled branches or overlapping canopies. Tree placement should also take into account all the uses of the landscape by pedestrian, bicyclists, motorized vehicles and children.

The presence or absence of thorns is obviously a consideration in the placement of some desert species. The nature, amount and seasonal distribution of leaf, flower and seed pod litter will determine the appropriateness of tree placement near patios, pools, playground equipment, and pedestrian areas.

What information is included in the chart?

Physical characteristics and definitions used for this matrix are listed below.

Tree Form: These are the basic shapes of the trees at maturity.

Pyramidal - common in excurrent type trees with a main, central stem.

Oval- elliptical in a vertical fashion.

Round - self-explanatory.

Vase - multi-stemmed, decurrent, wider at top than at the base.

Irregular - no fundamental shape

Columnar - very upright in its growth.

Shrub Like - small tree, often multi-stemmed.

Hardiness Zone: The United States Department of Agriculture's hardiness zone map was used. Range of zones in the Desert Southwest Region is 8 to 10. Except where noted trees listed are generally cold hardy across these regions. Given the lack of genetic uniformity within some desert adapted species grown from seed, and the existence of some uncharacteristically cold micro-climates within some desert communities, contact local horticulture professionals about conditions in your area.

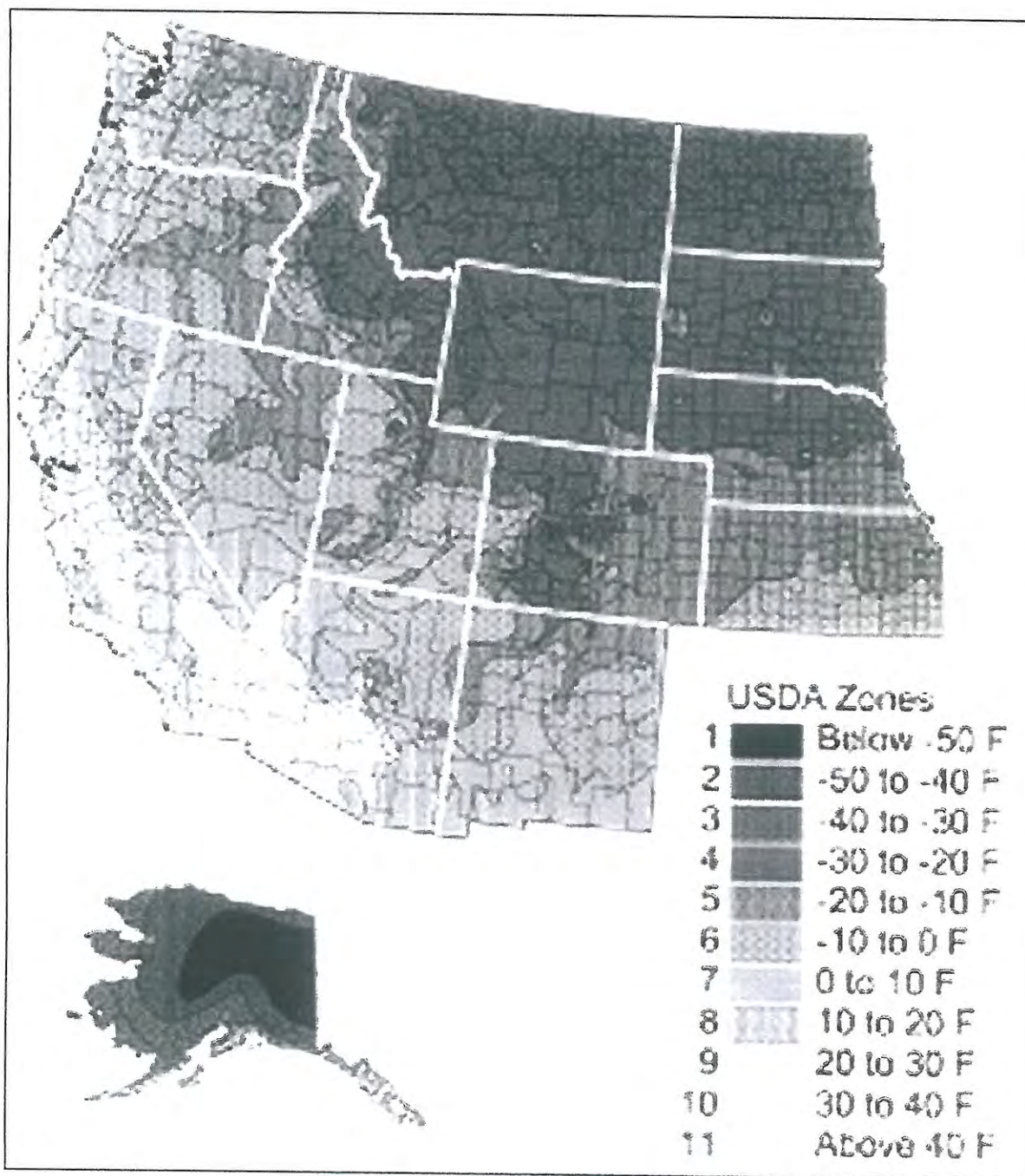
The symbol (a) indicates that the species may be cold tender in some desert locations, consult local horticulture professionals before planting.

Growth rate: Height growth was judged based on the ranges set below. Growth rates are markedly lower than in most other areas of the United States.

Fast - more than 2 feet (> 0.6 m) per year

Medium - 1 foot to 2 feet (0.3-0.6 m) per year

Slow - less than 1 foot (< 0.3 m) per year.



Relative size: This is the relative size of the tree at maturity.

Small - less than 25 feet (7.6 m) tall and wide. Trunk diameters are probably less than 20 inches (51 cm).

Medium - 25-40 feet (7.6-12.2 m) tall and wide. Trunk diameters can be 20 - 30 inches (51-76 cm).

Large - greater than 40 feet (12.2 m) tall and wide. Trunk diameters are commonly over 30 inches (> 76 cm).

Exposure: Indicates sun exposure tolerated by the tree.

FS Full Sun

PSPartial Shade

STShade Tolerant

BVOC: Biogenic Volatile Organic Compounds are hydrocarbon compounds from vegetation (e.g., isoprene, monoterpene) that exist in the ambient air and contribute to the formation of smog. We identify their potential to adversely affect air quality in ozone non-attainment areas if large numbers are planted:

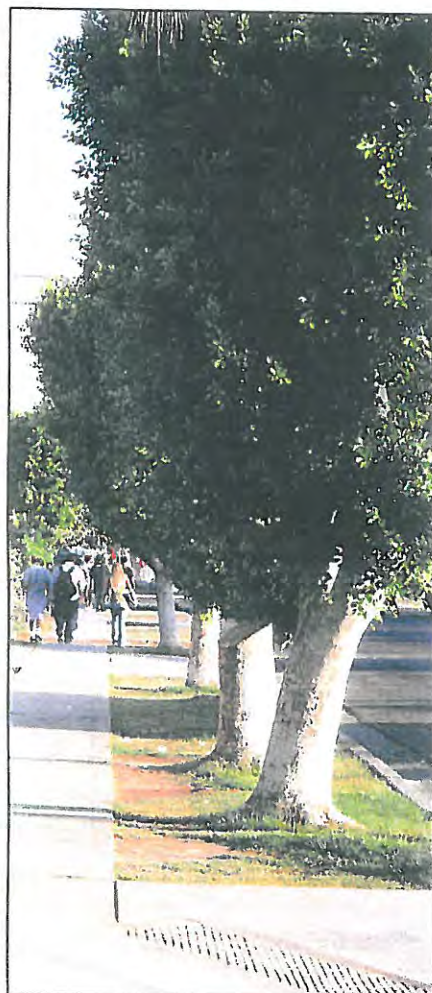
L= low, < 1;

M= moderate, 1-10;

H= High, > 10 μ g/g dry leaf wt/hr

(Benjamin et al. 1996; Karlik and Winer 2002). NA means no emission rate data are available for members of this family.

TREE SELECTION LIST FOR DESERT SOUTHWEST COMMUNITIES



BOTANICAL NAME	COMMON NAME	FORM	GROWTH RATE	SIZE	EXPOSURE	BVOC
<i>Conifers</i>						
<i>Cedrus atlantica</i>	Blue Atlas Cedar	C	S/M	L	PS	I
<i>Cupressus arizonica</i>	Arizona Cypress	C	M	M	PS, PS	I
<i>Cupressus sempervirens</i>	Italian Cypress	C	M	L	PS	I
<i>Pinus canariensis</i>	Canary Island Pine	O	M	L	PS	M
<i>Pinus edulis</i>	Afghan Pine	P	L	L	PS	M
<i>Pinus halepensis</i>	Aleppo Pine	I	L	L	PS	L
<i>Pinus pinaster</i>	Italian Stone Pine	P	M	L	PS, PS	I
<i>Pinus roxburghii</i>	Chir Pine	O	M	M	PS	M
<i>Pinus thunbergiana</i>	Japanese Black Pine	O	M	L	PS	M
<i>Palms</i>						
<i>Chamaerops humilis</i>	Mediterranean Fan Palm	R	S	S	PS, PS, GI	M
<i>Brasenia armata</i>	Mexican Blue Palm	R	S	S	PS	M
<i>Buthia capitata</i>	Jelly Palm	R	S	M	PS	M
<i>Phoenix canariensis</i>	Canary Island Date Palm	R	S	L	PS	M
<i>Phoenix dactylifera</i>	Date palm	R	S	L	PS	M
<i>Syagrus romanzoffianum</i>	Queen Palm	R	M	M	PS, PS	M
<i>Washingtonia filifera</i>	California Fan Palm	R	S	L	PS	M
<i>Washingtonia robusta</i>	Mexican Fan Palm	R	L	L	PS	LI
<i>Other Trees</i>						
<i>Acacia aneura</i>	Mulga	O	M	S	PS	M
<i>Acacia farnesiana</i>	Sweet Acacia	O	L	M	PS	M
<i>Acacia pendula</i>	Weeping Myall	V	M	M	PS	M
<i>Acacia rigidula</i>	Black Bush Acacia	O	S	S	PS	M
<i>Acacia salicina</i>	Willow Acacia	O	L	S	PS, PS	M
<i>Acacia schaffneri</i>	Twisted Acacia	I	L	S	PS	M
<i>Acacia stenophylla</i>	Shoestring Acacia	C	M	L	PS, PS	M
<i>Acacia willardiana</i>	Pale Blanco	C	S	S	PS, PS	M
<i>Albizia julibrissin</i>	Silk Mimosa Tree	O	M	M	PS, PS	LI
<i>Bauhinia lunarioides</i>	Anacacho Orchid Tree	O	S/M	S	PS	NA
<i>Brachychiton populneus</i>	Bottle Tree	O	M	M	PS, PS	NA
<i>Caesalpinia cactacea</i>	Cascadote	V	M	M	PS, PS	M
<i>Caesalpinia mexicana</i>	Mexican Bird of Paradise	V	L	S	PS, PS	M
<i>Callistemon citrinus</i>	Lemon Bottlebrush	C	M	S	PS, PS	LI
<i>Callistemon viminalis</i>	Weeping Bottlebrush	C	L	M	PS, PS	LI
<i>Caruarina spp.</i>	Boefwood, She Oak	C	M	L	PS	NA



BOTANICAL NAME	COMMON NAME	FORM	GROWTH RATE	SIZE	EXPOSURE	BVOC
<i>Celtis reticulata</i>	Western or Canyon Hackberry	T	M	M	PS, PS	I
<i>Ceratonia siliqua</i>	Carob Tree	O	S	L	PS	M
<i>Cercidium floridum</i> (<i>Parkinsonia florida</i>)	Blue Palo Verde	O	T	M	PS	M
<i>Cercidium</i> Hybrid	Thornless Hybrid Palo Verde	V	T	M	PS	M
<i>Cercidium microphyllum</i> (<i>Parkinsonia microphylla</i>)	Foothill or Little Leaf Palo Verde	V	S	M	PS	M
<i>Cercidium praecox</i> (<i>Parkinsonia praecox</i>)	Palo Brea	T	T	M	PS	M
<i>Cercis canadensis</i> v. <i>medicina</i>	Mexican Redbud	O	M	M	PS, PS	I
<i>Cercis canadensis</i> v. <i>boschniana</i>	Texas Redbud	O	M	M	PS, PS	I
<i>Cercis occidentalis</i>	Western Redbud	O	M	M	PS, PS	I
<i>Chilopsis linearis</i>	Desert Willow	O	S	M	PS, PS	M
X <i>Chitalpa tashkentensis</i>	Chitalpa	O	T	M	PS	M
<i>Chorisia speciosa</i>	Tree Silk Tree	C	M	M	PS, PS	NA
<i>Citrus</i> spp. ²	Citrus	O	M	S	PS	M
<i>Cotinus coggygria</i>	Smoke Tree	T	M	S	PS	M
<i>Dalbergia sissoo</i> ²	Indian Rosewood Tree	T	T	M	PS	NA
<i>Elaeagnus angustifolia</i>	Russian Olive	S	M/T	M	PS	NA
<i>Eriobotrya japonica</i>	Loquat	T	M	M	PS, PS	I
<i>Eucalyptus camaldulensis</i>	Red Flowered Mallee	O	T	L	PS	II
<i>Eucalyptus erythrocorys</i>	Red Cap Gum	O	T	M	PS, PS	II
<i>Eucalyptus erythronema</i>	Red flower Mallee	O	T	M	PS, PS	II
<i>Eucalyptus formanii</i>	Feather Gum	O	T	M	PS, PS	II
<i>Eucalyptus leucocoryon</i>	White Ironbark	O	T	M	PS, PS	II
<i>Eucalyptus coolibah</i>	Coolibah	O	T	L	PS	II
<i>Eucalyptus pauciflora</i>	Ghost Gum	O	T	L	PS, PS	II
<i>Eucalyptus polyanthemus</i>	Silver Dollar Gum	O	T	M	PS	II
<i>Eucalyptus rudis</i>	Flooded Gum	O	T	L	PS	II
<i>Eucalyptus sideroxylon</i>	Pink or Red Ironbark	O	T	M	PS, PS	II
<i>Eucalyptus spathulata</i>	Swamp Mallee	T	T	M	PS, PS	II
<i>Eucalyptus torquata</i>	Coral Gum	O	T	M	PS, PS	II
<i>Lyximhardtia orthocarpa</i>	Kidneywood	T	M	M	PS	NA

BOTANICAL NAME	COMMON NAME	FORM	GROWTH RATE	SIZE	EXPOSURE	BVOC
<i>Ficus carica</i>	Fig Tree	C	M	M	PS, PS	H
<i>Ficus nitida</i> "	Indian Laurel Fig	C	M	L	PS, PS	H
<i>Fraxinus greggii</i>	Littlesoft Ash	C	M	S	PS	L
<i>Fraxinus raywoodii</i>	Raywood Ash	C	F	M	PS	L
<i>Fraxinus uhdei</i>	Bhamel or Mesquite Ash	C	F	M	PS	L
<i>Fraxinus velutina</i>	Arizona Ash	C	F	M	PS	L
<i>Fraxinus v. lantex</i>	Lantex Ash	C	F	M	PS	L
<i>Fraxinus v. modesta</i>	Modesto Ash	C	F	M	PS	L
<i>Geijera parviflora</i>	Willow or Australian Willow	SL	M	S	PS, PS	M
<i>Ginkgo biloba</i>	Maidenhair Tree	T	S	L	PS	M
<i>Gleditsia triacanthos inermis</i>	Honey Locust	C	M	M	PS	M
<i>Grevillea robusta</i>	Silk Oak	C	M	L	PS, PS	NA
<i>Jacaranda mimosaefolia</i>	Jacaranda	C	M	L	PS, PS	L
<i>Koeberlinia paniculata</i>	Goldentrain Tree	C	M	M	PS	H
<i>Laurus nobilis</i>	Bay Laurel	T	M	S	PS, PS	L
<i>Leucocena retusa</i>	Golden Ball Lead Tree	T	M	S	PS, PS	M
<i>Leviliana microphylla v. thornberi</i>	Tree of the Desert, Leather Bush	T	S	M	PS, PS	M
<i>Malus</i> spp.	Apple Tree	C	M	S	PS	L
<i>Melia azadirach</i>	Texas Untroble Tree, Chittaberry	C	M	L	PS	NA
<i>Olea europaea</i>	Olive	C	S	M	PS	L
<i>Olonea aspera</i> "	Denon Ironwood	V	S	M	PS	NA
<i>Parkinsonia acuminata</i>	Mexican Palo Verde	V	F	M	PS	M
<i>Paulownia tomentosa</i>	Imperial Dragon, Impress Tree	C	F	M	PS	M
<i>Pistacia chinensis</i>	Chinese Pistache	C	S	L	PS	M
<i>Pithecellobium flexitame (Ebenopsis coronat)</i>	Texas Ebony	C	S	M	PS, PS	NA
<i>Pithecellobium mexicanum (Harvardia mexicana)</i>	Mexican Ebony	V	M	M	PS, PS	NA
<i>Pithecellobium pallens (Harvardia badensis)</i>	Lenaza	T	M	M	PS, PS	NA
<i>Pittosporum phylloracoides</i>	Willow Pittosporum	C	S	S	PS, PS	L
<i>Paratanus racemosa</i>	California Sycamore	C	M	L	PS	H
<i>Paratanus wrightii</i>	Arizona Sycamore	C	M	L	PS	H





BOTANICAL NAME	COMMON NAME	FORM	GROWTH RATE	SIZE	EXPOSURE	BVOC
<i>Pithecellobium mexicanum</i> (<i>Harvardia mexicana</i>)	Mexican Ebony	V	M	M	IS, IS	NA
<i>Pithecellobium pallens</i> (<i>Harvardia pallens</i>)	Tenaza	I	M	M	IS, IS	NA
<i>Pittosporum phylliracoides</i>	Willow Pittosporum	C	S	S	IS, IS	I
<i>Platanus racemosa</i>	California Sycamore	O	M	L	IS	I
<i>Platanus wrightii</i>	Arizona Sycamore	O	M	L	IS	II
<i>Populus fremontii</i>	Fremont or Western Cottonwood	O	M	L	IS	II
<i>Prosopis</i> spp.	Thornless Hybrid Mesquite	O	I	M	IS	M
<i>Prosopis glandulosa</i>	Honey Mesquite	O	I	M	IS, IS	M
<i>Prosopis pubescens</i>	Screwbean Mesquite	O	M	M	IS	M
<i>Prosopis velutina</i>	Velvet Mesquite	O	M	M	IS	M
<i>Prunus</i> dwarf	Dwarf Fruit Tree	R	M	M	IS, IS	I
<i>Prunus mume</i>	Japanese Flowering Apricot	R	M	M	IS	I
<i>Prunus triloba</i>	Almond	O	M	M	IS	I
<i>Pyrus calleryana</i>	Bradford Pear	O	M	M	IS, IS	I
<i>Pyrus kawakamii</i>	Mesquite Pear	O	M	M/IS	IS	I
<i>Quercus buckleyi</i>	Texas Spanish	O	S	M	IS	II
<i>Quercus fusiformis</i>	Escarpment Live Oak	O	S/M	L	IS	II
<i>Quercus ilex</i>	Holm, Holly Oak	O	S	M	IS	II
<i>Quercus lobata</i>	Valley Oak	O	S	L	IS	M
<i>Quercus muhlenbergii</i>	Chinquapin Oak	O	S	M	IS	II
<i>Quercus sarber</i>	Cork Oak	O	S	M	IS	M
<i>Quercus virginiana</i>	Southern Live Oak	O	S	M	IS	I
<i>Rhus lancea</i>	African Sumac	L	M	M	IS, IS	I
<i>Rhus lanceolata</i>	Prairie Flameleaf Sumac	L	M	M	IS	I
<i>Robinia pseudoacacia</i>	Black Locust	O	M	L	IS	II
<i>Salix babylonica</i>	Weeping Willow	O	M	M	IS, IS	II
<i>Salix matsudana</i>	Hankow or Navajo Globe Willow	O	M	M	IS, IS	II
<i>Sambucus mexicana</i>	Mexican Elderberry	S	M	S	IS, IS	I
<i>Schinus molle</i>	California Pepper Tree	L	M	M	IS	M
<i>Schinus terebinthifolius</i>	Brazilian Pepper Tree	L	S	M	IS	M

BOTANICAL NAME	COMMON NAME	FORM	GROWTH RATE	SIZE	EXPOSURE	BVOC
<i>Houmaia tipu</i>	Tipu Tree	O	M	L	IS, IS	NA
<i>Ulmus parvifolia</i>	Chinese Elm	R	I	L	IS	L
<i>Ungnadia speciosa</i>	Mexican Buckeye	S	S	S	IS, IS	II
<i>Quercus buckleyi</i>	Texas Spanish	O	S	M	IS	II
<i>Quercus fusiformis</i>	Lacarpment Live Oak	O	S/M	L	IS	II
<i>Quercus laevis</i>	Ulmus, Holly Oak	O	S	M	IS	II
<i>Quercus lobata</i>	Valley Oak	O	S	L	IS	M
<i>Vitex agnus castus</i>	Chaste Tree or Monk's Pepper	I	S	M	IS, IS	NA
<i>Zelkova serotina</i>	Stawleat Zelkova	O	I	L	IS	L
<i>Zizyphus juba</i>	Chinese Fig	O	M	M	IS	II





APPENDIX TWO-H FOCUS GROUP MEETING NOTES

SCHOOLS FOCUS GROUP

October 12, 2006, 9AM
Brawley Elementary School District Board
Room

Attendees:

School Superintendents:

Terri L. Decker, Brawley Elementary School
District
Roberto Moreno, Brawley Union High School
District Superintendent

J.W. Oakley/Phil D. Swing Schools:

Monica Kenagy, School Site Council
Cindy Hickingbottom, PTA
Araceli Morales, English Learner Advisory
Committee

Miguel Hidalgo/Myron D. Witter Schools:

Jane Rodriguez, School Site Council
Liz Gonzales, PTO

Barbara Worth Junior High School:

Cindy Verdugo, School Site Council
Martha Beltran, English Learner Advisory
Committee

Also in Attendance:

Mikey Garcia
Rosemarie Wood – BUHS
Mark Saracusa
Paul Zykovsky
Steve Tracy

Comments and Issues:

Brawley Union High School:

One attendee's son was hit by a car near the
High School. A Street near the High School has
bus and truck traffic. Trucks ignore truck route
signs and drive on other streets. Need four-way
stops at all intersections near these schools.
with peak hour red/green lights and off-peak red
flashers.

*North Imperial and C Street near Jr. High and
High School:*

Junior High and High School students on North
Imperial and streaming through Plaza area.
Johnny Burritos swarming with High School
students at lunch with only a 2-way stop. Need
a 4-way stop at that location. Poor visibility in
this area.

Witter Elementary School at K Street and 2nd

Witter Elementary School is the biggest
problem. Needs a crosswalk with flashing
lights. Two bad accidents there. It is just off
Highway 86. K Street traffic is an issue for two
elementary schools. Close K Street? Bus stops
in front of schools at Witter, blocking visibility.



Bus stop should be moved forward. Traffic is dangerous on K Street by Witter Elementary and Hidalgo Elementary. General acceptance of roundabout concept on Highway 86.

Phil Swing Elementary School:

1st Street and A Street near school, no stops are required. Western Avenue is a north/south corridor. Dangerous crossing Western Avenue. Poor visibility with dip in road. Need better signs and crosswalks at River Drive and Western Avenue.

Busing of students:

All elementary school children who need to cross Main Street are on buses. Oakley Elementary School is isolated. Witter Elementary School is K – 3 only. Hidalgo serves a small area, new school. Phil Swing and Hidalgo lend themselves to walking.

Other Comments:

West Main Street By Vons — Trucks blow through stops. Crossing to Vons parking lot is dangerous. Dangerous for seniors from the retirement home crossing Main Street with wheelchairs. Drivers often have the sun in their eyes. The last set of traffic lights is at Rio Vista Avenue, so this sets up speeding between there and the edge of town.

Plaza area and Main Street — Plaza area is a big problem with students on foot and heavy traffic. Semi trucks in the Plaza are dangerous. One

person at meeting was hit crossing Main Street at Plaza in 1991. Need a pedestrian bridge going north and south. Angles of Plaza streets and Main Street make it hard to look and find traffic. Difficult to twist neck far enough to see over your shoulder. Need a safe crossing. Visibility at 3rd Street and Main Street is poor, and there was a very serious accident there involving a High School student. Now there is a light at that intersection.

6th Street and Main Street intersection — The traffic signal changes too quickly, improve timing. This intersection gets a D + grade.

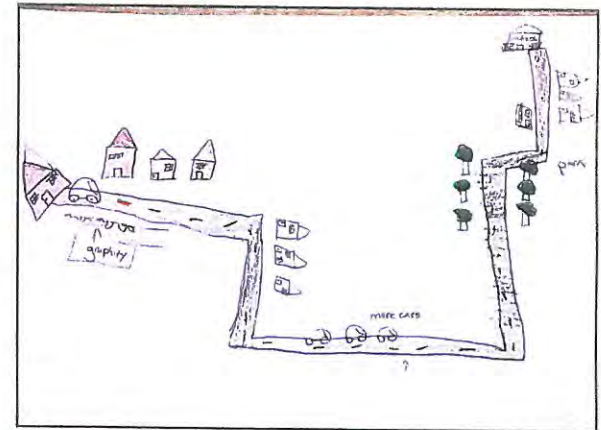
8th Street and Main Street — Revamping Ciudad Plaza building at 8th Street, but trucks are driving over the curb.

East Main Street — It doesn't feel like part of the City. It needs a gateway. Satellite of SDSU – High School – new edge of Brawley will be there.

Best Road — Speeds are 10 – 20mph faster there. Meat plant traffic is a problem. Cars speed drastically on East Main Street.

Parking — One area is behind Newberrys. Can't get to Main Street from that area. El Centro has good parking behind Main Street.

General — Hopefully this street design project will also look off of Main Street to school problem areas. Truck routes need improvement. Relinquishment won't solve the problem, traffic is growing.





BUSINESS COMMUNITY FOCUS GROUP

Chamber of Commerce conference room
October 12, 2006, 2PM

Attendees:

Scott Webster — 1200 block of East Main Street
Jesse Enriques — East Main Street businessman
Jay Kruger — Brawley Beautification
Nicole Nicholas Gilles — Brawley Chamber of Commerce
Ryan Brand — Irish Pub
Richard Mendez — Pioneers Hospital
George Nava — Brawley Main Street
Mary Miller — 500 Block business owner
Paul Chonet — Brawley Elementary School District
Greg Smith — 510 W Main business owner
Ted Riley — Brawley Main Street, businessman
Norma Jaurequi — Brawley Economic Development Department
Erasmo Gonzalez

Tony Leonard — Local Government Commission (LGC)
Paul Zykovsky — LGC
Steve Tracy — LGC
Kendra Stevens — Downtown Solutions

Comments and Issues:

Plaza Area:

The Plaza is an asset we should beautify, and take ownership of. It's difficult to cross the street. Plaza and surrounding area are too dark at night. Cars speed around angled corners in Plaza area. The Plaza area is a corridor for school kids, but needs safety improvements. Need better medians and more greenery, and graffiti abatement.

1200 Block of West Main Street:

Median won't work on that block. Attendee's business has a fuel station. Large tractor-trailer rigs are in and out of East Main Street businesses, and large RVs also.



Redesign and Traffic Calming:

Need to slow speeding vehicles down. Slowing vehicles is not a problem. Build on what is there already. Brawley Beautification supports a redesign. We need better crosswalks. Whole traffic flow pattern should be looked at. Lots of traffic going through downtown. Cars are going 70 MPH near Las Flores Drive. Dangerous to wheelchairs. Vons driveway doesn't line up with Marjorie Avenue. It's difficult to work with Caltrans, even to get a "Welcome" sign put up.

Land Use, Renovation, and Redevelopment:

Downtown looks bad. We need incentives to bring businesses in. Parks and water, greenery, trees. We need to address the issue of absentee building owners with poor maintenance habits who keep buildings as tax write off. We need more businesses in Downtown. The Planters Hotel needs to be preserved. Downtown needs to become a destination. It needs energy, better sidewalks, lighting, fresh paint, and a good

cleaning. The 300/400 blocks are full of weeds and need cleaning up.

Alleys and Breezeways:

Alleys can be used, but must be well lighted and safe. We need rear access to businesses, but it must be clean and well lighted. There has been talk of breezeways. Once money was set aside.

Parking Downtown:

Need more. Need safe parking behind businesses like in El Centro. Owners need to stop parking in front of their own businesses.

Economic Development:

We need to plan for what type of business should be downtown. We need funding to do this plan. The City needs to work with downtown businesses. Opening a Super Walmart will hurt. Main Street is not kid friendly. Kids need things to do so parents will come downtown and shop.

HISPANIC COMMUNITY FOCUS GROUP

Brawley Public Works Department Conference Room

October 12, 2006, 4PM

Attendees:

Manuel Avila — Brawley American Citizens Club

Jesse Enriques — Hidalgo Society

Tony Leonard — Local Government Commission

Steve Tracy — Local Government Commission

Comments and Issues:

There used to be more parking, and angle parking downtown.

The vacant lot at 6th and Main could be a parking structure.

Parking in back of businesses is not appealing. It is lucky a kid has not been seriously hurt or killed yet.

Must park in back, not enough in front. Lunch traffic people short on time.

Kids' security was an issue around high school "El Campo", is better now.

Strong-arm robberies by kids, gangbanger wannabes were a problem in the past. It is safer now than the 80's.





TRANSPORTATION AGENCY FOCUS GROUP

Brawley Public Works Department Conference Room

October 13, 2006, 11AM

Attendees:

Yazmin Arrelano — Director, Brawley Public Works Department

Alan Chan — Brawley Public Works Dept.

Jo Shields — Brawley City Council

Rosa Lopez — Imperial Valley Association of Governments

Frank Fiorenza — Imperial County Public Works Department

Jacob Armstrong — Caltrans Planning

Bob Corbin — Caltrans Operations

Dan Burden — Glatting Jackson

Tony Leonard — Local Government Commission (LGC)

Paul Zykovsky — LGC

Steve Tracy — LGC

Kendra Stevens — Downtown Solutions



Comments and Issues:

Main Street design project:

Caltrans wants to improve the quality of life in the cities. Narrow lanes and other changes may require a design exception from Caltrans, so that review should be planned for. Brawley should have development project environmental analyses look at Main Street impacts. Caltrans will review the Main Street project

report, which should have recommendations for with and without the bypass.

Caltrans will not allow any changes to Main Street until the bypass is complete, but there is a pedestrian crossing problem, but not a big one. Caltrans priority is keeping vehicle speeds up

LGC projects increase safety, lower speeds, but improve vehicle flow. Many short-term safety improvements are cheap and won't hurt Caltrans operations.

Brawley was denied Post Office to City Hall crossing improvements because they were not allowed to work within the Caltrans ROW.

Caltrans removed some mid-block crosswalks we used to have. Caltrans feels mid-block crossings are an accident waiting to happen.

We need better connectivity downtown. It is hard to get across Main Street with 45 MPH traffic. We need high-visibility crosswalks. It is hard for cars to get across, also. The traffic signals are not coordinated for slower speeds.

Negative comments about the Main Street project in El Centro, and desire not to repeat those mistakes in Brawley.

Highway 111 Bypass:

Bypass completion is in ROW and engineering phase now, but plan for completion no sooner than late 2009. Citizens are concerned about the bypass, but generally in favor of it. There is also concern about the impact on sales tax revenues