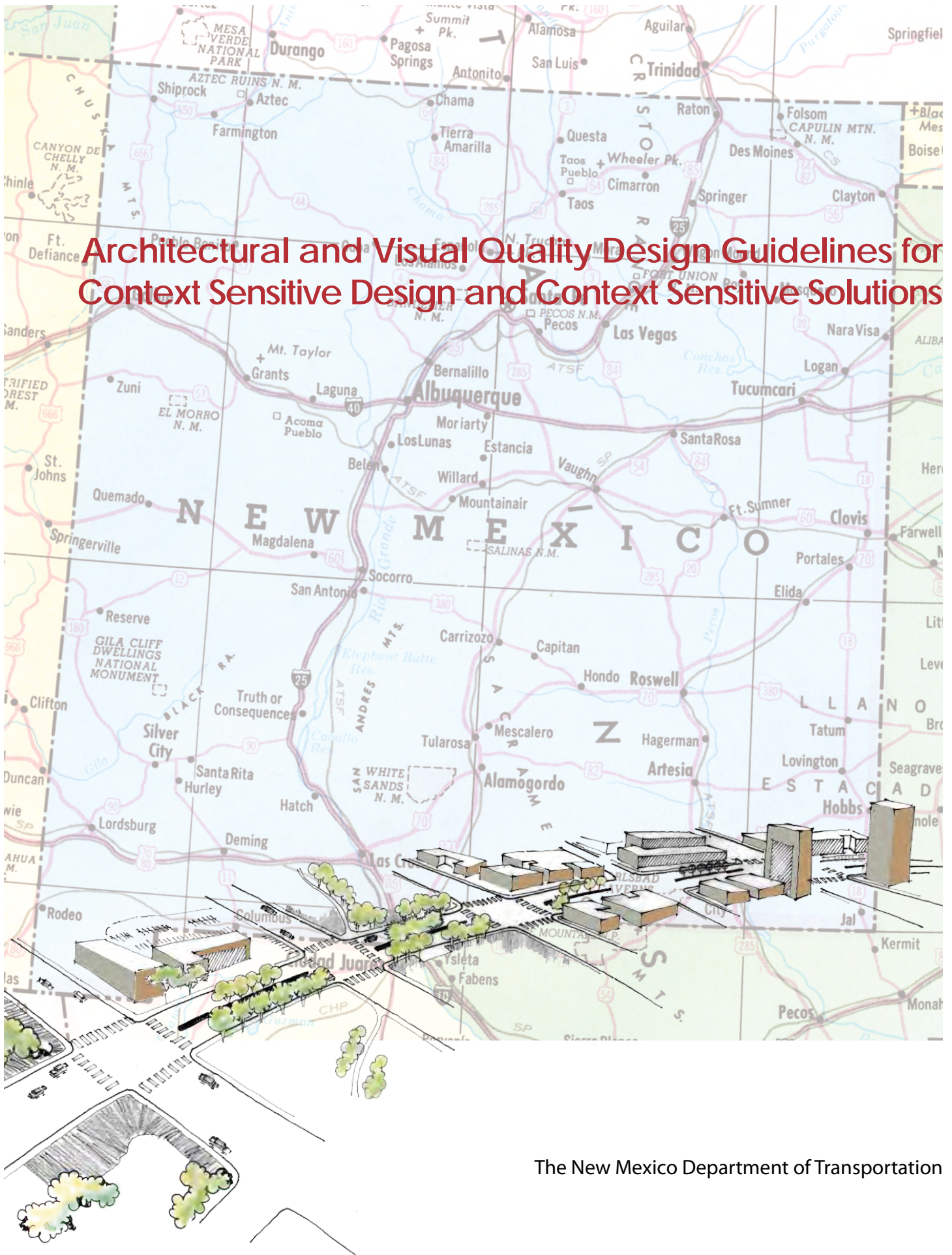


Architectural and Visual Quality Design Guidelines for Context Sensitive Design and Context Sensitive Solutions



The New Mexico Department of Transportation

Architectural and Visual Quality Design Guidelines for Context Sensitive Design and Context Sensitive Solutions

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Section 1

INTRODUCTION

A. PURPOSE AND STRUCTURE OF THIS DOCUMENT

Transportation agencies across the United States have come to recognize the importance of designing projects that take the local context into account – a movement known as “context sensitive design” (CSD) or “context sensitive solutions” (CSS). Beginning in the 1990s such efforts have studied existing neighborhood character, architecture, aesthetics, ecology, economics, and community needs, and have sought to incorporate those contextual dimensions into project planning. Increasingly, CSD/CSS is also required by federal and state regulation.

Taking the local context into account can help transportation agencies design better projects, generate local buy-in, and avoid opposition and litigation from local constituencies. CSD/CSS can save time and money while better meeting the needs of those communities that projects are expected to serve. In New Mexico and elsewhere, effectively implementing CSD/CSS is a major challenge for state Departments of Transportation and local transportation planning agencies.

Commissioned by the NM State Department of Transportation, this guidebook is intended to assist New Mexico transportation planners implement context-sensitive design. It provides the following resources:

- background on the subject
- processes for applying CSD/CSS
- guidelines for evaluating project contexts through a “place audit”
- guidelines for compiling an overall needs assessment
- a toolbox of alternative road design strategies for the New Mexico context
- suggestions for innovative ways to display and communicate proposals
- guidelines for evaluating alternatives and making decisions
- guidelines for evaluating the success of project CSD/CSS

Although this guidebook is focused on architectural and aesthetic dimensions of the project context, these are intrinsically linked to the economic, environmental, social, and cultural character of particular places. To a large extent these elements must be considered together when developing project designs that will work well with the project context.

A transportation project that changes architectural character and aesthetics, for example, may affect tourism, which is an important economic basis for many New Mexico communities. Likewise, projects affecting the natural environment may impact community livelihoods, historic identity, and local culture. When considering the context of a place, it is important to take a broad perspective, and that is one important theme running through this guidebook.

A team of researchers from the School of Architecture and Planning (SA&P) at the University of New Mexico (UNM) prepared this document in consultation with staff of the New Mexico Department of Transportation (NMDOT).

B. BACKGROUND

i. Definitions of CSD

There is no single, universally cited definition of CSD or CSS. However, there are a number of similar formulations of these concepts.

In particular, the Federal Highway Administration (FHWA) has issued the following definition of context sensitive solutions:

“Context sensitive solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist.” (quoted at http://www.contextsensitivesolutions.org/content/topics/what_is_css/.)

Certain state Departments of Transportation (DOTs) have developed additional elements of CSD/CSS definitions.

For example, the California Department of Transportation emphasizes public participation: “Context sensitive solutions are reached through a collaborative, interdisciplinary approach involving all stakeholders.” (“Director’s Policy: Context Sensitive Solutions,” California Department of Transportation, Sacramento, 2001).

The New York Department of Transportation includes a goal of “sustainability”: “Context sensitive projects recognize community goals, and are designed, built and maintained to be sustainable while minimizing disruption to the community and the environment.” (<http://www.dot.state.ny.us/design/css/about.html>).



*Tramway Pedestrian Bridge,
Albuquerque, NM,
Photo: Carrie Barkhurst*

ii. Brief History

During the past 35 years federal and state legislation has increasingly required that planners consider the environmental and human context within which projects would be carried out.

The National Environmental Policy Act of 1969 can be viewed as the forerunner of current CSD/CSS efforts, in that it requires agencies to thoroughly analyze the impacts of proposed federally funded projects, and to compare these impacts with alternative project designs including a “no build” alternative. Many states (although not New Mexico)

have adopted state versions of this law, which often expand its application and add more stringent requirements.

In 1991, Section 1016(a) of the Intermodal Surface Transportation Efficiency Act (ISTEA) required transportation projects that are built in areas of historic or scenic value to be designed to appropriate standards or to adopt mitigations to minimize impacts on those resources. ISTEA also strengthened requirements for public participation within transportation projects.

The 1995 National Highway System Designation Act emphasized flexibility in highway design so as to preserve historic, scenic, and aesthetic resources, and extended these considerations to federally funded projects not on the National Highway System. This Act also emphasized design that takes into account “access for other modes of transportation.”

A specific focus on CSD/CSS emerged nationally in the mid-1990s in response to increased public pressure at both state and federal levels. The FHWA implemented a pilot CSS project in 1997, working with the states of Kentucky, Utah, Minnesota, Maryland, and Connecticut. Vermont adopted CSS standards in 1997. As of 2005, 26 states had either adopted context sensitive policies or were in the process of developing these. In 2002 the FHWA, under Administrator Mary Peters, adopted the goal of having context sensitive solutions applied in every state by September 2007.

In 2005 the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) reiterated contextual considerations in Section 6008, and specifically called for project planning to incorporate concepts from the FHWA’s publication *Flexibility in Highway Design*, and from the 1998 conference “Thinking Beyond the Pavement.” These concepts include the following:

“Qualities of Excellence in Transportation Design”

- The project satisfies the purpose and needs as agreed to by a full range of stakeholders. This agreement is forged in the earliest phase of the project and amended as warranted as the project develops.
- The project is a safe facility for both the user and the community.
- The project is in harmony with the community, and it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area, i.e., exhibits context sensitive design.
- The project meets the expectations of both designers and stakeholders and achieves a level of excellence in people’s minds.
- The project involves efficient and effective use of the resources (time, budget, community) of all involved parties.
- The project is designed and built with minimal disruption to the community.
- The project is seen as having added lasting value to the community.

“Characteristics of the Process Contributing to Excellence

- Communication with all stakeholders is open, honest, early, and continuous.
- A multidisciplinary team is established early, with disciplines based on the needs of the specific project, and with the inclusion of the public.

- A full range of stakeholders is involved with transportation officials in the scoping phase. The purposes of the project are clearly defined, and consensus on the scope is forged before proceeding.
- The highway development process is tailored to meet the circumstances. This process should examine multiple alternatives that will result in a consensus of approach methods.
- A commitment to the process from top agency officials and local leaders is secured.
- The public involvement process, which includes informal meetings, is tailored to the project.
- The landscape, the community, and valued resources are understood before engineering design is started.
- A full range of tools for communication about project alternatives is used (e.g., visualization)."

Currently, most states are in the process of adopting context sensitive policy, and national organizations have emerged to promote this. One of the foremost of these is Context Sensitive Solutions.org, a project of the Project for Public Spaces and Scenic America in collaboration with the American Association of State Highway and Transportation Officials (AASHTO), the Federal Transit Administration (FTA), the Institute for Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO), and the National Park Service (NPS).

The FHWA also maintains a CSD website at <http://www.fhwa.dot.gov/csd/>.

iii. Benefits/need for CSD and design guidelines

Context sensitive design is generally seen as having a number of benefits. These include the following:

Improved definition of the "problem" to be addressed. By consulting with stakeholders and analyzing dimensions of the context beyond traditional transportation planning considerations, project planners can arrive at a broader definition of the "problem" to be addressed that better meets the needs of a diverse community of stakeholders.

Better-designed projects. Projects that take their context into account often do better at meeting their own project goals than projects that don't. Even if the project goal is simply the traditional one of increasing motor vehicle capacity and speed, the process of considering the local economic, land use, and planning context can help the project more accurately meet future demand.

Preserving historic, cultural, scenic, and environmental resources. Through CSD, transportation projects can potentially be designed to as to minimize impacts on important historic, cultural, scenic, and environmental resources.

Meeting the needs of more constituencies. Traditionally, transportation projects have often met the needs of certain constituencies rather than others. They have often provided facilities for longer-distance travelers and truckers, for example, rather than pedes-

trians, bicyclists, public transportation vehicles, and the disabled. Balancing the needs of all constituencies has increasingly become a transportation planning goal.

Improving the livability of local communities. Often, road projects have met long-distance travel needs while creating negative impacts for local communities. These impacts may include noise, congestion, air pollution, loss of historic character, and safety (due to higher speed and/or volume of traffic). Wide or high-speed roads may also serve to divide neighborhoods and create barriers for many pedestrians and bicyclists. Conversely, projects can seek to improve local quality of life by mitigating or avoiding some of these impacts.

Avoiding potential opposition and litigation. Projects that are insensitive to local context run the risk of opposition from a wide variety of organizations, including local governments and other public agencies. Such opposition can delay or kill projects through political or legal means. Litigants can use statutes related to the environment, historic preservation, Native American artifacts and religious sites, water availability, and the disabled to tie up projects in court.

Potential time and cost savings. Although contextual analysis and public involvement can take time and money up front, in the long run they may save both if they result in a better-designed project that meets local needs and avoids opposition. In some cases, CSD may result in a scaled-down version of the original project that is cheaper as well as more appropriate for the local context. For example, three-lane configurations for state highways may prove a better solution in many places than the default five-lane configuration that has often been employed. These lower construction costs and the amount of right-of-way that may need to be acquired.

Enhanced agency credibility. Through public consultation, involvement of stakeholders, and increased sensitivity to local contexts, the NMDOT and other transportation agencies can develop goodwill among local constituencies, and potentially gain credibility as planning entities that understand local needs.

Fulfilling democratic values. Involving multiple stakeholders and local communities helps ensure that citizens have a say in planning that will affect them, potentially generates consensus behind the best possible projects, and avoids the harmful “top-down” planning that has historically damaged many communities.

IV. CSD APPLICATIONS AND TRANSPORTATION SETTINGS – TOWN, TRANSITIONAL, RURAL

Context sensitive design can and should be applied in a wide range of different settings. Basically, every transportation project has a context, and understanding that context can help create a better project as well as meeting local needs.

In New Mexico there are a number of types of DOT projects that call for special attention to CSD.

State highways through small towns and older commercial corridors within cities represent one typical design problem. Throughout the U.S. in the past, such roads have often been widened from two to three, four or five lanes as a way to improve capacity and traffic flow. But this has often required acquisition of right-of-way and has led to the displacement of local businesses, destruction of historic buildings or landscape features, and replacement of unique, traditional small-town design character with more generic, roadway-dominated environments. More sensitive treatment of road projects in this small-town context is important in the future.

Bypasses around small towns are another typical problem area. Such bypasses have often been constructed nationally as part of a strategy to preserve historic businesses in the town center, which might be displaced by road widening in downtown locations, but often lead to large problems in their own right. Typically what happens in the absence of local land use planning to prevent it is that strip commercial development occurs along the bypass. This alone may undermine the character of traditional rural or small-town landscapes, and may have the additional impact of drawing market share away from downtown businesses. The local jurisdiction then winds up with a dying downtown and a new suburban landscape outside of town.

New or upgraded roads in transitional settings near existing cities or towns often present CSD/CSS problems. These facilities may be desirable as a way to improve accessibility. However, by the same token, they may help open previously rural land up to development, especially if this land is privately held rather than being in government or tribal ownership. In the East Mountains area east of Albuquerque, for example, improved roads have helped facilitate “rural sprawl” – a form of development in which low-density subdivisions and “hobby farms” spread across forested or agricultural land. Similar low density development is occurring around Santa Fe, and may occur along new or improved roads in many other parts of the state.



*Public Art Pedestrian Path along San
Mateo, Albuquerque, NM
Photo: Carrie Barkhurst*

Road development in rural or semi-rural locations is likely to help bring about changes in the traditional character of the landscape that should be considered when planning the project. Road projects in such areas are also likely to generate greater traffic in the future (“induced demand”) that may then require additional roads and other public investment. In such situations DOT staff should consult with local authorities and regional councils of governments about “smart growth” strategies that can coordinate transportation investments with land use planning.

State highways in urban settings may need radically different design treatments than in

the past. In the past, transportation planning goals have often been simply to increase capacity and smooth out traffic flow. Now, a much more complex mix of goals must be addressed in urban situations, including local economic vitality, downtown revitalization efforts, historic preservation, and bike- and pedestrian-friendly design. These new goals require far more attention to the local context. This need is likely to grow in the future as New Mexico cities and towns gain population and become more urban in character.

Highways through tribal lands, pueblos, and villages require special treatment. The landscapes themselves may be sacred to the tribes, or may contain particular places or features of importance (such as petroglyphs, trails, or ancestral village sites). Road expansion may also affect tribal businesses, the character of pueblos and businesses, and traditional ways of life. Working with tribe members and tribal governments is the only good way to identify such issues, and is required for projects receiving federal money.

Public transportation projects represent a relatively new set of initiatives within the state that also must be developed in a context-sensitive way. The Rail-Runner Train, for example, has resulted in the development of stations in urban Albuquerque, Belen, Isleta Pueblo, and Bernalillo. These stations, platform areas, parking lots, and access facilities have been designed for each local context.

v. CSD guidelines elsewhere in the country

Following pilot projects in Kentucky, Utah, Minnesota, Maryland, and Connecticut, all 50 states have begun developing CSD/CSS guidelines and policies, as required by federal law.

One of the initial pilot states, Minnesota is currently one of the most advanced not only in developing CSS policy, but in training DOT staff to implement it. Mn/DOT has a training program that has offered 1-, 2-, and 3-day CSD workshops that have trained more than 500 professionals. The state's training materials are available online at www.cts.umn.edu/education/csd.

Another of the original pilot states, Utah has incorporated CSS policy into all phases of UDOT's operation, and established a CSS Director position in 2002. Public Involvement Coordinator positions were created in each of the state's regions, and more than 400 employees, including all UDOT leaders, have completed CSS training. As part of its public involvement strategy, UDOT has held Community Transportation Planning (CTP) meetings to help guide future transportation projects and expenditures in rural areas.

Under Transportation Commissioner Carol Murray, New Hampshire has been a leader in involving the public in transportation planning, and has reached out actively to public organizations such as People for Public Spaces for help in developing policy. Although the state has not yet adopted policy, it has applied CSD to several road projects.

Arizona is currently applying CSD principles to one of the state's most pristine highways,

State Route 179. The state developed a “Needs Based Implementation Plan” as a way to more completely incorporate community input. Information is available at <http://www.scenic179.com>.

Florida’s CSS program is known as Transportation Design for Livable Communities (TDLC). The state is taking a decentralized approach towards implementation, with separate sets of TDLC goals being established by eight different districts.

Kentucky has developed a Project Impact Profile (PIP) process to summarize the impacts for each project as well as relevant legislation and needed actions. These actions are further cataloged in a Project Commitments Ledger, which is provided to contractors as part of the bid process. The state has also developed a training program to educate its construction engineers and contractors.

Oregon, like New York, is incorporating the theme of sustainability into its CSS planning. The state’s DOT has developed an overall Sustainability Plan that includes many context sensitive elements. A citizens advisory committee is generally established for each project, and other outreach efforts undertaken including workshops, newsletters, and meetings with different stakeholder groups.



I 40 Median Planting, Albuquerque, NM
Photo: Baker Morrow

vi. Barriers to successful context sensitive design

It is important to identify a number of conditions that work against context sensitive design, and if possible to anticipate and defuse these. Many of these factors are practical in nature, and addressing them also helps ensure that projects are clearly articulated, well-designed, and well-managed.

One basic difficulty is in **understanding the context** in which a project is being considered. The place audit strategy below is a way to develop such understanding. Involving stakeholder groups and members of the general public is another important method, since these constituencies may have knowledge of the local context, from architectural history to economics, that would not be discovered otherwise.

A related difficulty is in **determining the appropriate level of analysis** of the context. An extremely detailed analysis can be time-consuming and expensive. However, an overly brief analysis can miss important features of the context, at minimum, meaning that the project design does not respond fully to these needs, and possibly even leading to local opposition and litigation if these elements are important enough to local constituencies. The process discussion in Section 2 below can help determine an appropriate level of analysis for each process.

A third difficulty is in **arranging for good, efficient public consultation**. Working with the public is not easy, but is important in order to gain important contextual information, to meet legal requirements, to develop local consensus behind a project, and to conform with the ideals of a democratic society. Poorly designed participation processes can be as bad as no participation at all. For example, a very lengthy series of public meetings on a project can burn out both agency staff and members of the public, consume large amounts of time and money, and result in only the most die-hard activists attending after a while. Often a short, focused set of meetings at appropriate points within the project development process, combined with individual contact with key constituencies, is a more effective process. DOT staff may not have extensive background in public participation, and so this function might be contracted out, or additional staff brought on board or trained in public process skills.

A fourth difficulty is in **making sure that context analysis and development of design alternatives is carried out early in the project process**, not as an afterthought toward the end, when most parameters of the project are already well established and participants are already bought into certain solutions. Doing such analysis early allows the project managers to develop more creative alternative designs or mitigations to meet local needs, and may save substantial time and money while producing a better solution.

A fifth difficulty is in **identifying appropriate team members and consultants** to perform CSD/CSS. Often state DOTs or other agencies have particular areas of expertise, such as in project engineering, but little background in other important areas, such as urban design, ecological analysis, or community involvement. These tasks may need to be contracted out, but relationships with and knowledge about such contractors may not exist. The relevant agency itself may need to rethink its own organization in the long run to bring such staff on board. Both are challenges, and will be discussed more in Section 2.

Failure to consider a complete range of design alternatives can be a major obstacle to CSD/CSS. If some alternatives are ruled out from the beginning, agency staff and stakeholders will never know if they might have been feasible or preferable. Generally this occurs when agency staff begins with rigid notions of what the project should consist of, holds rigid views about what is possible within road design (for example, that lanes cannot be narrowed to less than 12 feet), or considers alternatives too far along in the process, when the agency has already become committed to a particular approach.

Coordination within DOT teams or between DOT staff and contractors is a frequent

additional problem. For example, project designers may develop pedestrian-oriented road designs when a state highway passes through a town, but other engineers on staff or the construction contractor's personnel may not have experience with such designs, and may alter the designs before construction or construct them poorly. Careful coordination, project management, and staff or contractor training can help address this problem.

Lastly but perhaps most fundamentally is the problem of **overcoming institutional inertia**. Large agencies such as DOTs change slowly and may resist new ways of doing things. CSD/CSS may not be taken seriously, or may be carried out in cursory or perfunctory fashion. Those individuals within the agency who understand the need may not be listened to, or may not be given the attention and resources that they need to carry out the process. Different agency staff or offices involved in different elements of CSD/CSS may not be coordinating their work well. These problems can often only be addressed through leadership from within many levels of the agency, and adoption of more unified and coordinated approaches to context sensitive project design.



*Healthy root system planter.
Tempe, AZ
Photo: Alf Simon*

C. WHAT CSD MEANS IN NEW MEXICO

The state of New Mexico possesses a wide range of unique cultural and natural landscapes that make context-sensitive design particularly important. Some of these settings are now urban, some are associated with small towns, and some concern rural areas where even such characteristic as fences, fields, irrigation ditches, and outbuildings can possess a unique local character with deep cultural roots. The cultural landscapes, architecture, and natural beauty of the state are important elements of its identity and economic welfare through activities such as tourism, movie production, the arts, and retirement living.

Because it has been inhabited by humans for thousands of years (to at least 13,000 BCE), the state possesses layers of community character related to Native American, Hispanic, or Anglo periods of settlement. Deciphering these layers of context can be a particular challenge to CSD/CSS here. New Mexico has one of the strongest regional characters of any state in the country, and preserving the elements that make up that character is of particular importance.

New Mexico has a very wide range of traditional constituencies and conditions that make CSD/CSS challenging here. Numerous Native American tribes control a sizable fraction of the state's land base, as do a wide range of federal, state, regional, and local agencies. Spanish land grant communities still exist in parts of the state, with land ownership questions often unsettled. Archeological sites exist in virtually every part of the state. Water rights, water availability, and appropriate drainage treatments are all often controversial. Pedestrian fatalities and drunk driving are more notable problems in this state than in many others, and may demand additional attention to safe road design. For these and other reasons, CSD/CSS is both particularly important in New Mexico and particularly challenging.

D. RELATION OF CSD/CSS IN NEW MEXICO TO NATIONAL STANDARDS

State contexts vary greatly, and as described previously state DOTs have taken a variety of different approaches toward implementing CSD/CSS. Beyond the general goals specified by the FHWA and federal legislation, there are no national standards for the CSD/CSS process itself. But it is clear that such processes must consider a wide range of contextual dimensions, including environmental, aesthetic, historic, and cultural considerations, and that they must include extensive involvement of stakeholders.

As discussed above, CSD/CSS in New Mexico is very important. New Mexico has a variety of unique cultural landscapes, which have great value to local constituencies. New Mexico has an unusually long historical and archeological record, which is also of scientific and cultural importance. The cultural and scenic resources are important to tourism and other economic activities. Lastly, there are pressing problems with road safety, due to high rates of drunk driving and pedestrian fatalities.

National standards for road design have often been an obstacle to CSD/CSS in the past. By their nature, these guidelines are often not good at taking local contexts into account. NMDOT has adopted the AASHTO "Green Book" (A Policy on Geometric Design of Highways and Streets) as its design manual, but some flexibility in applying such design standards is advisable in order to meet the needs of local contexts and stakeholders. In recent years, AASHTO and other national organizations have published a variety of new materials that often represent updated approaches to road design. AASHTO's Guide for the Planning, Design, and Operation of Pedestrian Facilities is one example. These updated standards can be an important resource for CSD/CSS.

The Transportation Research Board's National Cooperative Highway Research Program released a report in 2002 entitled *NCHRP Report 480: A Guide to Best Practices for Achieving Context Sensitive Solutions*. This document is particularly useful in giving examples of specific highway projects in which CSD/CSS was applied, and general guidelines about how an agency might best adopt CSD/CSS.



2.0 The Process of Applying Visual Quality Design Guidelines for CSD

Section 2 The Process of Applying Design Guidelines for CSD



UNM student interdisciplinary design team for DPAC/Mainstreet design project in Roswell, NM
Photo: Anne Godfrey
TOO DARK

A. IDENTIFYING THE INTERDISCIPLINARY TEAM

Context sensitive design will usually require a somewhat broader project development team than traditional forms of transportation project management. Staff or consultants with skills in public participation, context analysis, and alternative design strategies will be needed.

Specific needs will depend on the project. However, the project manager should begin by reviewing potential elements in the place audit (described in Section 3 below) to determine which of them can be handled by existing staff and which might require the addition of consultants or consultation with staff from other agencies.

Once team members have been identified, project management staff will need to establish a CSD work plan, taking into account the time and resource needs of different types of contextual analysis, and leaving sufficient time to develop design alternatives that will respond to this analysis.

B. EVALUATION AND ANALYSIS OF THE CONTEXT: THE PLACE AUDIT (DETAILED GUIDELINES IN SECTION 3)

The heart of the CSD/CSS process lies in the actual evaluation of the context which is called the “place audit.” This procedure systematically reviews many potential elements of the cultural, historic, economic, social, and environmental environment that may be affected by the project, analyzes potential impacts, and develops information that can then be used to generate context-sensitive design options. Some dimensions of the context will bear relatively little relation to a given project, and can be assessed briefly and then summarized in a succinct fashion. But other dimensions will need much more in-depth analysis.

Presumably the project management team will have already developed a problem statement analyzing the nature, scope, and severity of the transportation problems being addressed. Coupled with this should be a brief summary of the context within which problem solutions will be implemented. This step identifies the geographical area to be studied and provides an initial indication of the severity of potential impacts and extent of analysis. It is a preliminary guide to the more detailed work of the place audit.

To carry out the place audit, project staff will need to synthesize existing data from many sources, and may need to generate new data for specific elements that have not been previously studied. Information regarding landmarked structures, archeological sites, endangered species, hydrology, and many other topics is already available from local, regional, state, or federal sources. Other types of information, such as the traditional architectural character of a given street, the numbers and types of current businesses

along it, or the typical routes and behaviors of pedestrians in a given place will probably not have been previously gathered, and will have to be collected. The current needs and desires of local constituencies and organizations will need to be determined through public participation processes.

Much if not most of the contextual data can be mapped along the project route through geographic information system (GIS) software. This software, currently in use by most large public agencies, allows project staff to spatially reference data to determine the exact locations of existing conditions and potential interrelationships between contextual elements. GIS systems such as ArcGIS create layers of data that can be overlaid, analyzed, and coordinated with computer-assisted design (CAD) drawings showing project design detail. Much data for a particular project site is currently available from state agencies, counties, or cities and towns. As much as possible, place audit data should be integrated with pre-existing spatial data into a comprehensive, multi-dimensional project GIS system.

Another vital part of the place audit involves consultation with stakeholders (groups or individuals which may be affected by the project). As a rough rule of thumb, the more severely a stakeholder will be impacted or the closer to the project they are located, the more extensive should be the consultation with them. Such consultation should occur as early in the process as possible (many groups do not appreciate receiving word after initial decisions have been made), and should be ongoing. Different types of contact are appropriate at different times. A brief initial call or meeting with the leadership of a given group may be sufficient to notify them that the project is being considered and solicit their input on elements to be considered in the project evaluation. But down the line, a much more extensive workshop or design charrette may be desirable to involve a much greater number of people in the task of identifying design alternatives.

Specific types of stakeholders and process options are discussed further in Section 3.3 below. The entire place audit is described in Section 3.

C. SYNTHESIZING INFORMATION AND ARTICULATION OF A STATEMENT OF CONTEXT – DETERMINATION OF NEEDS

Once the place audit is completed, the task becomes to determine its implications for project design. One main step to help do this is to create a concise statement of context and needs, along with a table analyzing the potential severity and nature of different project impacts. The “needs” in this statement represent the agency’s initial determination of project goals as modified by a fuller understanding of the context and stakeholder desires. The process of summarizing the context and needs is discussed in Section 4.

D. DEVELOPING DESIGN ALTERNATIVES

Having determined potential project impacts, project staff can develop design alternatives to mitigate or avoid these impacts. This process should be carried out in consultation with stakeholders, as they may have the most detailed knowledge of the project context and local needs. Members of the public and concerned constituencies may have

previously suggested particular alternatives in contacts with project staff. Additional public contacts, workshops, or design charrettes may be desirable as well. Local officials should certainly be consulted for their input on both the process of developing alternatives as well as the alternatives themselves.

It's also crucial for staff to be creative when developing alternatives, and to look beyond traditional strategies. The field of transportation planning has changed enormously in the past 15 years, and alternatives that would not have been considered a short while ago are often appropriate now. For example, in newly developing suburban areas nationally boulevard designs have become an alternative to wide arterial roads, providing extensive landscaping, pedestrian, bicycle, and local access facilities in addition to fast travel lanes. Roundabouts are now being proposed in some locations instead of signalized intersections. Three-lane arterials are seen as sufficient in some locations instead of

five-lane versions. Roads and traffic lanes are actually being narrowed in some U.S. communities as a way to slow traffic and accommodate transit or non-motorized modes of travel. Keeping an open mind about such alternatives, and researching "best practice" examples nationally, is part of a creative project development process.

The process of identifying and studying project alternatives as well as a "no build" alternative is specifically required as a part of environmental impact analysis for any federally funded project by the National Environmental



Historic building along state highway in need of restoration and CSD solutions. Carlsbad, NM. Photo: Anne Godfrey

Policy Act. "Scoping" meetings are also required to allow members of the public to comment on the scope of alternatives and impacts to be analyzed. Design alternatives are discussed in Section 5.

E. DISPLAYING AND COMMUNICATING PROPOSALS AND IDEAS – VISUALIZATION STRATEGIES

After identifying alternative strategies, these need to be developed to an extent that they can be analyzed for feasibility and impacts. They also need to be presented to stakeholders for further input and potential refinement. Graphics can often help do this far more effectively than textual description. Specific communication strategies are discussed in Section 6.

F. EVALUATING DESIGN STRATEGIES, INCLUDING FUNDING, REGULATORY, ENVIRONMENTAL CONSIDERATIONS AND COMMUNITY FEEDBACK

Perhaps the most important part of the decision-making process involves the evaluation of different alternatives for final design for the project. Too often this step is omitted within transportation project decision-making nationally. The essence of CSD/CSS is to have the context influence the design, and so to avoid being locked into traditional or generic project designs too early in the process. This step of the process is addressed in Section 7.

G. CHOOSING AND IMPLEMENTING A CSD/CSS PLAN

The culmination of the CSD/CSS process is a decision on a particular project design incorporating context sensitive solutions, followed by implementation of the project. This decision should rely on the previous evaluation of design alternatives, which takes contextual and stakeholder information into account. This process is also discussed in Section 7.

H. EVALUATION OF CSD PROCESS AND OUTCOMES

A very important piece of the process involves the evaluation of the CSD/CSS process and outcomes as the project is built and starting to be in use. Without this sort of process and construction evaluation, important lessons for future projects are often missed. Evaluation can also help the agency develop more effective CSD/CSS processes in the future, and can be a valuable educational process for agency staff. The evaluation process is discussed in Section 8.



3.0 Guidelines for Evaluating the Context : The Place Audit

This section provides guidelines for understanding various dimensions of the local context through the mechanism of a “place audit.” This strategy compiles contextual data into a single document which can be easily read and understood by project personnel, consultants, and community members. It is important that this document be concise and focused, but detailed enough to accurately point out all contextual considerations that are important for the project. Maps, photos, and other graphics are essential ways to communicate many contextual elements.

For any given project, some dimensions of the context will be more important than others. Some may require a very detailed study, while others can be investigated relatively quickly. But for every project it is important to lay out the entire picture, so that those involved can understand how different dimensions of the project and its context fit together, and so that both project staff and community stakeholders have enough background information to develop useful design alternatives or mitigations.

In this chapter each element of a typical place audit is illustrated with sample data and graphics. This information is purely illustrative, and is provided to show how concise descriptions of a particular context might be presented.

ROADWAY AND TRAFFIC CONSIDERATIONS

(FROM A CSD/CSS PERSPECTIVE)

The information in this design analysis is a small segment of the very detailed roadway and traffic analysis carried out by the design engineers. The purpose of including these considerations in the place audit is to add to the information regarding the way in which the roadway corridor is used, and to understand the experience of movement along the corridor. This data is useful in determining how design decisions can be applied to issues of signage and legibility, driver and pedestrian safety, and parking needs.

Traffic types

The vehicle types using the corridor are as follows:

Automobiles 82%

Pickup trucks 9%

2 axle, 6 tire trucks 5%

The remaining 4% is divided among the categories of larger trucks, buses and motor-cycles.

In general, this route serves a primarily local function, with longer-distance regional traffic and most large trucks using the arterial street to the west or the freeway to the east. Local trips and deliveries appear to make up the vast majority of trips.

Traffic Volumes

Traffic volumes appear to be stable along this corridor and are indicated by the numbers in red on the map opposite. Peak am and pm rush hour volumes currently result in Level of Service D at the intersection with Algodones Drive. Lesser congestion is also observed during morning and afternoon peak periods around Taylor Elementary and Hidalgo Middle School. The Miramonte shopping center is a large traffic generator along this route. Substantial new residential development to the west appears to be raising traffic volumes on cross-streets. Little new development is likely to the south, meaning that long-term volumes are likely to be relatively stable.

Traffic speeds

Speed limits vary between 30 and 40 mph along the corridor and are indicated by the numbers in green on the map opposite. Actual speeds are between 35 and 45 miles per hour, indicating an inconsistency between the design of the roadway and the desired speed. Particular speeding problems have been documented through radar counts near the intersections of Rinaldo and Tomatillo. Between the intersections of Vegas and Ruiz, local residents report that motorists frequently make unsafe passing motions in this relatively long, straight stretch of roadway. The accident history shows several recent fatalities in this location.

Parking

Parking occurs along the aprons/shoulders on each side of the road and is related directly to businesses and other land uses along the corridor. The current land use pattern suggests that there is not a need for additional casual parking. Most businesses have substantial off-street parking available.

Accidents

There were a total of 215 accidents in the past 5 years along the corridor segment under review. These are shown as dots in the map opposite. The locations of accidents indicate

design problems in these areas.

Over 90% of accidents involved another vehicle

6% involved a fixed object

2% involved parked vehicles

.5% involved pedestrians

.5% involved cyclists

Transit

Transit movement along the corridor accounts for only .06 of the traffic activity. Stops are shown as squares on the map opposite. Transit stops do not offer any amenities for people waiting for buses. Future transit plans for this road should be taken into consideration in the final design

Intersections

There is one major and 15 minor intersections along the corridor. Only the major intersection has a traffic light, and none of the others have formalized pedestrian crossings. Crossings in certain areas, such as the elementary school, the library, and other popular destinations would be desirable.

Turning and Access

There is no center median and as access is required to each lot along the corridor, left hand turns occur continuously. There is no center turning lane. Local residents and business leaders express frustration with difficulties in making left turns across the roadway, especially in the section between Vegas and Ruiz where unsafe speeds and passing motions have been reported.



GENERAL CONTEXTUAL CONDITIONS

Figure Ground

Figure ground maps help individuals understand the relationship between built space and open space along the corridor, as well as to see the general building pattern and typical building footprint characteristics.

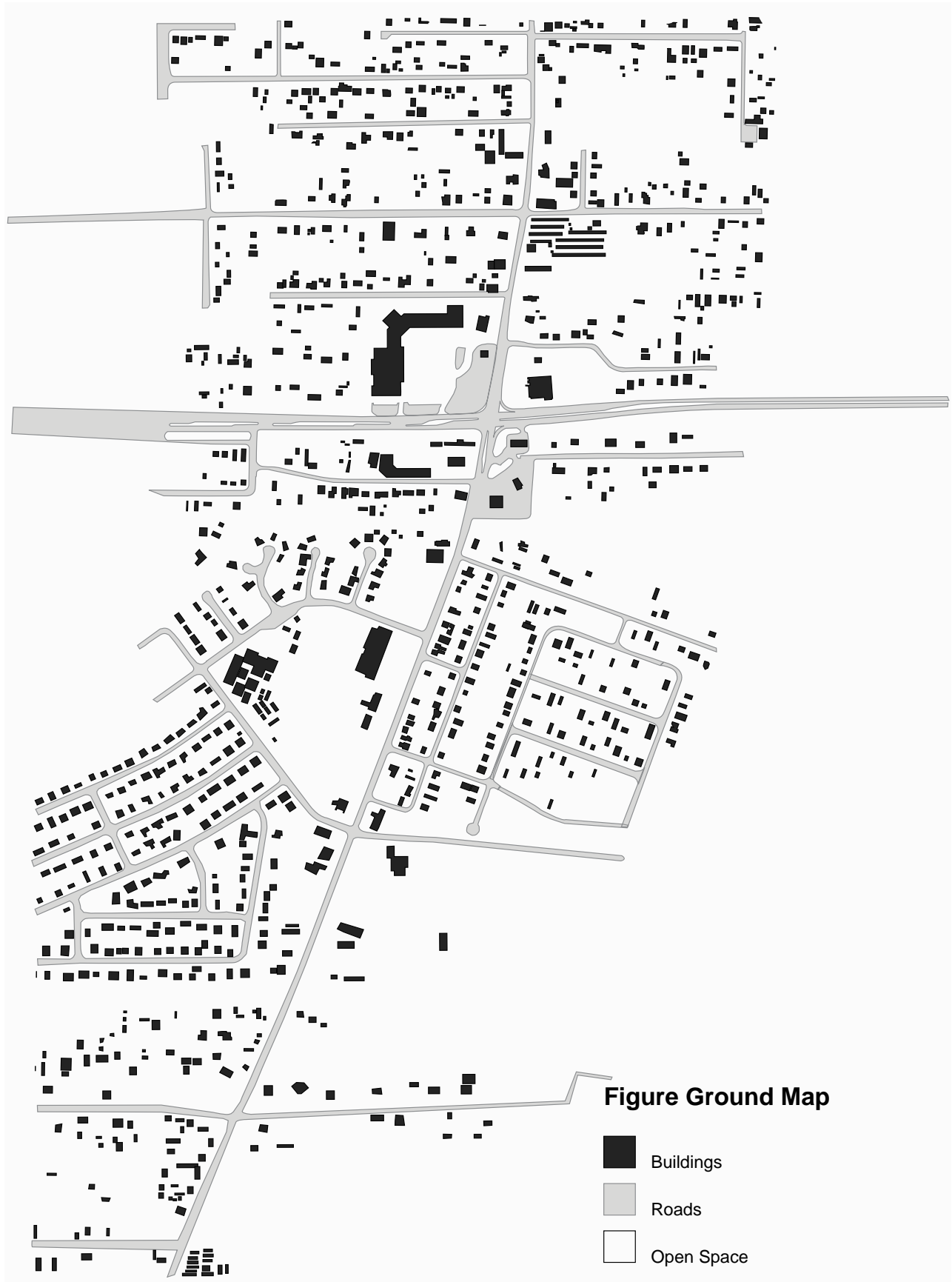
This information on built form context is important to understanding the broad sense of visual character, spatial distribution and roadway experience.

The figure-ground map opposite indicates a low density environment with small building footprints and a significant amount of open land. The corridor character changes to the south with very large open areas that could be connected to agricultural or open space uses.

At the center-north sections of the map we see small buildings at the edge of the street in a traditional urban or semi-urban street pattern. The building pattern behind the street indicates one and two acre incremental residential development

In the center-south area the pattern of building placement along the street suggest that these might be historical in nature and could warrant further investigation. The buildings behind the street in the south indicates a smaller lot size tract suburban-type residential development.

The larger intersection at the center indicates a more recent style of commercial and strip mall development.



Land Use Along the Corridor

This information is used to assess the variety of land uses that contribute to the character and make-up of the corridor.

It contributes to an understanding of the opportunities for economic development along the corridor and may help the design team to understand safety and accessibility issues at various locations. For example, commercial facilities and public institutions may be likely to generate pedestrian traffic or large volumes of motor vehicle traffic that should be accommodated in the project design.

In the map on the right we can see that the lands along the corridor are primarily commercial with some institutional and residential uses. Because of the low density nature of this suburban commercial pattern it is likely that there will be frequent access (left turns) required to the various buildings along the corridor.

Data sources: County GIS data



Property Values Along the Corridor

The economic value of different properties along the project route, can be an indicator of the feasibility of acquiring land along the corridor, if such acquisitions are deemed to be beneficial to the roadway and its ancillary development.

Property value analysis is also a way of understanding the tax base generated by the project corridor.

Data sources: County GIS data



Land Ownership Along the Corridor

For an initial evaluation it is useful to know which lands along the corridor are publicly owned and which are privately owned. Publicly owned lands may be more readily available for uses that support roadway development such as information centers, park sites, public art or surge pond sites.



SPATIAL CONTEXT

Cross Sectional Analysis

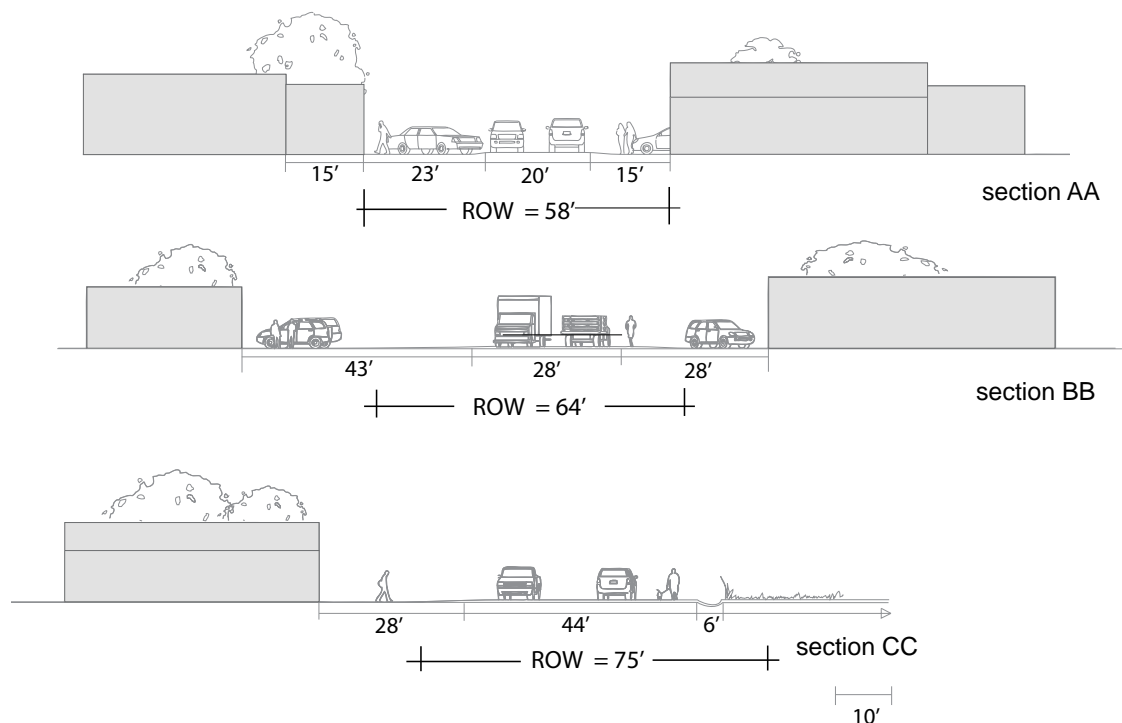
A cross sectional analysis of a road corridor will show the typical configuration of built forms within the corridor and their relation to the roadway itself. As a design tool the section helps individuals understand the scale and spatial character of the corridor, and can indicate where the spatial distribution might be changed in order to address specific conditions and roadway character. For example, a detailed section drawing can help determine possible opportunities for landscape development and pedestrian facilities.

Section AA demonstrates a section through a two lane portion of roadway that has a total of 20 ft dedicated to the traffic lanes, and an unpaved 20 ft apron on either side of the street dedicated to parking and informal pedestrian movement.

Section BB demonstrates a section through a two lane portion of roadway that has a total of 28 ft dedicated to automobile traffic. The left side of the road has a large unpaved area dedicated to parking and pedestrian movement while the right side only has about half that area.

Section CC demonstrates a section through a four lane portion of roadway that has a total of 44 ft dedicated to automobile traffic. Again we see about 28ft on the left side dedicated to parking and pedestrian traffic. The right side of the road way gives way to agricultural lands.

Each of these sections also demonstrates that the buildings along this roadway are one story and set a minimum distance of 20 ft from the road edge. The aprons are primarily dedicated to parking resulting in an informal and potentially dangerous pedestrian zone.





Architectural Character

Identification of the architectural character along the corridor is important so that transportation projects respect and compliment this character and the unique qualities of the roadway. Many of the buildings along the road may have historic or cultural importance, and may represent cultural values and regional styles. Preserving these buildings may be important. The architecture may also display the economic character and evolution of the roadway environment, for example, the presence of small, locally-owned business that may be sensitive to drastic changes in the roadway environment. Each building and its character should be cataloged, and significant structures mapped along the project corridor.

Local historical societies, public institutions such as libraries, and community groups may be important sources of information regarding historical architectural character. Historical photos and maps can help add detail to this section on architectural character.



Fig. 1 This commercial complex at the north end of the corridor has strong ethnic vernacular flavor brought out in the bright colors and the signage style



Fig. 2 This site is a small business with a residence attached. Small family-owned and operated business are common along the street



Fig. 3 This commercial complex in the area of the intersection of the two major roads is in contrast with the rest of the architecture in the corridor. The architecture and site design is typical of generic strip mall development



Fig. 4 The bank building is an interpretation of adobe-style architecture and is set back from the street to allow parking.



Fig. 5 The southern area of the corridor has more of a rural/rural residential character.



Fig. 6 A small grocery/C store with a parking setback. The building is 1960's and typical of C store architecture, except for the deep overhang characteristic of traditional southwest buildings.



Corridor Zones

This section identifies specific character zones along the corridor. These zones may have different street configurations, and/or different types of built form and historic use. Gateway or transitional zones may also be important, and may benefit from particular design treatments.

In this case, the corridor is primarily a two and three lane roadway that varies in speed and width. The width can vary between 20 and 44 feet, and the speed varies between 30 to 40 miles per hour. The majority of the street has a 40 mph speed limit, which is too fast to view the commercial establishments along the corridor. Three distinct zones can be identified by virtue of the land use characteristics, the road width, the number of lanes and the spatial enclosure of the corridor.

Zone 1

The northern end of the corridor has a mixed residential and commercial use that appear to work well together. It is the area in which you see most pedestrian traffic. The road is narrow (20-24' wide) with shoulders wide enough to park a car perpendicular to the roadway. This is a zone that has a safe and comfortable communal feel. The zone has the highest proportion of residential use. Both the residential and commercial structures are deteriorating, but do receive a degree of maintenance.

Zone 2

Moving south the roadway widens, becoming 2 lanes in each direction. The zone is heavily commercial, with a major intersection towards its northern end. Newer strip-type commercial development is dominant in the intersection area, including a strip mall, a gas station, a medical clinic and a fast food establishment. This zone has the least residential use, and is the least pedestrian friendly. Parking is located in front of the businesses, and the result is that the corridor has a less comfortable feel.

Zone 3

Here the roadway is reduced in width and becomes more pedestrian friendly. The zone is mainly residential and agricultural, with some of the agricultural land being transformed into residential lots. The open agricultural fields give the corridor a rural feel.



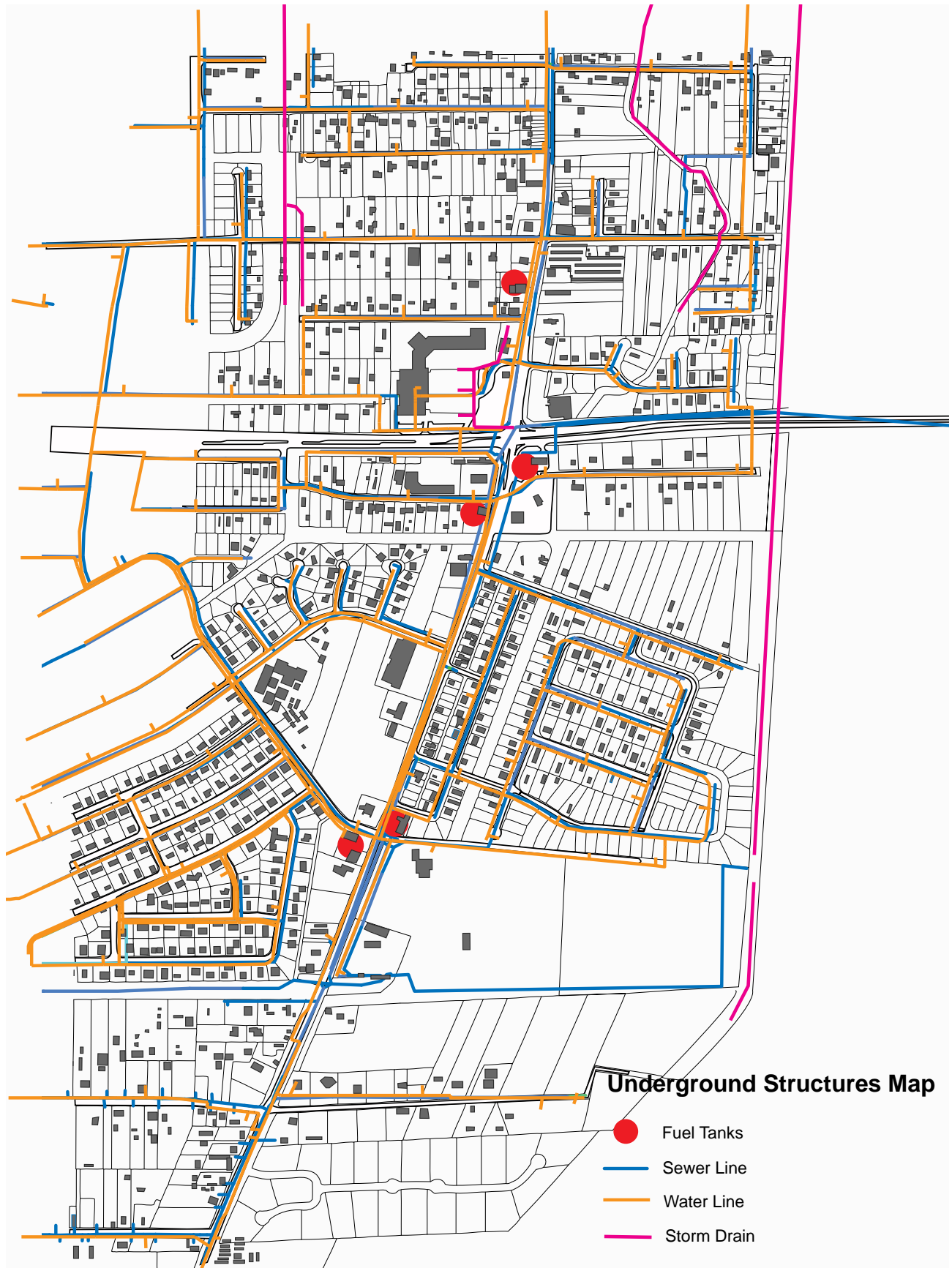
STRUCTURES

Underground Structures

The locations of underground sewer lines, storm water drains, water supply lines underground fuel tanks, gas lines and communication cable should be identified.

The map at the right shows, as in most urban corridors, the underground services running underneath the roadway. This could have an impact on cost, and if infrastructure upgrading is due it may be an opportune time while the roadbed is removed. Buried fuel tanks, particularly those out of commission, may suggest that remediation is required and investigation should be carried out to determine whether any of the subsurface of the roadway may be contaminated.

Sources: County GIS data



Above Ground Utilities and Structures

Above ground services and other structures will have an impact on the visual character and from a design point of view should be incorporated successfully into the visual field. Certain above ground utilities may also need to be relocated during project construction, or may influence the range of design alternatives that is feasible for this project.

Some existing features contribute to the identity of the place, or serve a particular purpose for the community, and should be retained or reflected in the design. These might include bridges, retaining walls, historic fencing or walls, water towers, gateways and signposts, public facilities such as libraries, schools, parks, and community centers.

Potential data sources: PNM, City/County Planning Departments, State or City Historic Preservation Offices, GIS databases



ENVIRONMENTAL CONTEXT

All highway development projects will include a NEPA process in which a detailed environmental audit takes place. This information regarding environmental conditions related to the project should be embedded into the general place audit. For design purposes this data will aid the team in understanding factors contributing to site drainage, solar and wind exposures, erosion patterns and potential, significant viewsheds, habitat, and species and site microclimates.

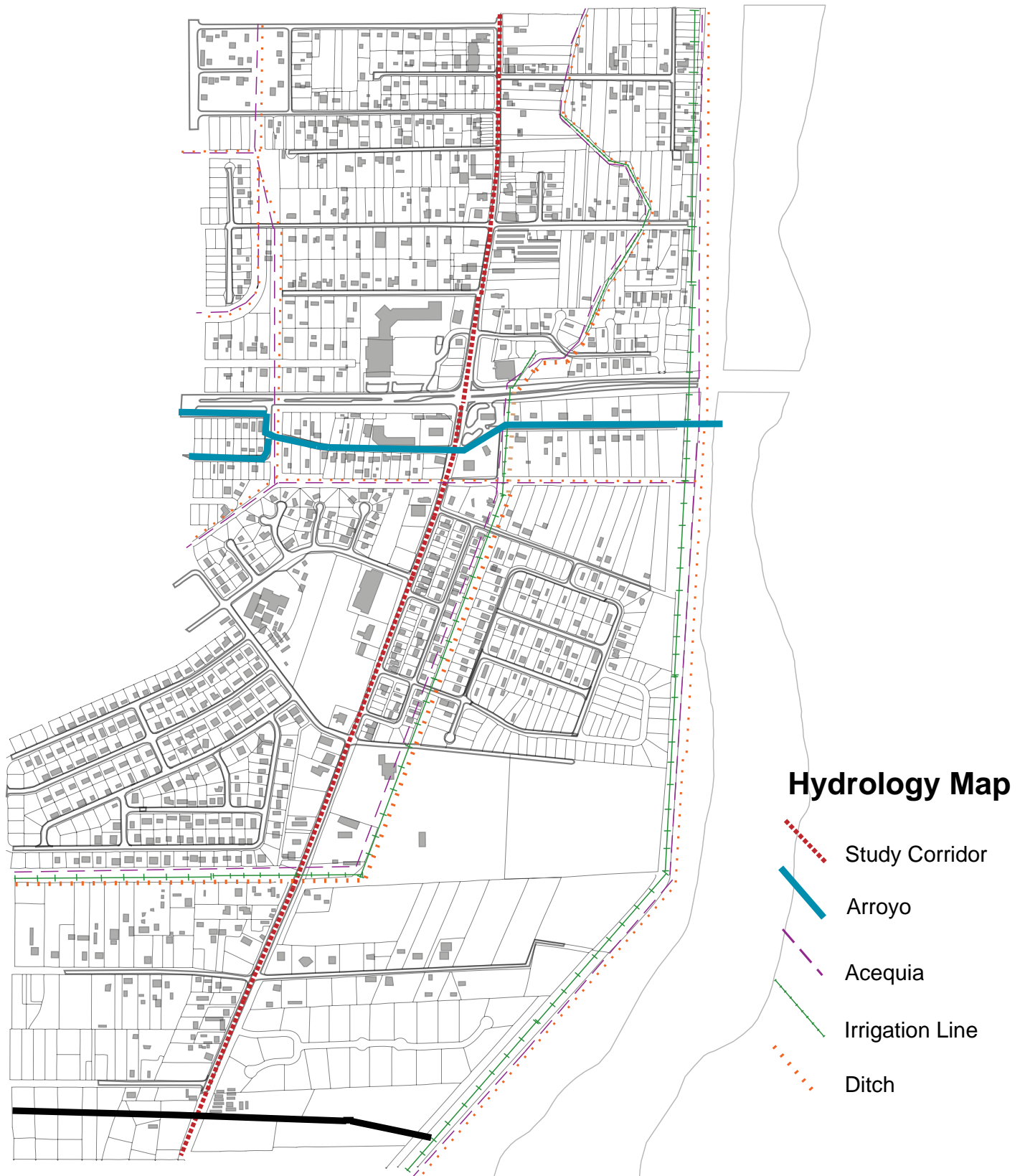
Types of data which could be included in the assessment of environmental context for visual quality purposes include topographical maps, geological maps, drainage systems, solar and wind pattern maps, historic and current vegetation patterns and endangered plant and animal species.

Significant physical features such as landmark trees, key geologic features, natural springs or other water features should also be included.

Potential sources for these types of data include City, County, State and Federal GIS databases, US Photo maps, City, County and State Engineering offices, the USGS, and local universities.

Hydrology

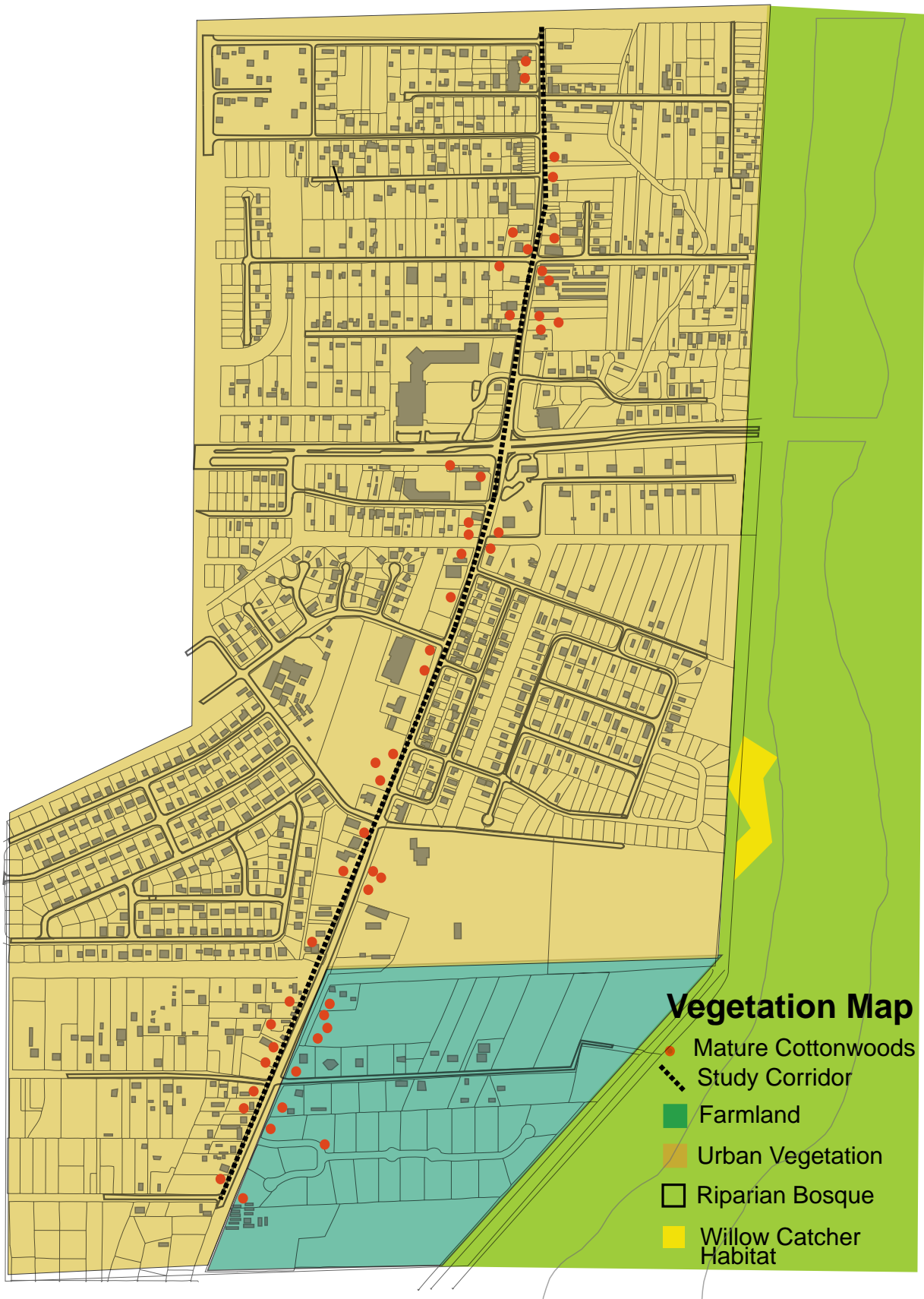
The map on the right indicates water movement patterns along and around the corridor. The general slope of the land is from west to east towards the river. The surface drainage system has been altered from the natural arroyo system to a system of ditches that are largely harmonized with the platted landscape. Irrigation water is put back into the landscape through a system of acequias.



Vegetation

The vegetation map on the right indicates broad categories of vegetation along and around the corridor. Of particular note here is the prevalence of mature cottonwoods. These would not only have a significant visual impact along the roadway, but would provide shade, reduce glare and help to lower air temperatures along the corridor.

The discussion of vegetation should seek to identify historic types of native vegetation that may have existed on the project site in previous times. These native species may be useful in project landscaping, and may help recreate the historic character of the project corridor.



HISTORIC AND CULTURAL AREAS

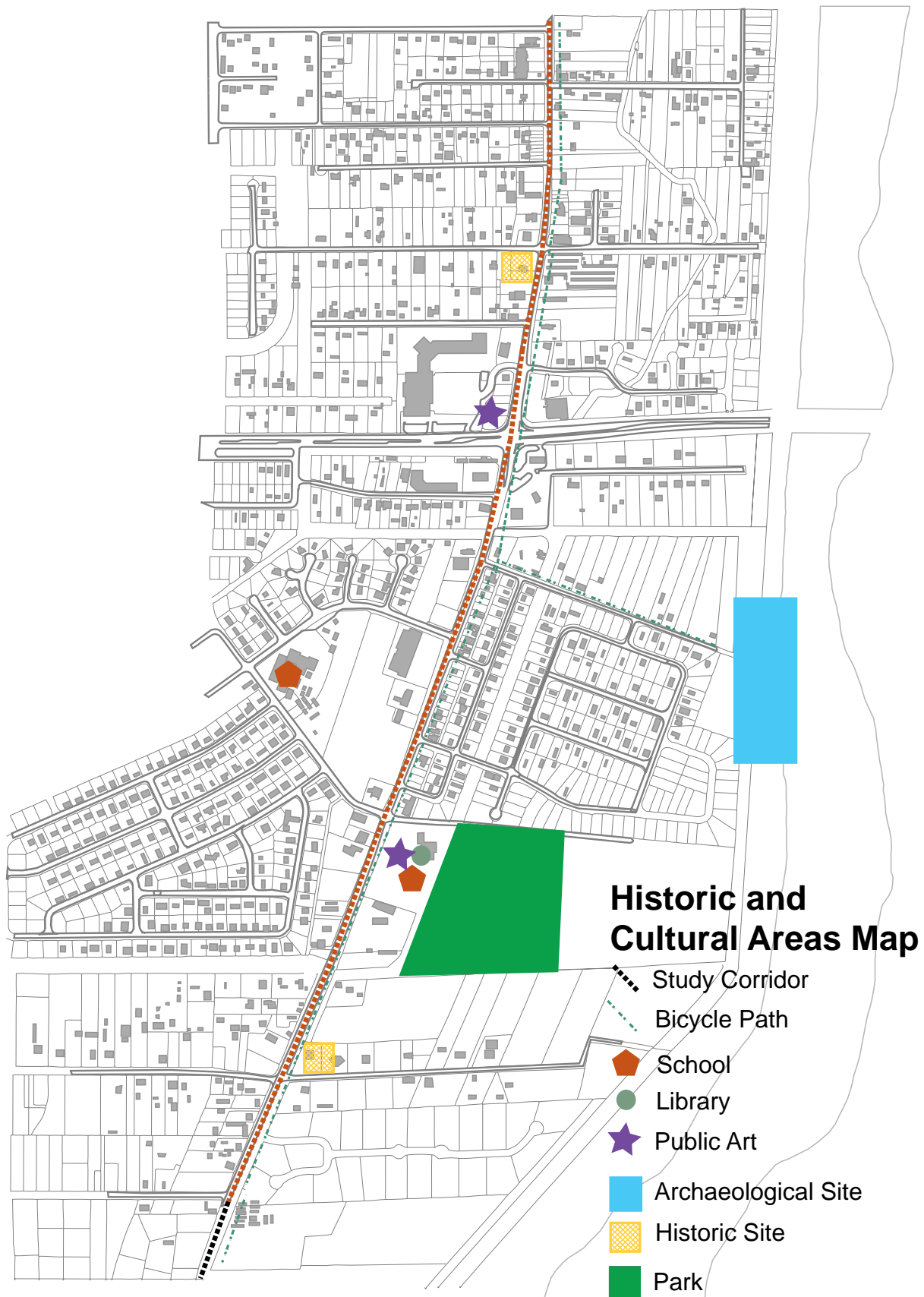
Gathering information regarding sites of historic, archaeological and/or cultural significance will assist the design team in determining potential preservation needs and in identifying features which will help to create a distinctive 'sense of place' through inclusion of local or regional history. Many different types of features can have cultural significance to a particular area or region, yet may not be immediately obvious to non-residents. Public art provides a means for reinforcing local identity and marking symbolic importance.

Identifying existing and planned recreational resources may contribute to understanding circulation needs, and transportation issues affecting the site. Incorporating these resources in the planning will contribute to preserving local context.

Items that might be identified in this survey include historic buildings, ruins, historic plazas, public art installations, cultural facilities such as libraries, museums, schools, and recreational facilities such as trails systems, parks, athletic fields, swimming pools and the like.

Data sources for these elements could include GIS databases, State Office of Cultural Affairs, City/County Planning Departments, Neighborhood Associations, Sector Development Plans, Special Interest Groups, physical site surveys, , National Park Service Trail Maps, City or County Open Space Divisions, U.S. Forest Dept., local public school facility planning, City or County Parks & Recreation departments, 1% for Art Programs, local university art departments, local artists, museums and galleries.

Additional sources include the National Archaeological Database, State or City Historic Preservation Offices, State Archeologist, State Office of Cultural Affairs, State and University Archive Libraries, State and City Architectural Historian, City Landmarks Office, Sector Development Plans, Sanborn Maps, local university history and archaeology departments, local history museum archives, local community input gathered through surveys, interviews, or focus groups and local experts in history and archaeology.



Section 3.2 Local and Regional Plans

One important part of the context of any transportation project is the framework of local and regional planning documents that specify goals, conditions, policies, and programs for the surrounding area. These documents may be a valuable source of information for project planners, and may lay out goals and conditions that the project should address.

An important component of the place audit, therefore, is a concise analysis of how local and regional plans might relate to the proposed project. The following discussion is intended to help project staff understand the planning context and how this might relate to a project.

A. TYPICAL PLANNING FRAMEWORK

New Mexico's planning statutes are based on federal model legislation from the 1920's that gives local government the authority to adopt planning and zoning laws. Towns are encouraged by State government to develop a comprehensive plan to guide their development. A comprehensive plan is a detailed vision for the future with goals and a strategy for implementation. They commonly address land use, economic, housing, transportation, and infrastructure elements of a community. Like other planning efforts, comprehensive plans are required to have a public participation component.

After adopting a comprehensive plan, local governments create more detailed plans for specific areas of the city, a sector (neighborhood), or a corridor. Additionally, plans may be created to specifically address a type of infrastructure, economic development, historic preservation or archaeological resources, strategic policies for an area, or a design overlay zone.

In 1967, the New Mexico Legislature passed a Regional Planning Act expanding the focus of planning beyond the municipality. The state is divided into seven State Planning and Development Districts, called Council of Governments (COG). Regional COGs originally functioned as clearinghouses for Federal and State grants, exercising little planning authority. In some regions of the state, they have expanded to address a wide range of regional planning concerns including: transportation planning, economic development, regional water planning, infrastructure Capital Improvement Planning, statistical data, and community empowerment initiatives.

On a statewide level, the governor's Cabinet has departments of Policy and Planning, Economic Development, Environment, and Transportation, which engage in planning activities for the state as a whole. The State Office of Policy and Planning provides technical assistance and serves as a liaison between these state agencies to develop statewide comprehensive planning. But despite these statewide agencies, planning authority in New Mexico as in most states is primarily concentrated at county and municipal levels. It is up to individual local governments to initiate and enact local planning documents.

Local planning departments are generally responsible for:

- Comprehensive planning
- Urban design
- Land use / zoning

- Building codes / subdivision regulations
- Locally oriented transportation planning (local roads; bike and pedestrian planning)

B. RECENT PLANNING TRENDS

Certain recent themes in local and regional planning have particular significance for transportation projects. These themes include the following:

Smart Growth. This term refers to a national movement since the mid-1990's to promote more compact, cost-effective growth within metropolitan regions. Minimizing infrastructure costs to local governments is a prime motivation. Channeling public investment into existing urban areas is another frequent theme. Some states have enacted state-wide smart growth legislation; New Mexico has not. However, the topic is being explored by the Governor's Task Force on Livable Communities. More information about smart growth nationally is available at www.smartgrowth.org.

The New Urbanism. A closely related national movement, originating in the architectural profession in the early 1990's, to design compact, walkable, mixed-use neighborhoods. Traditional American small towns are a frequent inspiration for such designers. This influential movement promotes ample pedestrian facilities, highly connected street networks, and narrower road and lane widths to slow traffic and improve pedestrian friendliness. More information is available at www.cnu.org.

Form-based codes. These are new types of zoning codes, promoted by The New Urbanism, which emphasize building form rather than use. Typically such codes provide a graphic menu of desirable building types, rather than long legalistic passages of zoning code text. Some New Mexico communities may have adopted form-based codes for neighborhoods along DOT roadways. For example, Albuquerque has approved such a code for the East Downtown area, and is likely to do so as well for the Nob Hill/Highland Area. Roadway project design should consider the type of streetscape that such codes are trying to promote.

Main Streets Programs. Many states across the country have initiated Main Streets Programs designed to help local communities revitalize historic main streets. New Mexico has such a program, which has worked to date with communities such as Grants, Gallup, and Portales. DOT projects should take past, present, and future Main Streets efforts into account, and try to enhance these programs. More information on the New Mexico Main Streets Program is available through the state's Economic Development office at <http://www1.edd.state.nm.us>.

Certain specific state and national programs also may be of particular interest:

- Governor Richardson's Investment Partnership (GRIP)—A \$1.6 billion transportation expansion / infrastructure improvement project approved by the Legislature in 2003
- New Mexico Park & Ride—Encourages ridesharing and transit use by providing Park & Ride lots. Provides intercity transit for commuters to reduce traffic volume.
- New Mexico Memorial Designations and Dedications of Highways and

Structures—identifies roads, bridges, intersections and interchanges that have been dedicated between 1912 and 2005.

C. LOCAL PLANS

The design of transportation projects should be consistent with municipal vision, goals and strategies as identified in local planning documents.

For example, if a local Comprehensive Plan sets out a vision of establishing a pedestrian-oriented downtown Main Street supporting local businesses, road design should seek to provide the wide sidewalks, on-street parking, slow speeds, and attractive landscape design that would help meet these goals. Even if the rest of the road corridor emphasizes higher-speed design, separate design treatment of the Main Street area is called for. Or if a Corridor Plan or Metropolitan Transportation Plan envisions improved public transit along a particular route, additional coordination with the relevant transit agencies is then desirable to ensure that road design includes the appropriate bus pads, pull-outs, and waiting area design.

Local planning documents provide a detailed assessment of the physical, economic, demographic, and cultural context of a given area. They can help with understanding the existing conditions as well as community needs and goals. Material from these plans can help develop the place audit.

Look for specific statements that address transportation issues, local historic and architectural character, relationships of buildings to the roads, inclusion of bike lanes and public transportation, archeological issues, economic development objectives, and other related topics. These goals and policies reflect a community developed perspective that has been developed to balance the various stakeholders, needs, and goals for the area. Plans may have become out-dated, and no longer relevant for understanding the issues and needs of a community. Conversely, many of the proposed elements of the plan may have been implemented, and new needs may have arisen. It is important to discuss these issues with local officials, and verify the context that the plans present.

RANK AND RELATIONSHIPS OF PLANS

When gathering and reviewing local planning documents, it is important to understand the relationship between the different plans, and the content that is contained within each. The following text can serve as a guide for understanding the typical information that is in each.

Comprehensive Plan – Provides a vision and policies to guide the development of a metropolitan area. Assesses current physical, economic, and social conditions and projects the direction for future investment. Features of this guiding document are:

- Long-range scope (20 years)
- Includes narrative, graphics and maps (land use and circulation)
- Implementation oriented—goals, objectives, policy recommendations

Comprehensive plans provide the general direction for public investment, development, and land use, which is addressed more specifically in Rank II and III plans.

RANK II PLANS

Area Plans—Address a smaller area or quadrant of the city. Typically provide policies to coordinate growth with expansion of public services and infrastructure. Transportation and infrastructure sections are particularly relevant, as they provide a specific vision for the area and detailed changes to citywide ordinances. The vision and economic development sections can shed light on the desired form of development.

Facility Plan/Functional Plans—Cover one particular topic area, such as Electric Service Transmission Facilities, Trails & Bikeways, Open Space, or Historic Preservation. Should be reviewed for elements that fall within the transportation project area. In particular, Historic Preservation or Archeological plans may be important for some projects. The State Historic Preservation Officer should be consulted in the event that there is a historic or archaeological site in the project area.

RANK III PLANS

Sector Development Plans—Ten-year policy and implementation plans which provide a vision and framework for a small geographic area such as a neighborhood. These plans contain goals, policies, and implementation actions for land use, transportation, and urban design.

Corridor Development Plans—Inventory existing conditions and the desired future for a street corridor. May contain specific criteria for urban design, historic preservation, and viewsheds.

CONTACTS FOR FURTHER INFORMATION

COUNTY AND METROPOLITAN PLANNING AGENCIES

City and county planning departments have various names, such as land use, zoning, planning or building department. In some places the planning department is broken into a long range and current planning and building. Other towns do not have a planning department and planning authority lies in other departments or at the county level.

A range of agencies and groups may address planning issues, for example:

- City or County Council
- County Engineer
- Economic Development Department
- Community Development Department
- County Health Agencies
- County ADA Office
- Transportation Office
- Water Resources Department
- Project & Facilities Management Department
- Housing Authority
- Public Works Department
- Traffic Engineering Division
- Environmental Services
- Construction/Maintenance firms
- Non-profits

Incorporated Areas—Community land use plans, as well as street and utility plans must

consulted to ensure that state plans are compatible with local needs. Managers include: City Clerk, Mayor, Planning and Land Use Department, Long Range Planning & Design, Transit Authority, City Development Division, and Community Development Department.

Incorporated Areas—County laws and regulations govern areas that are outside municipal boundaries. Managers include County Commissioners, County planning agency, or any combination of the departments listed above.

TRANSPORTATION SERVICE GROUPS

- American Association of State Highway and Transportation Officials (AASHTO)
- Transportation Research Board
- Local Transit Department
- Airports

STATE, REGIONAL, AND SUB-REGIONAL PLANS

Economic Development Plans

Promote coordinated economic growth throughout the state or region. Provide the location of economic development districts and projects. Outline current development strategies, which may have an impact on traffic patterns.

Transportation Plans

Set long-term goals, policies, and programs for transportation systems at state or regional levels. NMDOT projects should conform to these criteria. Contain traffic flow maps and other useful data.

SOURCES FOR FURTHER INFORMATION

GOVERNOR'S CABINET, STATE PLANNING DEPARTMENTS:

- NM Economic Development Department
- NM Environment Department www.nmenv.state.nm.us
- NM State Land Office—State Land Trust, Commercial Resources, Community Development
- Highway and Transportation Department (NMSHTD) www.nmshtd.state.nm.us
- Office of the State Engineer www.ose.state.nm.us
- General Services Department, State Purchasing Division www.state.nm.us/spd/spd.html
- Historical Preservation Division (Dept of Cultural Affairs) <http://www.nmhistoricpreservation.org/aboutphpd.html>
- NM Energy, Minerals and Natural Resources Department, WIPP Transportation Safety Program, <http://www.emnrd.state.nm.us/EMNRD/MAIN/>
- Department of Transportation
- Department of Public Safety
- NM Environment Department—NM Water Quality Control Commission
- NM Tourism Department

LOCAL PLANNING AGENCIES

Department of Finance & Administration / Local Government Division

Bataan Memorial Building, Santa Fe, NM 87503

- Northwest New Mexico Council of Governments, <http://www.epcog.org/nw/>
224 West Coal Ave, Gallup, NM 87301
- North Central New Mexico Economic Development District, <http://www.epcog.org/nc/> P.O. box 5115, Santa Fe, NM 87505
- Middle Rio Grande Council of Governments, <http://www.mrcog-nm.gov/>
- Eastern Plains Council of Governments; 418 Main Street, Clovis, NM 88101
- Southwest New Mexico Council of Governments, <http://www.epcog.org/sw/>
P.O. Box 2157, Silver City, NM 88062
- Southeastern New Mexico Economic Development District <http://www.epcog.org/se/>
110 East 4th #105, Roswell, NM 88201
- South Central Council of Governments <http://www.epcog.org/sc/>
P.O. Box 686, T or C, NM 87901
- Local Soil Conservation District

Section 3.3 Identifying and Involving Stakeholders

Identifying stakeholders is a preliminary step toward involving the community in the design and planning process for a transportation project. Many types of organizations exist within communities, including local government agencies, business organizations, neighborhood associations, and non-profit interest groups.

One good way to start identifying local stakeholders is by accessing local government and civic organization websites, and checking out any links these sites provide to other groups in the area. Local government staff may also have lists of neighborhood associations and other organizations. Check previous projects to see what groups played a role in local roadway development in the past. Planning documents can also provide lists of community participants, often on an acknowledgements page or in appendices listing public comments.

A. TYPES OF STAKEHOLDERS

Each project is unique and will draw out a different mix of stakeholders. The following list provides some examples:

Regional organizations such as a council of governments, a park district, a transit district, or a flood control authority may have important information relevant to the project. Regional organizations often play a significant role in gathering data on economic, environmental, or social issues affecting an area, and may be responsible for particular adjacent properties (such as parks and schools). They may also play key roles regarding compliance with federal or state regulation (such as on air and water quality).

County, municipal, village, and tribal government planning departments can provide critical information on historical development patterns, development projects near transportation corridors, and recent planning documents and processes. Planning departments also are aware of specific issues that pertain to their locale and the political and community climate of development projects.

Public works departments within local government are responsible for supplying and maintaining infrastructure needs in a community. They can be tapped for a better understanding of the successes and challenges of specific infrastructure projects in their jurisdiction.

Commissions within local government are appointed boards of local citizens that approve development permits or policy on topics such as planning, parks, and open space. These commissions are usually very aware of past histories and specific local issues that are relevant to roadway development. Committees within local government may also address bicycle and pedestrian issues or economic development.

Neighborhood Associations are often registered through the municipal government. These associations are an excellent way of tapping into the community perspective and value system. They also are organized in such a way as to provide quick communication access to their membership, either through phone or email. Many neighborhood asso-

ciations produce a newsletter or have websites, which can provide a means of communicating with residents about upcoming meetings or projects. However, neighborhood associations do not necessarily represent all members of a given neighborhood, such as renters or low-income residents, so other methods of communication should be employed as well.

Chambers of Commerce can provide information on the local business climate and economic context. Chambers of Commerce can also help identify specific businesses that would be affected by road construction or improvement projects.

Convention and visitors bureaus can provide information on community celebrations and events that could potentially be affected by roadway development.

Educational institutions can be an excellent source of information on community-specific data and trends. Local colleges and universities often study specific sites within the community, either as a state-sponsored project or for educational purposes, and public school districts keep extensive data on local population and enrollments. Both K-12 school districts and institutions of higher education may also own substantial property near project sites and have strong interests in student safety and transportation to school.

Local bicycle and pedestrian organizations are often a good source of information on cycling and pedestrian infrastructure needs. These groups have a membership that can provide specific information on the safety and effectiveness of current infrastructure, and on how to better serve this segment of the population in future projects. For cycling, there may be separate organizations for commuter and recreational users. National bike and pedestrian advocacy groups have toolkits and data that are useful for planners, engineers, and community organizers. Innovative projects and community success stories are also featured on their websites.

Beautification organizations deal with litter abatement and landscaping issues on a grassroots community level. Local organizations often have a large volunteer base that can be mobilized for projects or useful for conducting surveys or questionnaires. National scenic preservation organizations are an offshoot that can provide specific guidance on how infrastructure projects can be created in harmony with local scenic resources.

Historic preservation organizations are intimately involved with preserving the local historic character of a community. They engage in projects that are specific to sites as well as address an entire region or district. Local, regional, or national historic preservation organizations can provide critical information about what elements must be in place to retain the historic character and integrity of an area.

Main street and downtown revitalization programs are formal efforts to revitalize the economic and aesthetic heart of some New Mexico communities. Staff persons for these programs can be a vital resource in understanding the local community context.

Community development corporations (CDCs) are nonprofit organizations pursuing spe-

cific projects intended to improve the economic or social vitality of a community. They are often supported by a large group of residents and/or business owners, and thereby provide an efficient way of accessing the efforts that have affected the community's economic context.

Civic organizations exist to address a variety of needs, from environmental restoration to social networking, and are often composed of the most active community members. They may have group meetings in which they will invite local officials to update them on current community efforts. Civic organizations represent an active sector of the community that may have constructive input regarding transportation projects.

Social, cultural, and religious organizations are also often well connected to the community and provide an easy way to reach a large community audience. Their inherent organization makes it convenient to communicate with them, be it to announce meeting opportunities or solicit input on a project. These organizations can also be tied closely to community history, the built landscape, or other issues relevant to roadway development.

The nature of a transportation project and the nature of the communities it passes through will determine who the stakeholders are. Rural road projects through agricultural land may be of interest to historic preservation groups, economic development organizations, or local real estate interests. More urban projects may involve other groups, such as bicycle and pedestrian organizations. If a roadway project cuts across many different types of contexts, the diversity of stakeholders increases. Each community is unique in the way it defines its character. The more organized a community is in terms of its social networks and groups, the more stakeholders will potentially be interested in a DOT highway project.

B. PROCESS OPTIONS AND COMMUNICATION STRATEGIES

Involving the public in project design is central to a context sensitive project, and the process through which this is done may determine the success or failure of the entire project. Good public involvement may generate useful ideas about how the project can be better designed to meet community needs. Inadequate or poorly handled public involvement can generate local opposition that can derail a project.

It is important to be open, honest, and consistent about public involvement and the roles of various players. Prior to starting the process, identify existing and potential barriers to communication and participation. These barriers may include cultural and language differences, disabilities, economic barriers, or certain groups' alienation from the system or mistrust of the process of public involvement. Tailor your approach to the specific barriers that exist. Cultural barriers require building trust with community leaders and learning more about local culture and issues. Language differences can be bridged through interpreters and bilingual materials. Disabilities can be accommodated through accessible facilities and technology (Braille, TDD). Economic barriers are eased when participation opportunities are held at a time and place convenient for participants, with possible child care services and transportation subsidies.

A number of strategies can lead to successful public process. Solicit public involvement as early as possible. That helps get local ideas into project design at the beginning, and helps avoid individuals asking “why weren’t we told about this sooner?” Hold smaller more informal meetings when feasible to overcome intimidation and participation barriers. Go to where people congregate, be it public spaces or commercial districts instead of asking them to go to you. Use incentives to solicit participation and open communication, such as providing child care at meetings, offering refreshments, and assisting with transportation costs as necessary.

Various means of communication may be employed to inform community groups about the project and participation possibilities. Large-scale advertising through newspapers, radio, or TV may be appropriate when trying to hold initial meetings or inform the community that project input is being solicited. Mass mailings to local residents and businesses can also be useful initially. Use of existing mailing lists and email lists to communicate and give personal invitations as much as possible. On the other hand, individual contacts with key agencies, organizations, and businesses may be needed to directly solicit their active involvement. Personal invitations are taken more seriously by many individuals and are often appreciated.

The following table lists a variety of means to involve community members:

METHODS FOR INFORMING THE COMMUNITY

Method	Description	Pros	Cons
Media	Using local print, web-based, or electronic media for outreach. This could include a news story, press release, PSA, web bulletin, or radio advertisement.	Reaches a broad audience. If using public access television or radio, they may provide free publicity.	If you are targeting a specific audience, this method may not be very effective.
Drop-in center	Physical space with visual displays, such as maps or sketch plans specific to the site. If the center is staffed it is extremely effective.	Allows community members to access information at their convenience. Provides a central location for community-based operation.	Can be costly and requires management. If the drop-in center is an adjunct of an already existing community space, it is easier to manage.
Presentations	Presentations provide an opportunity to reach out to a target audience, provide updates on the project, and interact with community.	An effective way to become involved with existing community organizations such as neighborhood associations, economic development groups, or interest groups.	Can be time consuming to set up presentation opportunities. May not have substantial audience or interest.
Printed materials	Flyers, brochures, neighborhood association or stakeholder newsletters, posters, mailings or inserts in local utility bills. Printed materials are an effective way of communicating with the entire community about upcoming meetings, surveys, or participation opportunities.	A large audience can be reached; advanced notification can be given for meetings or for garnering public input.	This method is effective in initial stages of community participation but it is not an effective way to educate or provide detailed information about a project.
Individual contact with community leaders	Contacting community leaders can be a means by which one can reach their associated members or specific organizations that might have an interest in participating in the project.	This is a highly effective and personal way to communicate with target groups. This type of contact can help get a footing with members of specific community organizations.	Time consuming and requires identifying the local network of leaders. It is possible to inadvertently leave out important community leaders or stakeholders.

Methods	Description	Pros	Cons
Focus Groups	Focus groups are composed of a group of residents that provide specific feedback or can be tasked to steps in project development. These groups work with professionals and are educated in detail about the project.	Can derive specific information and feedback about a project plan or implementation. Is highly engaging and very rewarding for those involved.	Time consuming and the group dynamic can affect the outcome of the group product.
Community Meetings	Community meetings allow a forum for education and issue identification. If facilitated in a way that provides for participation, they can be a valuable source of community vision and values.	Community meetings bring together diverse groups that have an interest in the project.	Meetings may not attract the full spectrum of community members. It is difficult to have broad participation, as scheduling is tough for busy community members. Can be costly if providing childcare or food.
Defining vision workshop	This method involves bringing a group together to collectively define their vision of a successful project.	Inspires group work and collective input.	Can be difficult to reach consensus or productively incorporate divergent views.
Workshop	An interactive meeting that allows for focused input of ideas. A workshop could have an educational, data collection, and concept development component.	Provides community members an opportunity for education as well as collectively producing an outcome.	May require multiple locations and meetings to cover all stakeholders. Can be time intensive and not always have a productive outcome.
Design Charette	A specific workshop that has a product in mind, such as a roadway design.	Gives community members an opportunity to produce something directly related to the project, perhaps even shaping the direction of the project.	Usually is an all-day or multi-day affair. Requires facilitation and patience with the process.
Questionnaire or responsive publication	This method can target the project specifically, such as asking the community about their preferences in roadway design.	Can be conducted over the phone, on a website, or in public information center. The results are quantifiable.	Time spent on administering and collecting surveys.
Individual Interviews	Interviews are conducted in a personal manner to develop an understanding of community member's values and vision.	Can provide specific information that helps guide project development; important networking method.	Time consuming if many interviews are conducted.
Advisory Committee	A select group of volunteer citizens that provide reactions/advisement for the project. Their input provides valuable input from the community.	Direct, specific reactions to project ideas or implementation.	Intensive; may require contacting, monitoring, and facilitating meetings.

Section 3.4 Economic Context

The economic conditions and goals of a community are important to take into account within analysis of the project context. Transportation projects can complement those goals, or work against them. Analyzing local plans and talking with local officials and business groups can help fill in this portion of the context.

Many New Mexico communities currently desire downtown economic revitalization, and so road design that increases the visibility of small downtown businesses, slows traffic, provides parking, and creates an attractive pedestrian streetscape is desirable. Road bypass projects that funnel traffic away from downtowns and lead to strip commercial development outside of downtown may be less desirable.

Silver City, New Mexico, is an example of a successful downtown Main Street revitalization project. Twenty years ago, a copper mine halted operations, and the nearby downtown was left virtually abandoned. Grassroots-based economic development allowed small-scale local businesses to reinvigorate the downtown district. In addition, the community removed parking meters, added streetlights, and developed an extensive public trail system nearby. Downtown Silver City is now host to large events, like the Tour de Gila bike race, which attract visitors from all over the country. The economic revival of Silver City has been facilitated in part by physical improvements to its streetscape, trails, and parks.

Attractive, safe, and functional design of tourist routes is important to the economic well-being of many New Mexico towns. The Jemez Mountain Trail National Scenic Byway, for example, crosses through a variety of communities with very different economic contexts, including the small villages of San Ysidro and Jemez Springs, the Jemez Pueblo, national forest lands, and the city of Los Alamos. Maintaining the rural two-lane character of this roadway is important in most locations. However, in some communities the road design should encourage slower speeds than in others, and tourist pulloffs, parking, and other facilities are important in a number of specific locations.

Construction detours, delays, and disruption can lower access to local businesses and substantially impact revenues. Changes in vehicle or pedestrian circulation can also raise or lower revenues. These potential economic impacts are part of project context and should be described for the public.

If project impacts on existing businesses are likely to be severe, consider bringing in additional staff or consultants to study the situation and recommend mitigation strategies. Open communication with businesses and economic interests early in the process. Encourage them to participate in the public involvement process. Develop a plan for mitigating negative impacts and design projects in a way that minimizes impacts.

Section 3.5 Environmental Justice Considerations

A. COMMUNITIES AFFECTED BY THE PROJECT

Projects that have a disproportionate impact on the health or environment of minority or low-income groups should be considered for environmental justice mitigations, and these potential impacts should be spelled out within initial analysis of the project context.

Title IV of the 1964 Civil Rights Act and the National Environmental Policy Act of 1969 are the federal laws that address equal protection and non-discrimination as related to environmental impacts of federally funded transportation projects. The 1994 Environmental Justice Executive Order amplifies these Acts by requiring that all federal agencies identify and address any form of environmental justice discrimination. In 1998 the U.S. Environmental Protection Agency issued guidance under this Order which mandates a process to include input from minority and low-income populations in agency decision-making. The 1999 Federal Highway Administration Memorandum on the Current Status of Environmental Justice Activities also mandates that those populations at risk for adverse environmental impacts should be involved in the public participation process, so as to prevent them from bearing a disproportionate burden of negative impacts from a project.

These environmental justice (EJ) regulations are designed to minimize adverse health and environmental effects on populations traditionally at risk. A minority population is defined as being Hispanic or Latino, African American, Asian American, or Native American. Low-income populations are defined as those below the federal poverty level.

More specifically, the federal legal framework related to environmental justice includes the following:

- The US Constitution (equal protection);
- Title VI of the 1964 Civil Rights Act (nondiscrimination in programs and activities funded with federal money);
- The 1969 National Environmental Policy Act (requires public involvement as well as environmental study of the project and alternatives)
- Executive Order #12898 of 1994 (established the federal EJ program); and
- EPA's 1998 EJ Guidance (provides details and guidance for implementing the federal EJ program).

The U.S. Department of Transportation's Order on Environmental Justice (DOT Order 5610.2) requires the DOT to implement the principles of E.O. 12898 by incorporating environmental justice principles in all DOT programs, policies, and activities. The order is available on the Federal Highway Administration's (FHWA) Home Page: www.fhwa.dot.gov/environment/ejustice/dot_ord.htm or from the FHWA Office of Human Environment.

The Federal Highway Administration's Order requires FHWA to implement the principles of the DOT Order 5610.2 and E.O. 12898 by incorporating EJ principles in all FHWA programs, policies, and activities. The order is available on the FHWA Home Page: http://www.fhwa.dot.gov/legsregs/directives/orders/6640_23.htm or from the FHWA Office of

Human Environment.

B. PAST HISTORY OF INEQUITIES

The discussion below in text is presented only as “potential” environmental justice (EJ) concerns. The NMDOT adheres to the EJ criteria’s and regulations described in attachments EJ-A, EJ-B, and EJ-C for this manual (Appendix 1). Each proposed action using federal monies undergoes the rigorous consideration described in EJ-A, EJ-B, and EJ-C.

Most obviously, project impacts such as noise, dust, pollution, increased or changed traffic flows, and construction disruption may fall predominantly on lower income/minority populations because these neighborhoods are often the ones located near major thoroughfares. When a neighborhood is in close proximity to a project, community outreach should proactively engage the residents to understand their concerns.

·Minority populations typically have less time, resources, and experience voicing their concerns in public forums. Established commissions and agencies typically have appointed or self-selected volunteers, who do not always reflect the diversity in the population. Community groups and neighborhood associations should be notified early on in the process. They have the experience and connections to reach a larger percentage of the area’s population. They can also engage residents in more informal manners that do not require attending public meetings.

The alignment of new roads through established communities can fracture them, destroying social and economic capital. Urban renewal movements, beginning in the late 1940’s, demolished whole neighborhoods for slum clearance or the creation of highways and new roads. Projects that radically alter the physical fabric of a community should be careful to avoid the often disproportionate effects that minority populations are exposed to.

Major roads also tend to divide parts of a community. Areas that have less access to resources may rapidly decline when they are physically isolated. This is “the other side of the tracks” phenomenon, where a physical barrier segregates undesirable activities and social classes. Enlarging roads or changing their character may attract commercial activity that changes the character of an area. For example, strip-malls and chains may replace local businesses on a major thoroughfare. Transportation projects must be sensitive to the existing context of an area to avoid adversely affecting the future climate of development.

C. POTENTIAL IMPACT ON COMMUNITIES OF CONCERN

Environmental justice-related impacts of a transportation project on a community include:

- Air emissions, dust
- Noise, when residential land is close to the highway
- Increased traffic flow
- Separation of the community

- Socioeconomic impacts on local employment, services, etc.
- Diminution of property values, which has affordable housing implications
- Litter, visible blight
- Change of the character of an area
- Introduction of non-compatible activities to the neighborhood
- Over-concentration of infrastructure or transportation facilities in an area of minority and low income groups

As part of the place audit, a community impact assessment can be developed that reflects specifically on environmental justice considerations such as those above. Addressing environmental justice considerations as part of the place audit will help avoid future issues or litigation. It is not only a legal requirement, but also an opportunity to better understand potential adverse effects of the roadway project.

- Consultation and public involvement component

Addressing environmental justice considerations as part of the place audit will help avoid future issues or litigation. It is not only a legal requirement, but also an opportunity to understand potential adverse effects of the roadway project.

Section 3.6

Identifying Funding Programs and Opportunities for Roadways

A. FUNDING OPPORTUNITIES FOR CSD/CSS PROCESS AND STRATEGIES

Given its importance and the growing national commitment to this theme, CSD/CSS is likely to become a normal part of transportation planning and design, and should be budgeted for accordingly. That is, funding for basic CSD/CSS processes, including community involvement, should be included within the overall project budget.

Likewise, many design elements that will come out of the CSD/CSS process are elements that should be included in any well-designed project, and should be part of the basic project budget. For example, many states allocate a percentage of construction cost toward aesthetic and landscape treatments. The design consultant fees for those treatments are also part of the allocation.

Some other design elements may need additional funding. Because the CSD/CSS process actively involves the local community there is a much greater chance of local governments and private developers contributing funds for special facilities. If the community stakeholders come to agreement on priorities and see the value of the proposed project for their community, they will likely be willing to contribute local resources. They are also more likely to compromise on specific elements if involved in the process of prioritization of needs and desires.

Project budgeting should consider life cycle costs - the costs of constructing, operating, maintaining and replacing infrastructure over its life span, measured on an annualized basis. In some cases, an innovative design may be more expensive to construct initially, but this cost may be offset by a longer life span or by lower ongoing maintenance expenses.

The largest source of federal funds for transportation projects is SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users), approved in 2005, which replaces the earlier ISTEA and TEA-21 federal transportation legislation. SAFETEA-LU addresses issues of improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. Funding for CSD/CSS elements might be obtained from a number of programs within this legislation.

SAFETEA-LU apportions funds as follows:

The Highway Safety Improvement Program (HSIP) is funded to reduce highway fatalities and injuries through highway safety planning and infrastructure safety. It includes monies for railroad/highway crossing program, and improvements to high-risk rural roads. Other programs and provisions address specific areas of concern regarding safety. They are "Safe Routes to School"; "Work Zone Safety"; and "Other Safety Issues" comprised of bicycle and pedestrian safety, improved traffic signs, and pavement markings targeted to older drivers and pedestrians.

The National Highway System (NHS) funds construction and improvement of the National Highway System which consists of the Interstate System and other national important roads. These monies can cover needs such as environmental restoration, pollution abatement, control of noxious weeds, and establishment of native species.

The Surface Transportation Program (STP) funds construction, improvement and other transportation-related projects on roads functionally classified as Interstates, Principal Arterials, Minor Arterials, and Major collectors, but not local or minor collectors. Funds may be used for the following:

- preliminary engineering, including scope, environmental and archaeological assessment, and design
- right of way acquisition
- construction, reconstruction, rehabilitation, resurfacing, restoration, and operational improvements
- car-pool projects, parking facilities, bicycle, and pedestrian walkways
- safety improvements for highways, transit, and railway-highway grade crossings, as well as mitigation of hazards caused by wildlife.

The Bridge Program provides funds to improve condition of bridges over highway system.

The Federal Lands Highways Program can be used for transportation planning, research, engineering, and construction of roadways on public lands, national parks, and Indian reservations. Also, funds from this program may be used for the state/local match for most Federal aid highway projects.

The Scenic Byways Program provides funding to states and Indian Tribes to develop scenic byways and projects on highways of outstanding scenic, historic, cultural, natural, recreation and archeological qualities.

The National Corridor Infrastructure Improvement Program provides funds to promote economic growth and international or interregional trade.

The Congestion Mitigation and Air Quality Improvement (CMAQ) Program helps state and local governments fund transportation projects to meet requirements for the federal Clean Air Act.

The Recreational Trails Program is intended to help develop and maintain recreational trails for pedestrian, equestrian, bicycling, and non-motorized snow activities as well as off road motorized vehicle activities.

The Transportation Enhancements Program is concerned with corridor beautification through historic preservation, pedestrian and bicycle paths, and rail corridor preservation.

The Transportation, Community and System Preservation Program makes discretionary grants available to integrate transportation, community and system preservation plans and practices.

There are other federal sources of funding, however most do not have large amounts of monies available. Some of these include the Rivers, Trails and Conservation Assistance Program, administered by the National Parks Service; the Federal Navajo Nation Indian School Bus Routes Maintenance Program; the USDA Forest Service: Rural Community Assistance, planning and partnerships that enable communities and tribes to work toward economic diversification.

The U.S. Corps of Army Engineers offer some planning assistance to states for environmental, economic, hydraulic, and geotechnical studies; flood control studies; stream bank and shoreline protection studies.

Community Development Block Grants are federal funds channeled to local governments by the federal Department of Housing and Urban Development. Local governments have discretion in their use, but frequently earmarked these monies for community infrastructure including streetscaping, lighting, sidewalks, and pedestrian amenities.

There are also State funding opportunities from several sources. One is the State Road Fund which funds roads on the State system that are not eligible for federal aid. The State Maintenance Bureau and District Engineers administer the Local Government Road Fund (LGRF). They have several different programs geared toward county and municipal arterials, and usually require matching local funds.

The State Legislature sometimes appropriates funds to the NMDOT for local road and street projects and finances them through the General Fund or the Road Fund. These funds generally require matching funds from the local communities.

Funding long-term maintenance is always an issue for transportation departments. CSD/CSS should not adversely affect maintenance issues, as communities will probably be more inclined to share in the cost of maintenance if they have been a part of the process of planning the roads. Adopt a Highway is a program that promotes long-term maintenance agreements with local partners. Americorp and Vista have programs that help communities develop pedestrian and bicycle trails.

At the County and City level the funding opportunities mainly arise out of special bond issues, or through innovative financing being offered through federal programs such as GARVEE bonds and TIFIA notes. As discussed briefly before, local communities and counties can decide to impose impact fees on development to raise money for deterioration of roads due to growth, or increase sales tax on transportation related items, or fuel. Another mechanism for raising funds at the local level is to create local transportation improvement districts, or special assessment districts where properties being directly benefited by transportation improvements can be taxed or assessed differently.

Local communities can also decide to use Capital Improvements Budgets for Public Works, or Parks Departments, and Cultural Affairs Departments to help fund items that may be considered amenities in conjunction with roadway projects. Local 1% for Arts Programs can help fund public art projects along roadways. The National Endowment for the Arts offer grants for art and community development through revitalization of a cultural district. The State of New Mexico's Main Street Program helps local communities

establish revitalization efforts, and establish funding mechanisms (not direct grant monies).

Local developers, businesses, universities, and school districts may be willing to contribute monies (or land) to projects that affect their interests, and this money can often be used as matching funds from the federal sources.

In summary, any transportation project requires funding from many different sources. CSD/CSS projects are no different. They will require funding from different levels of government, and their basic funding should be included in the project budget. Certain specific optional design elements may be successful in terms of gaining local public or private support if these design elements have substantial appeal to local constituencies.



4.0 Synthesis and Needs Assessment

4.0 Synthesis and Needs Assessment

After preparation of the place audit described in Section 3, a concise Statement of Context and Determination of Needs should be prepared. This document summarizes main contextual issues and stakeholder concerns, and integrates these with the initial understanding of the project to produce a revised set of issues and needs that can be used to develop context-sensitive design alternatives.

A. NEEDS IDENTIFIED IN PHYSICAL ANALYSIS

One set of contextual issues and needs will arise from analysis of the physical, environmental, historic, cultural, and economic context of the project. This group of important considerations may include needs such as to protect certain historical structures, cultural facilities, or archeological sites; to design roadway or sidewalk elements for pedestrian or bicycle safety; to incorporate particular local symbols, materials, or motifs into project components so as to enhance local character; and to mitigate effects of project construction on certain local businesses. The exact set of needs will vary depending on the project site. Many of these needs will have been identified by the agency itself, rather than being raised by stakeholders or existing local plans.

B. NEEDS IDENTIFIED IN LOCAL AND REGIONAL PLANS

Goals and objectives from local and regional planning documents should be itemized and analyzed in terms of their implications for the project. These needs have been identified by local residents and officials in the course of their own previous planning processes, and may or may not have been articulated by stakeholders during the place audit. However, because they have been articulated in plans adopted by local elected officials, they should be considered very seriously within CSD/CSS. Such local plan goals may relate to environmental protection, economic development, historic preservation, downtown revitalization, circulation, safety, and many other areas of interest.

C. NEEDS IDENTIFIED BY STAKEHOLDERS

Needs or concerns raised by stakeholders should be listed in a third section of the statement of context and needs. The degree of concern and number of groups or individuals prioritizing each point should be indicated. This list of needs may be far broader and more diverse than either of the categories above. In some case, a single individual may have articulated a need that is not shared by the rest of the community. This need may be noted briefly but not explored in depth. However, in other cases many groups or individuals will have supported a particular request, which may or may not have been considered by the agency previously. In this case, more extended discussion and analysis is appropriate.

D. COMPOSITE STATEMENT OF NEEDS

The table (sample format below) lists all the potential areas of impact surveyed in the place audit. Project staff should rate potential impacts for each element from 1 (negligible) to 5 (severe), and provide brief phrases indicating the nature of this impact. For example, a project requiring significant right of way acquisition through an historic town might have a severe impact through “acquiring and removing historic structures.” These impacts should then be summarized in a 1-2 page statement about how the proposed project would affect the context and mesh with local needs. Positive impacts of the project, such as improved traffic flow or pedestrian access, should of course be noted as well.

The final statement of needs should modify the initial agency formulation of project goals to take into account additional material gathered about the project context, particularly including the needs and desires of stakeholders. In some cases this may require flexibility on the part of agency staff. It is important that staff not be wedded to a pre-determined concept of the project, but be open to modifying project goals and design based on a fuller understanding of the context.

CONTEXT SENSITIVE DESIGN ISSUES AND NEEDS TABLE

Category	Issue	Severity	Stakeholders affected	Implication for project goals/needs
Roadway and Traffic				
Land Use				
Spatial Context and Character				
Structures				
Natural Environment				
Historic and Cultural Areas				
Economic Context				
Planning Context				
Environmental Justice				

5.0 Toolbox

5.0 Toolbox of Alternative Roadway Design Strategies for the New Mexico Context

This section provides specific guidance on alternative, context-sensitive design strategies related to New Mexico transportation projects. The focus is on innovative approaches in each topic area that are responsive to current environmental and community contexts, especially related to creation of attractive and aesthetically pleasing transportation facilities. This section does not replace standard reference materials, but should be used in conjunction with them.

A. CONTEXT SENSITIVITY PRINCIPLES

i. Establish Sustainable Practices

“Sustainability” is a term that is increasingly widely used in design, planning, and development circles. Although it may seem vague and difficult to define, this concept in fact refers to some important practical considerations that can help guide transportation projects in New Mexico, leading to projects that are not only beautiful but practical and context-appropriate.

In particular, sustainable designs and projects will last over time given limited ecological, institutional, and financial resources. When planning or designing a project, it is important to foresee the implications of that project 20, 30, or even 50 years in the future. Will the project require continued large amounts of water for landscape irrigation? Will it require high levels of maintenance? Will it lead to a healthier local community? Will it promote more driving and fossil fuel use? Will it promote the long-term economic development of a local town or city? Such questions are usually open to interpretation, and often have no definitive answers. However, asking them can help clarify the sustainability tradeoffs in project design, and can help frame context-sensitive design alternatives for the project.

For example, it may be worthwhile to provide initial irrigation to help establish landscape plantings along a main street, if in the long run those plantings will need relatively little water and if such landscape design will promote an attractive, vibrant, and economically successful downtown. It may also be desirable to use permeable paving for sidewalks, park-and-ride facilities, and access roads, despite potential increased maintenance, if that paving reduces the need for drainage facilities, enhances vegetation by allowing infiltration of rainwater into the soil, and (in some locations) recharges the local aquifer.

Understanding such tradeoffs, and considering the long-term implications of various design alternatives, is at the core of sustainable project design. Particular strategies in this toolbox can help improve project sustainability, in large part by making the project more sensitive to its context.

ii. Choose Appropriate Levels of Design

The intensity of design treatment for a given project may vary, and even within a single project the appropriate level of design may vary from place to place. When

beginning the design process, it is important to identify the particular levels of design that might be applied.

A roadway might receive a far more intensive level of design in the town center, where local merchants desire an attractive streetscape to enhance business, than in outlying areas. A scenic highway that will be heavily used by tourists may deserve more intensive design treatment than a little-used byway in some other part of the state. A route that passes near sites sacred to Native Americans may demand special design treatment to fit it into the landscape and make it less visible or audible. In each of these contexts, a different level of design treatment may be called for.

Background information related to the level of design will already have been developed in the evaluation of the context and determination of needs. But as the project enters the design process, it is important to review the levels of design that may be required in different areas and to adjust these as community needs and other contextual elements become better known.

iii. Work with the Historic/Cultural Context

Fitting a project into its historic and cultural context is central to CSD/CSS, and each element in this toolbox should be considered in light of that context. Although this toolbox can point out some general alternatives for project design, the exact details of, say, lighting fixtures, bridge railings, or landscape design may be best based on existing local models and traditions. Those existing local features are the true pattern book for any project.

iv. Use Local/Appropriate Materials

One frequent theme within sustainable design is the use of local or context-appropriate materials. For a road project, such materials may include the aggregate used in the road surface, the plants used in landscape design, and the wood or stone used in retaining walls, sound walls, benches, gateways, and other facilities.

Using local materials has a variety of aesthetic and sustainability benefits. It reduces the amount of energy needed to transport materials from long distances away. It can help create a more coherent, lasting, and attractive local architectural identity. It supports New Mexico businesses and workers, helping sustain the state's economy. And it can help projects fit in better with the coloration and character of the local landscape.

v. Explore Innovative/Non-Traditional Technologies

Though it may incorporate many traditional materials and construction techniques, sustainable design can also involve the use of innovative technologies to save energy, water, or other resources. Such technologies can be visually interesting and educational as well as practical — indeed, 'revelatory' in the sense that the visible elements of the design may reveal new strategies for "designing with nature," and doing so in aesthetically interesting, even artful ways. Keeping an eye out for such technologies is

important during the process of developing design alternatives.

Solar energy technologies to heat water or supply electricity are particularly appropriate for New Mexico, given the state's abundant sunshine and many isolated sites far from electrical service. Photovoltaic technologies have been widely used in the U.S. to power roadside telecommunications equipment and signage in remote locations. Low power lighting technologies using liquid crystal displays (LCDs) seem likely to expand potential use of photovoltaic power for many transportation-related applications. Solar hot water heating may also be appropriate for certain restroom, office building, or concession facilities in conjunction with transportation projects.

Use of permeable paving, constructed wetlands, dry wells, or swales to handle drainage on-site represents another set of context-sensitive technologies that may be appropriate for transportation projects, in contrast to traditional curb, gutter, and storm drain systems. These strategies can help create a more beautiful roadside landscape than applications emphasizing concrete culverts and retention basins, and are discussed further in the Drainage section below.

Many new public transit technologies offer potential for New Mexico. Bus rapid transit systems using high capacity vehicles with widely spaced stops and signal interface technologies can provide a level of service approaching light rail at a fraction of the cost. Modern streetcars can also provide service within urban areas that is frequently seen as preferable and more aesthetically appealing than buses. Compressed natural gas (CNG), hydrogen fuel cells, clean diesel engines, and hybrid technologies are providing new propulsion choices for public transit vehicles.

In these and other areas, innovative technologies may offer more sustainable, attractive, and context-appropriate alternatives to traditional forms of transit and project design.

B. ALTERNATIVE DESIGN STRATEGIES

i. Corridor Zones

A state route is likely to pass through a number of different character areas, each of which may require somewhat different design strategies. Identifying these zones at the beginning of a transportation project and planning for appropriate forms of design in each is a main CSD/CSS challenge.

For example, a state highway may pass through scenic wilderness, historic rural agricultural areas, American Indian pueblos, transitional suburban zones, downtown or main street environments, and industrial areas. Different design strategies may be appropriate in each. In addition, there will likely be sub-zones within each of these areas that may be defined more subtly, but that can be cued with design elements.

Character zones may be recognized by particular types of buildings, facades, and architectural elements; particular patterns of land use, ownership, and spatial context; or particular cultural sites, signage, planting, and vegetation. All of these elements can be initially determined through the mapping and observational practices discussed in Section 3, but will then require special analysis of alternative design strategies.

It may also be desirable to incorporate elements of transition that signal movement from one zone into another. This demarcation can be accomplished in a number of ways, depending on the nature of the zones. Entries into active main streets may suggest a more obvious 'gateway' design, while a transition from a rural to an urban area, for example, may be more subtly indicated through changes in the overall road character. This may be done through more intensive planting design, widening of sidewalks, addition of pedestrian-scale lighting, initiation of curb-and-gutter drainage, a change in signage graphics, and/or environmental art installations within the corridor.

A MAIN STREET OR COMMERCIAL STREET IN A CITY OR TOWN

Design applications for roadways in the active commercial zone areas may be more intensive and higher cost than those in other zones. The active zone of a commercial street in New Mexico may only be three or four blocks long. There will be lead-in zones on either side of the active area that might have a combination of mixed uses and empty lots, and beyond that there may be transition zones from a rural to an urban setting. The intensity of land use will increase as one moves towards the active commercial zone. The number of pedestrians is likely to also increase, as is need for parking. Traffic speed should slow down. Possible strategies include the following:

- Trees may be planted closer together and with more regularity in the active commercial zone. Other forms of landscape design using grasses, shrubs, stone, or other elements may be more intensive.
- Lane widths may change, becoming narrower in the active commercial area. The roadway may incorporate curb extensions (also known in some situations as bump-outs or bulb-outs) and parking in the active zone.
- Intersections may be formalized in the active zone, with clearly demarcated pedes-

trian crosswalks, pedestrian refuge zones, and different pavement treatments.

- The type of roadway lighting may change in the active zone. With the ambient light from the storefronts it may be possible to reduce the total amount of light needed, and to use smaller scale poles and fixtures.
- Sidewalks will become wider in the active zone where pedestrian activity is high.
- The visual design of medians can help to give identity to a zone. In some cases there may be a median in one zone but not in another.
- 'Gateways' can be signified with sculptural or architectural elements that mark an entry into the active zone.
- Other design elements may be used to emphasize local character, included pole-mounted banners, decorative planters, special sidewalk paving, distinctive planting and local symbols or logos added to walls, overpasses and other roadway structural elements.

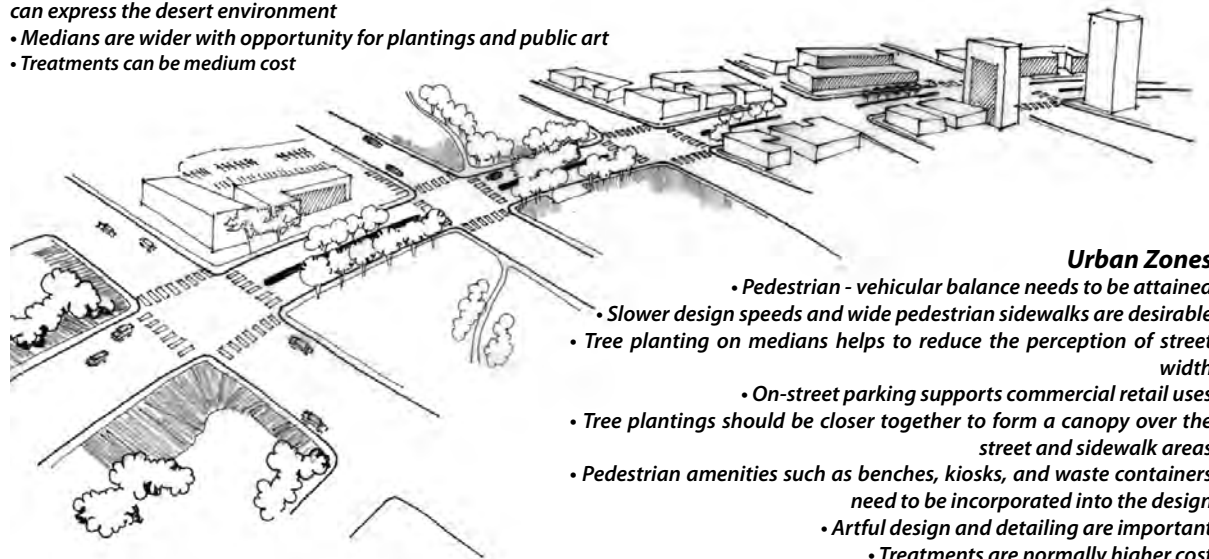
A ROADWAY IN AN URBANIZING/SUBURBAN AREA

Design applications for roadways in the urbanizing/suburban zone are likely to be medium cost and use an intermediate intensity of design treatment. Possible strategies include the following:

- Trees may be planted farther apart with less symmetrical, more clustered placement in mixed-use zones. Planting strategies in an urbanizing area may make more use of

Suburban/Transition Zones

- Heavy vehicular emphasis but pedestrian movement, crosswalks and bike lanes need to be incorporated
- Tree plantings can be further apart and not necessarily evenly spaced. Plantings can be a buffer between pedestrians and moving traffic, and can express the desert environment
- Medians are wider with opportunity for plantings and public art
- Treatments can be medium cost



Urban Zones

- Pedestrian - vehicular balance needs to be attained
- Slower design speeds and wide pedestrian sidewalks are desirable
- Tree planting on medians helps to reduce the perception of street width
- On-street parking supports commercial retail uses
- Tree plantings should be closer together to form a canopy over the street and sidewalk areas
- Pedestrian amenities such as benches, kiosks, and waste containers need to be incorporated into the design
- Artful design and detailing are important
- Treatments are normally higher cost

the 'borrowed landscape' — the landscape development already present in the private properties that border the roadway.

- Major intersections will likely be signaled for pedestrian crossing, and could be treated with different types of material and detail than are used in the active commercial zone.
- The roadway lighting and fixture types could be different from those in an active commercial area. The poles will typically be higher and should retain a distinctive character achieved through their form, use of materials, and color.
- Sidewalks may be narrower in the mixed-use zone, where pedestrian movement is not as high as in an active area, and a pedestrian buffer may be incorporated to separate the pedestrians and the moving traffic.
- The medians through this zone could maintain a consistent design character through the use of materials, the height of the elements and the type of plantings. The median may also function as a part of the drainage and first flush filtration system by serving as a bioswale.

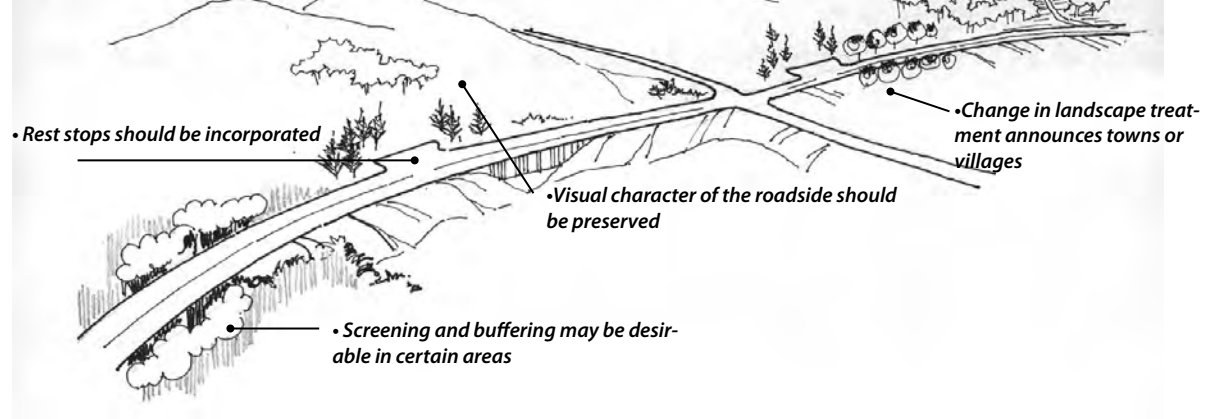
A RURAL ROADWAY

Design applications for roadways in the rural zone will generally be simplest and lowest cost. Possible strategies include the following:

- Plantings should be kept to a minimum and full advantage should be taken of the existing landscape and views. Selected planting may help to buffer or direct views when necessary, or to signal approaches to intersections or town boundaries.
- Approaches to intersections may be differentiated from the surrounding landscape, so as to warn drivers of the approaching intersection and increase safety.
- Drainage ways and arroyos that flow under the roadway may utilize local rock and gabions to prevent erosion as well as provide aesthetic appeal.
- Barriers should incorporate materials that work well with the surrounding landscape. It is desirable to use local materials in these and other elements where feasible.
- Medians, which may be present on four lane roadways, should be treated in an aesthetically pleasing, but low maintenance, sustainable way. This may be achieved using native grasses and other hardy native plants, with foliage and flower color where possible.

Rural Zones

- Traffic is moving at high speeds
- Cues to design should be taken from the larger landscape through which the road passes
- Treatments are normally low cost



THE URBAN FREEWAY

The freeway, particularly with the complex multi-lane corridor in urban areas, is a roadway type whose right-of-way is exclusively dedicated to the movement of motorized vehicles. The high-speed corridors occupy a wide ribbon of space, and tend to dominate the landscape.

Nevertheless, there are opportunities to address visual quality issues along freeways. A number of these strategies are covered in other sections of this toolbox and will be introduced and summarized here. In urban zones the roadway is either raised above or recessed below, the city grade. This allows for separation of the fast, efficient freeway movement from the stop and go patterns of the city, removes the roadway visually and aurally (as much as possible) from the city landscape, and enables city cross traffic to flow either over or under the freeway corridor. These factors, and the issue of separation, generate opportunities for visual intervention.

Slopes

The grade change of the roadway results in visible slopes that are frequently at a steep gradient in order to minimize the use of urban lands. These slopes have broad visibility and need to address issues of erosion or slumping. The use of terracing, plantings and stabilized materials with interesting colors, textures and bold patterns can transform this utilitarian condition into an attractive urban landscape. These strategies will be most effective in interchange zones.

Bridges

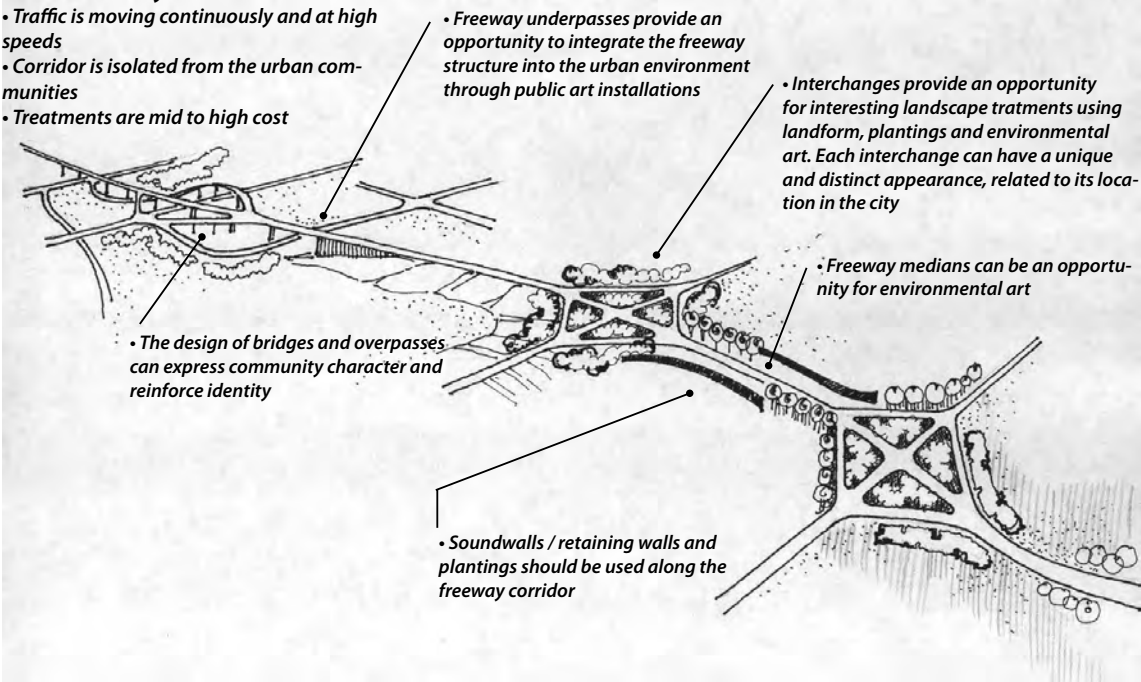
The necessary, frequent freeway crossings in urban areas result in many bridges and overpasses, and these structures dominate the visual field where they are located.

While simplicity and standardization in the bridge designs may be desirable from a cost point-of-view, the bridge and overpass crossings also present an opportunity for a series of unique expressions that constitute a 'collection' of bridges in an urban area. The use of details, color, texture, materials and pedestrian walkway 'saddlebags' are among the ways in which different expressions can be made on these structures. Variation in design should reflect, or provide character in, the diverse urban neighborhoods through which an urban freeway passes.

Sound walls

Tall, continuous sound walls are common along the edges of urban freeways. Without any kind of visual consideration these walls can be severe and unpleasant structures. Some of the strategies for turning sound walls into a visual opportunity include height variation (preferably in a smooth, continuous flow rather than abrupt and jagged lines), the use of textures and/or relief to create patterns, judicious use of color, and using the wall as a backdrop. In the last case, the wall could be a backdrop for interesting plantings, or may be a vine wall, or, sculptural landscapes can 'flow out' from, and in front of, the wall.

Urban Freeways

- Traffic is moving continuously and at high speeds
 - Corridor is isolated from the urban communities
 - Treatments are mid to high cost
 - Freeway underpasses provide an opportunity to integrate the freeway structure into the urban environment through public art installations
 - Interchanges provide an opportunity for interesting landscape treatments using landform, plantings and environmental art. Each interchange can have a unique and distinct appearance, related to its location in the city
 - Freeway medians can be an opportunity for environmental art
 - The design of bridges and overpasses can express community character and reinforce identity
 - Soundwalls / retaining walls and plantings should be used along the freeway corridor
- 

ii. Roadway Cross-section and Width

One of the basic and sometimes controversial roadway design decisions has to do with the width and configuration of the facility. In particular, widening an existing roadway or building a new one will have large impacts on the local context and environment no matter how sensitively the project is carried out. It is almost always preferable to design a new project within the cross-section of an existing roadway if at all possible.

In some cases when a new route is being designed there may be flexibility in the width of the right-of-way, providing the ability to develop innovative strategies such as boulevard designs for arterial streets. In other cases where the roadway is to be redeveloped within an existing right-of-way, the total width will likely be fixed and the design will need to be adapted accordingly. For example, the width of travel lanes, planting strips, and pedestrian areas may need to be carefully balanced to meet the needs of multiple users while creating an attractive street environment.

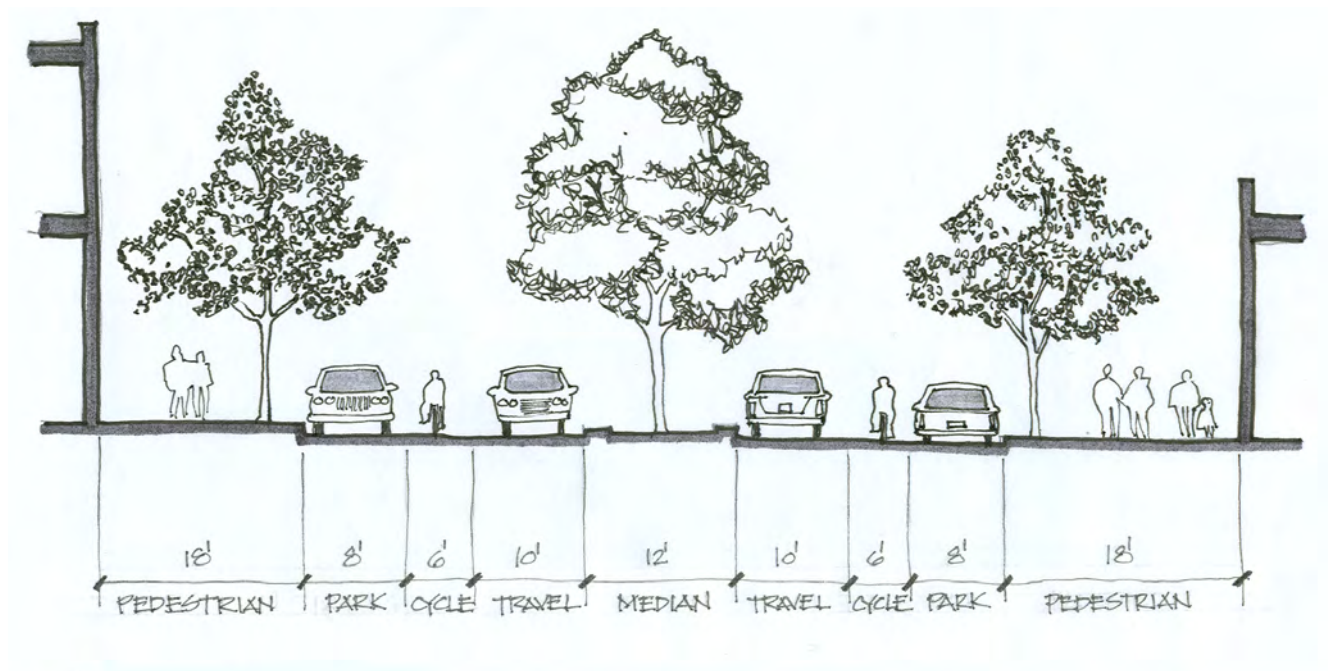
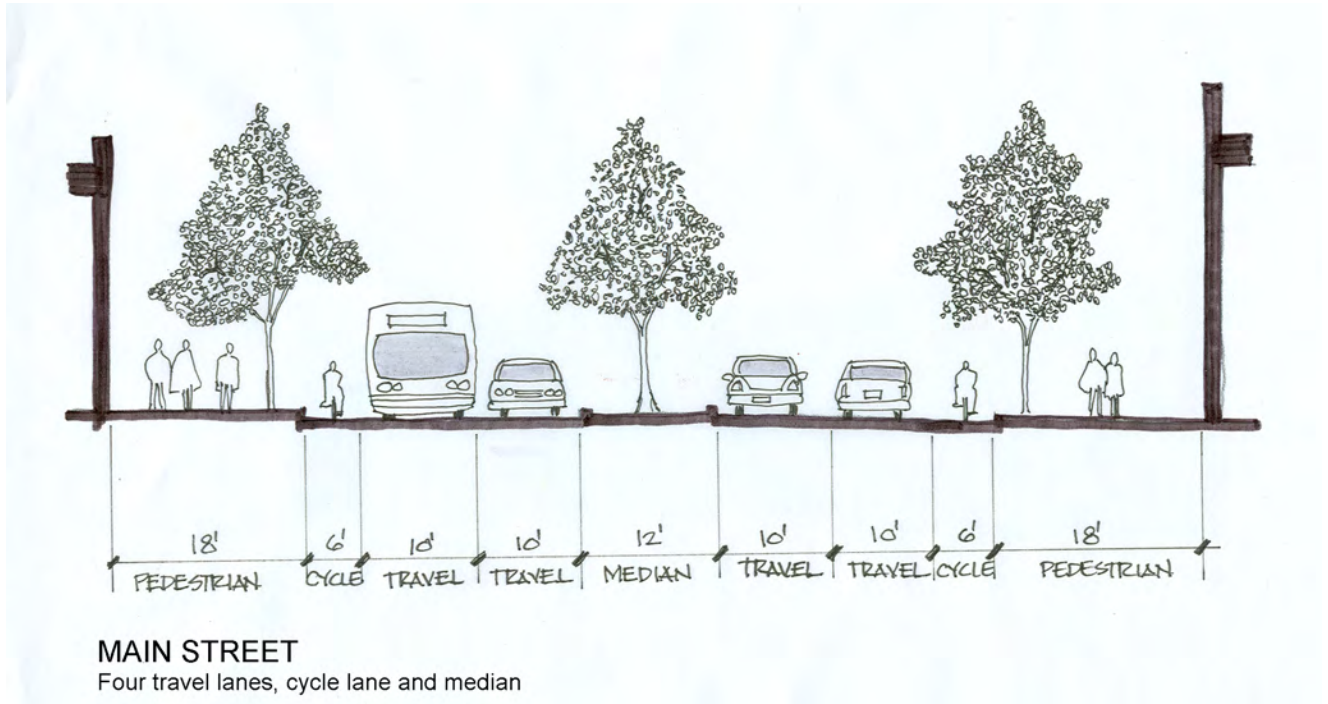
The right-of-way needs to accommodate a number of uses, activities, and elements. The relative degree of importance of the various uses/elements depends on the roadway type and its context. Roadway uses include vehicular movement and access, pedestrian movement, bicycle movement, transit operations, parking, and emergency use of shoulders. The design should also be able to accommodate, where appropriate, plantings, medians, safe crossings, and other activities within the pedestrian zone such as sidewalk seating, lighting, signage, utility poles, and other forms of street furniture.

New community needs and preferences in recent years may also affect the cross-sectional design. Desires to maintain a traditional 'main street' feel in cases where a state highway goes through a town center or other built-up area may argue for a three-lane design rather than a traditional four- or five-lane configuration. Right-of-way limitations and desires to avoid taking property and to preserve historic buildings, signs, trees, and other roadside elements may also require a narrower configuration.

The increase in recreational and commuter cycling often calls for ample, paved shoulders and/or integrated bicycle lanes. Grade-separated bike paths apart from the roadway may be appropriate in some locations. Growing public desires for more extensive pedestrian facilities may require wider sidewalks and as much separation as possible between those sidewalks and fast-moving traffic lanes. This separation can be provided for example by including a planting strip or on-street parking lane.

Public desires for street environments in which traffic is relatively slow and feels safe to pedestrians has led to an emphasis on "traffic calming" in recent years. On arterials or collector streets traffic-calming considerations may argue for narrower lanes and a more bounded streetscape overall, so that motorists have a sense that they are traveling through an enclosed, pedestrian-scale space rather than a wide-open speedway.

Finally, multiple roadway boulevard designs featuring aesthetically pleasing medians, plantings, and pedestrian walkways have made a comeback in recent years. Originally pioneered in the nineteenth century by designers such as Frederick Law Olmstead, these boulevard designs provide travel lanes in the center of the roadway for higher



speed through traffic and local access lanes and sidewalks to the outside of the right of way separated from the fast traffic by medians. Such streets are designed to handle high traffic volumes while also providing attractive landscape design and pedestrian environments to urban or suburban neighborhoods.

The following examples consider the distribution of spaces within a right-of-way for three relatively common New Mexico situations:

- a roadway that is also a main street or commercial street in a city or town
- a roadway in an urbanizing or suburban area
- a rural roadway

A MAIN STREET OR COMMERCIAL STREET IN A CITY OR TOWN

A number of considerations may affect the cross sectional design of main streets and commercial streets in urban contexts:

Speeds

Operating and design speeds will be lower than in more rural areas, and often speeds in the 25-30 mile per hour range will be desirable to promote a pedestrian-oriented environment. A commercial main street usually has a high pedestrian use and it is desirable that drivers move slowly enough to watch for pedestrians and to be able to see the storefronts and street activity. Lane widths can be 10-11', and three-lane configurations can work well.

Parking

Depending upon the availability of off-street lots or garages, street parking that gives people easy access to the shops and activities may be desirable. On-street parking helps buffer pedestrians on sidewalks from traffic and so helps create a pedestrian-oriented atmosphere. Diagonal parking may be desirable in occasional circumstances where sufficient street right-of-way exists, speeds are relatively low and local merchants desire to maximize parking.

Sidewalks

Wide sidewalks will accommodate larger numbers of people and allow the promenading activities and window shopping typical of a main street. In addition restaurants may want to spill out onto the sidewalks with outdoor dining areas. Sidewalks in such main street locations should be a minimum of 12' wide and 18- 20' is better for a comfortable pedestrian way. During the summer months shade from street trees or awnings is desirable.

Planting

If at all possible, space for tree planting should be accommodated in the cross sectional design. A planting strip of at least 4' is often desirable. In main street locations, curb extensions can also be used for planting. Trees help to create an attractive street environment, provide definition to the edges of the roadway, provide shade, and help to lower air temperatures during the hot months. More specific planting strategies are discussed in the Landscape Design section below.

Crosswalks

Crosswalks will need to accommodate large numbers of people in a safe manner and should be designed to reduce the perception of the width of the street crossing. Zebra-stripe or ladder-stripe crosswalks will have the highest visibility. Mid-block crosswalks may be desirable in some cases. Although crosswalks have traditionally been avoided in non-signalized locations, they can be a safe and desirable feature in many

locations if the overall design speed of the street is slow.

Medians

Medians may be desirable when the right-of-way is very wide and out of proportion to the height of the buildings at the edges. In this case, a median can reduce the perception of roadway width, and, with tree planting, can help to develop sub-spaces in the street. More detail on medians is provided in a separate section below.

Street Furniture

There needs to be space within the right-of-way for the 'furniture' and associated accoutrements typical of an urban shopping street. These design elements may include seating, waste containers, newspaper vending machines, bicycle racks, kiosks, signage, planters, and utility poles.

Bicycle Facilities

Bicycle lanes are often desirable on main streets as people are increasingly using bicycles as a means of transportation. In warmer climates such as in many places in New Mexico, cycling occurs year-round. Even though main streets often contain a substantial traffic volume, they are often the most direct and convenient route for cyclists. In four-lane situations where bike lanes are not provided, it is often desirable to reduce the width of the left-hand travel lane and increase the width of the right-hand lane so as to provide cyclists and transit vehicles with additional space. This treatment can help to reduce the risk of 'dooring' for cyclists who are riding beside parked cars.

Transit Facilities

Transit routes will likely exist on main streets. The cross sectional design should accommodate these vehicles in whatever way possible, for example by widening the right-hand travel lane as mentioned above. There will need to be space for bus stops, and these will need to incorporate shade and seating.

A THOROUGHFARE IN AN URBANIZING OR SUBURBAN AREA

A number of considerations may affect the cross sectional design of streets in semi-urban contexts characterized by increasing residential or commercial development:

Speeds

Operating and design speeds will be higher than along a main/shopping street, probably in the 35-40 miles per hour range. Lane widths can be 11-12', and four lane configurations work well. Turn lanes or turn-out bays in medians may be necessary at some intersections due to the higher vehicle speeds and risk of rear-ending vehicles waiting to make a turn.

Parking

There will not normally be a need for on-street parking. On this type of street commercial establishments will usually have their own parking on-site.

Sidewalks

There will be pedestrians but they will not be engaged in the same kinds of activities as on a shopping street. Sidewalks can be narrower, but should be at least 6'. Buffering sidewalks from the road surface by incorporating planting strips is still desirable; such

buffering also helps to maintain a level sidewalk surface at curb cuts.

Planting

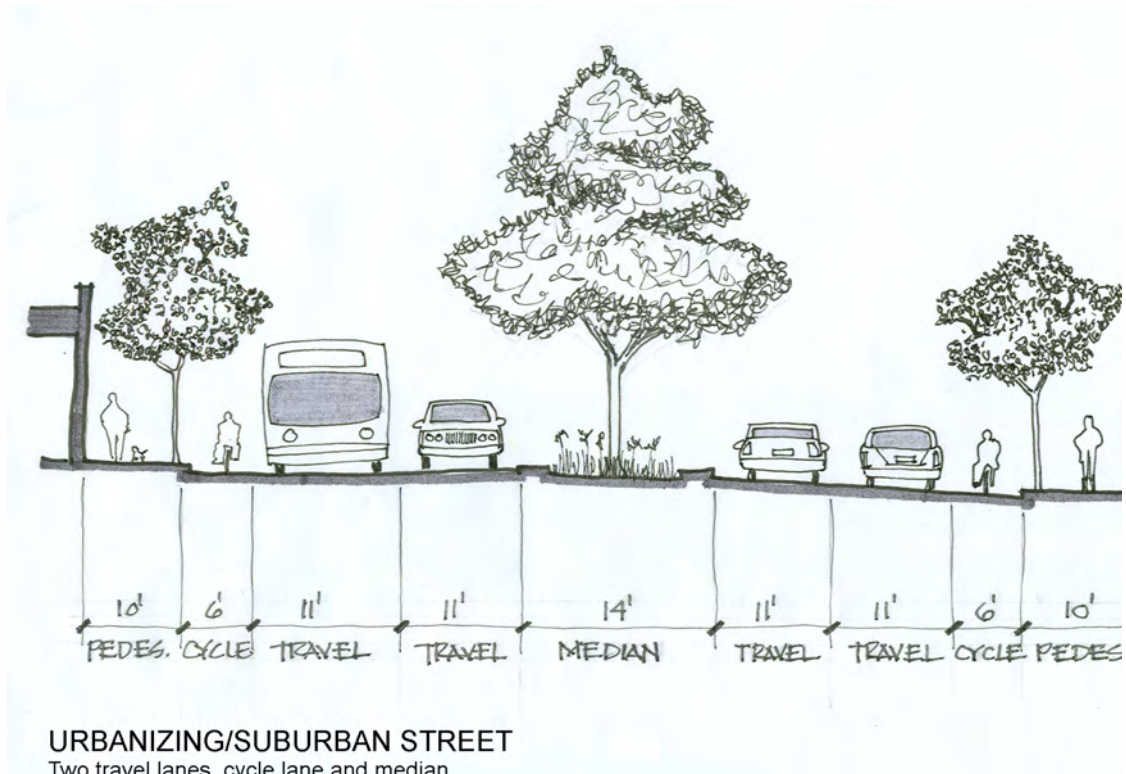
Tree planting is desirable, but more to create an attractive roadway for the motorist than to enhance the pedestrian experience. Trees can be planted further apart, and may not be placed as regularly as is usually the case on a main street. Trees might be placed in clusters, depending on the availability of space and the roadside conditions.

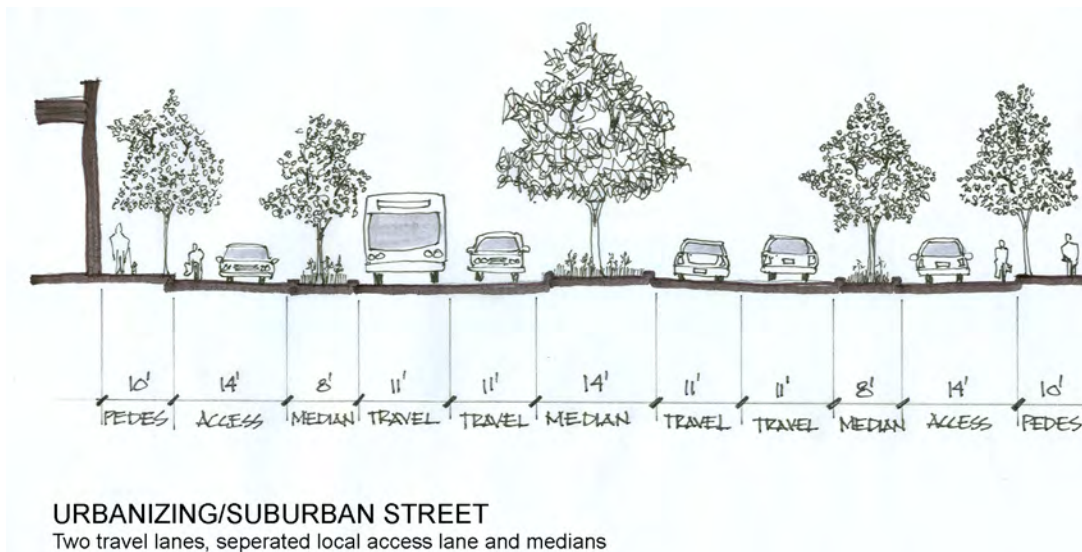
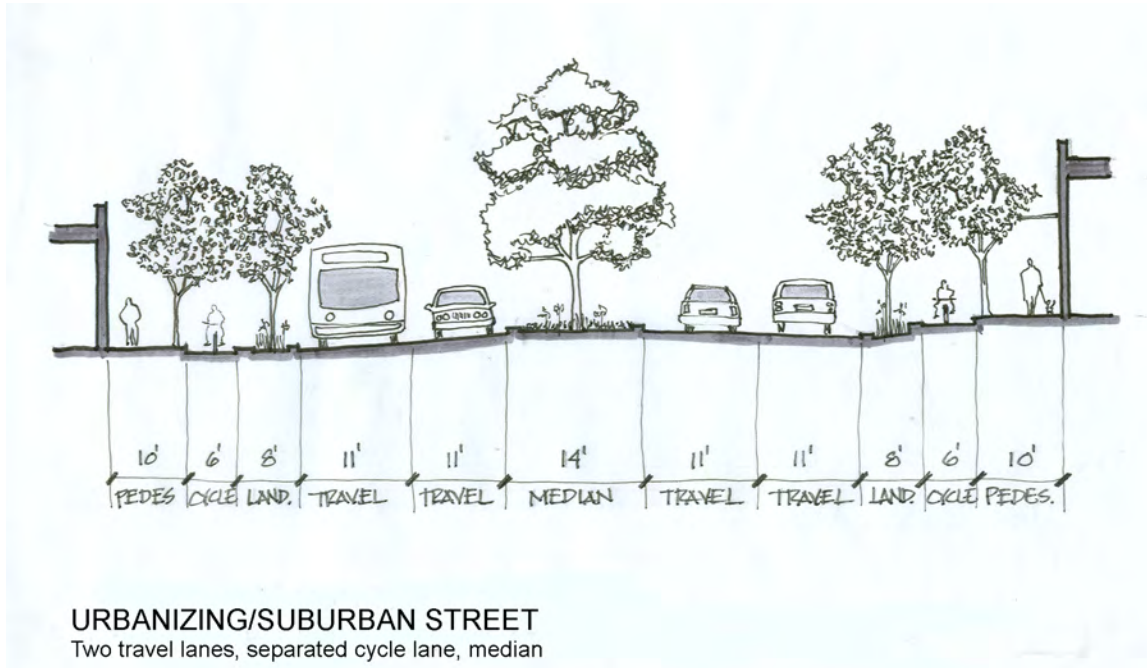
Crosswalks

Crosswalks will normally need to occur at signalized intersections. Pedestrian refuge zones may need to be created at the center of the street due to wider typical roadway widths. In some heavily used roads where traffic lights are backing up the traffic flow, or where more than two roads are intersecting, modern roundabout designs may be considered. In these cases crosswalks would be placed across each entering road before it enters the circle.

Medians

Medians are desirable in this road type. They help to reduce the scale of the roadway and to keep speeds down. Medians should be planted or treated in an aesthetically pleasing fashion; asphalt median spaces and gravel-covered medians should be avoided, as these are of little visual interest and reinforce the impression of a wide, hardscaped roadway. Median spaces may also act as 'sponges' and bioswales if drainage is directed towards them.





Street Furniture

Roadside accoutrements will largely consist of signage and perhaps utility poles, but there may be a limited need for other elements such as waste containers and transit stop facilities. Utility poles should be placed in the planting strip rather than in the middle of the sidewalk.

Bicycle Facilities

Bicycle lanes should be incorporated for commuters if this is compatible with any existing local or regional bikeway network plans. Depending upon the width of the right-of-way, the bikeways may be integrated with the roadway, or they may be developed as paths separated from the roadway.

Transit

Transit routes will likely exist on these streets. There will need to be space for bus stops, and these should incorporate shade and seating.

Boulevard Design

In some urban, semi-urban or urbanizing areas, boulevard designs can help provide both fast motor vehicle travel and pedestrian-friendly streetscapes. As previously mentioned, these designs typically use a wide right-of-way with multiple median strips to insulate sidewalk spaces or local access lanes from fast-moving travel lanes at the center of the roadway. Surrounding land uses face onto the roadway, helping to create an attractive pedestrian environment, rather than the current situation in which many suburban developments turn their back on the street.

A RURAL ROADWAY

A number of considerations may affect the cross sectional design of streets in rural contexts:

Speeds

Operating and design speeds will be in the 50-60 mile per hour range. Lane widths can be 12' in two, three or four lane configurations.

Parking

There will be no parking on the roadway, but there will be a need for pull-off zones.

Planting

Planting should be kept to a minimum, with the roadway character relying primarily on the adjacent landscapes. There may be a need for planting to screen particular elements that may be undesirable, or to signal a change in the road such as an intersection or a town ahead.

Intersections

Intersecting highways and roads may be an opportunity to widen the right-of-way and provide special visual treatment.

Medians

Medians might occur if the right-of-way is very wide, or in divided highway designs. In the latter case as much as possible of the original vegetation and surface features (rocks, topography, soil textures) should be maintained for visual interest. Irrigation of median landscaping is unlikely in these rural locations, so retention of existing climate-appropriate vegetation should be a priority.

Street Furniture

Roadside accoutrements will largely consist of signage. It may be desirable to include pull-offs or rest areas at points of scenic outlooks or special character.

Bicycle Facilities

If called for by regional bicycle network plans, bicycle lanes should be incorporated for

recreational and competition bicyclists. Due to growing recreational cycling in many parts of New Mexico, roadways should include wide, smooth shoulders for cyclists, usually not less than 6' in width.

iii. Pedestrian Design

Pedestrian-friendly design is a prime consideration for CSD/CSS in many contexts. Designing for pedestrians involves far more than simply providing sidewalks. Instead, what is important especially in urban contexts is the creation of an overall street environment that is safe and attractive to a variety of users including pedestrians. Consideration of pedestrian needs throughout project design is called for.

SIDEWALKS

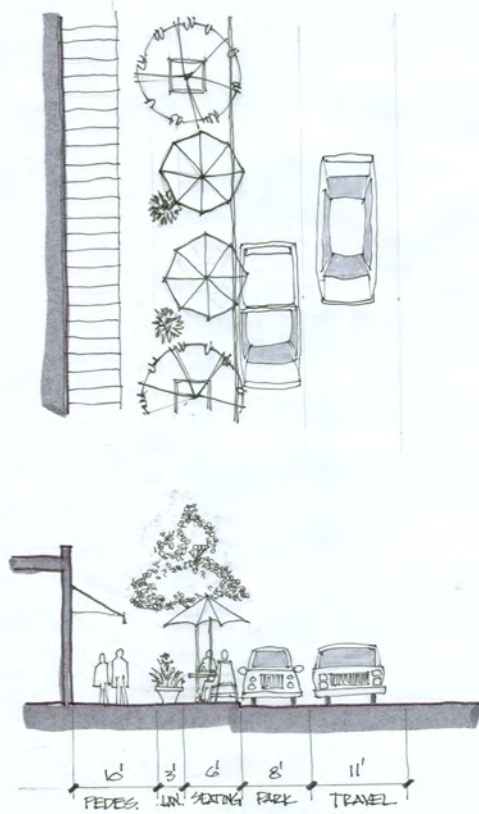
Sidewalk design considerations include the location of the project (urban, rural, semi-rural), the placement of the sidewalk in relation to the road, the width of the walkway, the materials used and possible changes in surface treatments, and the relation of



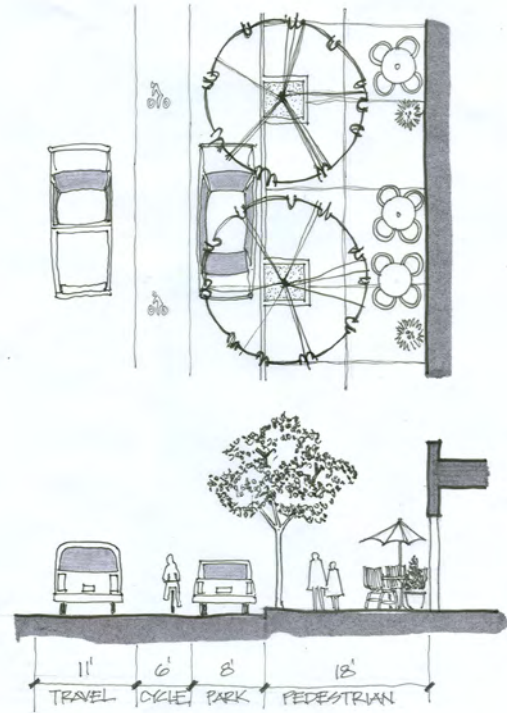
*Pedestrian Walkway
Mill Ave., Tempe, Arizona
Photo: Alf Simon*

sidewalks to adjoining pedestrian routes. Ideally sidewalks should be designed as part of an overall network of pedestrian routes enabling people to go where they want and need to go.

As mentioned in the previous section, the width of the sidewalk needs to be considered in context. In urban locations a wider-than-minimum walkway provides an opportunity for local businesses to use the sidewalk as an extension of their businesses, provides room for street furnishings, and can add to the overall pedestrian friendliness



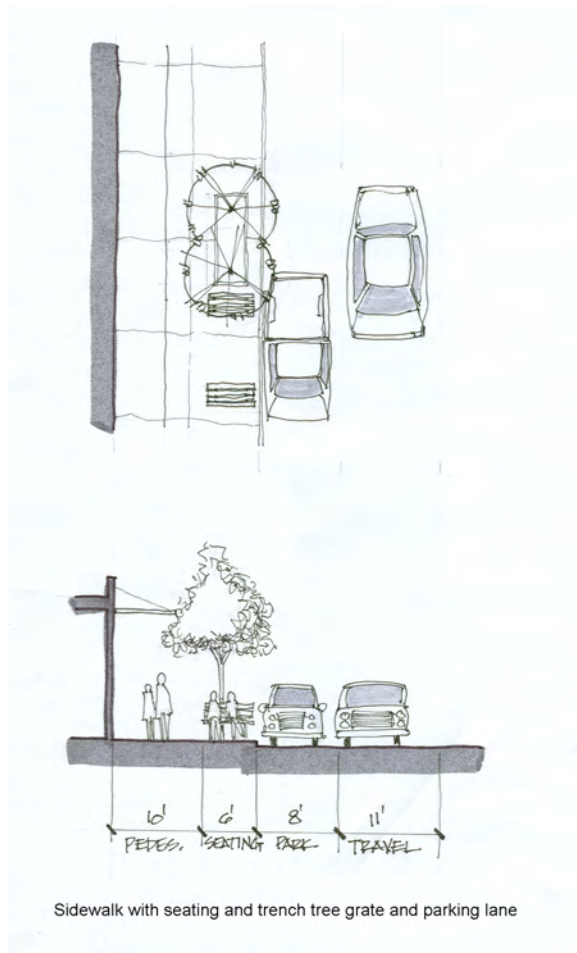
Sidewalk with cafe seating at street side and landscape space and parking lane.



Pedestrian sidewalk with cafe seating along building and parking lane.

of the community. In semi-urban or rural contexts, narrower sidewalks are appropriate, but in all locations they should be wide enough for two people to walk comfortably abreast, that is, about 6' wide. The 4', 3', and even 2' sidewalks found occasionally along New Mexico roads are simply too narrow. The volume of pedestrian traffic at different points on a roadway may call for different widths at different points.

Context sensitive design of sidewalks should consider the materials used for these walkways. A wide variety of pavers in different colors and textures is available, in addition to traditional brick designs and concrete. Tactile surfaces can be used for cross-



walks, intersections, curbs, transit boarding zones, or other special areas. In culturally or historically significant areas, text and design can be added to the sidewalk paving, for example presenting historic information or quotes from local citizens or cultural figures. Changes in materials can be used to demarcate different areas, such as downtown districts, neighborhood centers, or main streets, as well as to emphasize features such as curb ramps and crosswalks. Wayfinding aides can also be incorporated into the surface treatment. The paving material should be chosen to compliment the locale in type, color and texture. As a sidewalk moves from the edge of a town to the center of town, the width may increase, a landscaped buffer may be added, and the walk might contain stamped or embedded cultural or historical icons in the surface treatment. These are all items that can be designed to contribute to the identity of a place.

Sidewalk design is especially influenced by The Americans With Disabilities Act of 1990, which has specific requirements related to width, slope, surface material, and curb cuts. In many locations New Mexico sidewalks do not do well at meeting ADA requirements, and special care should be taken to ensure that high-quality curb cuts are provided and obstacles such as utility poles, signal control boxes, and bus stop shelters are not placed in sidewalk space. Providing planting strips along roadways is one way to avoid the latter problem.

In addition to this utilitarian function, a buffer zone or planting strip between the roadway and the sidewalk provides an opportunity for aesthetic enhancement and can be designed with appropriate plant materials, bollards, boulders, etc. to contribute to the identity of the area. Incorporating plant materials can create a microclimate that improves pedestrian comfort. A buffer zone can be a visual amenity for a community as well as creating enhanced pedestrian safety and comfort. It also provides space for street trees, lighting, signage, street furnishings, and unloading from vehicles without impeding movement on the sidewalk. Buffer zones eliminate the necessity for grade changes in the sidewalk adjacent to curb cuts for driveways or access roads.

CROSSWALKS

Designing crosswalks to contribute to the overall pedestrian environment requires consideration of the location of the crosswalks, their surface treatment, signage, lighting, and other visual and auditory cues for the motorist and the pedestrian. Although crosswalks have traditionally not been utilized on arterial streets except at signalized intersections, in urban or main street locations where design speeds are 30 miles per hour or less they may be appropriate at non-signalized intersections as well.

The design should be informed by the locale, and will be dependent on the volume and speed of vehicular traffic and the volume of pedestrian traffic. Clean, legible markings as well as signs and pavement stencils can help make motorists aware of pedestrian traffic. The location of crosswalks should be in direct relation to pedestrian routes, and make it possible to cross busy roads without having to travel far out of the way. Crosswalks may be designed with contrasting paint, different colors of pavement, different types of pavement such as pre-cast pavers. Audible signals should be considered at intersections with high pedestrian volumes, and the duration of traffic lights should take into account all users including pedestrians. The crosswalk area should also be well lit for both vehicles and pedestrians.

STREET FURNISHINGS

Issues to be considered in the design of street furnishings are the location and type of furnishings, who the users are likely to be, and how the item will be used. The architectural style of the furnishings should be considered in light of the surrounding context.

Street furnishings will enhance the pedestrian environment, and should be included in areas of high pedestrian use, transit stops and urban areas. These furnishings can encourage social interaction, and contribute to the sense of place as well as community pride. The addition and placement of street furnishings will show that a community cares about their pedestrians, and can add to the overall enjoyment of the public space. Seating is of particular importance, and can be provided through benches as well as secondary seating on low walls, planters, etc. Other street furnishings include planters, trash receptacles, newspaper racks, lighting, fire hydrants, utility poles, bike racks, parking meters, bus shelters, and signage. Although water conservation is a prime concern in our state, fountains may be appropriate in some public places near main streets. The pedestrian zone should be designed to easily accommodate street furnishings through wide walkways and buffer zones.

PEDESTRIAN-ORIENTED LIGHTING DESIGN

Lighting fixtures can play a major role in making streets more pedestrian friendly, in particular if those fixtures are attractive and at a height that helps create a pedestrian-scale street environment. Pedestrian-scale light fixtures should be lower than standard street lighting poles, typically 12'-15' high, and should be placed closer together than typical streetlights. Shielded lamp design should illuminate the pedestrian zone without creating light pollution in the surrounding community. Ambient light from sources that are 3' or lower (i.e. bollards or planting lights) or lights embedded within paving materials may also be considered, and can add to the architectural character of the pedestrian zone. Lighting design is discussed further in Section 5.b.ix below.

RURAL PEDESTRIAN DESIGN

In rural areas context-sensitive pedestrian design may have very different elements. Roadway corridors may have paved or unpaved shoulders that are used for pedestrian routes. Children might be using a segment of the roadway as a route to school, or might wait for a school bus at a particular point. In such cases pedestrian pathways away from the roadway should be considered with a buffer zone between the road and the path. The buffer zone might include a vegetated swale for drainage, or traffic barriers such as shrubs or boulders that would enhance the aesthetics of the roadway edge as well as increasing safety for the users of the trail.



I-40 Interchange, Pedestrian Area
Photo: Baker Morrow

If a transit stop is part of a rural roadway, a paved and widened shoulder with amenities should be considered. A bench, signage, lighting, and trees would enhance such an area. Shoulders that serve as pedestrian facilities may merit additional signage warning motorists to watch for pedestrians. In rural locations rolled curbs may fit the context better than curb-and-gutter treatment.

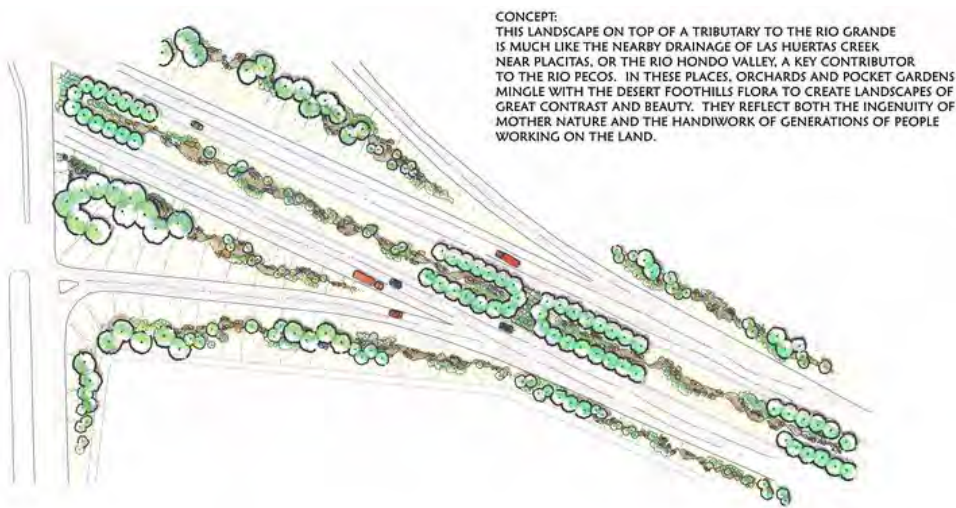
iv. Medians

Medians provide a range of opportunities for safer and more aesthetically appealing roadway projects. They can help establish a linear character element identifying a community or place. They can provide a visual amenity for motorists and pedestrians. On a low speed urban road, medians can function as access management and can slow turning movements, improving pedestrian safety. They may also serve as pedestrian refuge points on a wide street. Medians can provide space for lighting, utilities, and signage. If wide enough and attractively landscaped, a median can even serve as a linear park or greenway, attracting pedestrians, runners, dog-walkers, and other community members.

When designing a large roadway, especially in an urban or semi-urban context, the value a median can provide to the community in terms of identity, visual amenity, pedestrian safety, and potential recreational resource should be considered as well as vehicular needs.

Landscape design of the median offers an excellent opportunity to enhance the local character of a community through appropriate plant selections and design. Rock and bark mulches along with low water use plants and low maintenance designs can create a microclimate that in turn will retain moisture and improve the quality of storm water runoff. Landscaped medians may in fact help lower temperatures in urban areas where much of the land is paved.

Trees planted in a median can improve the visual quality of a road, and can create a canopy that may act as a gateway or identifying feature for a community. A canopy of trees is also thought to slow traffic by creating the perception of an enclosed space along the street. Careful selection of the tree species should be made that is both



Conceptual Plan March 2004
City of Albuquerque
East I-40 Landscape Improvements



*I-40 Interchange, Pedestrian Area
Morrow, Reardon, Wilkinson,
Miller, LTD.*

appropriate to the locale in terms of climate, but also appropriate in its growth structure for the job it is expected to perform, i.e. as a shade or ornamental tree. Section 5.b.ix provides more consideration of specific species that might be used along medians.

Sculptures may be incorporated into median design to enhance the identity of an area. If sculpture is to be part of a median, it should be part of the overall median design, not an added decoration. Such artwork might be historical, cultural, or contemporary, but should be considered as part of the total design.



Park-like median in a suburban residential area
Photo: Sue Frye

The width and character of medians should be based on the local context. On rural highways, narrow painted median strips with embedded lane markers and reflectors may be sufficient. But in more urban areas it often becomes important to grasp any opportunity to reduce the large amount of asphalt in the urban environment, and landscaping the median space of a roadway is a prime way to do this. Along new roadways, wide medians of 20' or more may be desirable to allow space for a double row of trees or other plantings, and potentially to accommodate a pedestrian path.

Reflective materials may be needed along medians where no lighting exists. Irrigation may be needed in some median locations more than others (for example it may not be needed in a floodplain where the water table is within a few feet of the surface). Community groups may exist in some areas that are willing to take on maintenance of median landscaping, or to fund special design treatments.

Medians are often sources of community pride and public input should help inform median design. The community will be aware of regular or intermittent activities that are not necessarily obvious to an outsider. Examples might be areas where children walk to school, where a church holds a large service every Sunday, or where a flea market takes place on Saturday mornings on the side of the road. These types of adjacent activities should be considered when designing medians, for example making their use as pedestrian refuges at certain intersections particularly important, or even accommodating certain activities in the median space.

v. Intersections

Intersection design is a challenging task, especially in suburban or urbanizing locations with high traffic volumes. Safety and traffic-handling concerns must be balanced with aesthetic considerations and use by pedestrians, cyclists, and transit vehicles. Too often arterial intersections are perceived by members of the public as unattractive expanses of asphalt, the epitome of a car-dominated environment. As arterial roads have grown wider, this problem has increased.

INTERSECTION SIZE AND CROSSING DISTANCE

With the growing size of arterial streets and the frequent addition of multiple turn lanes, intersections have expanded greatly in size. Not only has this trend led to unsightly expanses of asphalt, but it has substantially increased crossing distances for pedestrians. When designing a new intersection or retrofitting an existing one, it is desirable to minimize the overall paved surface and to introduce landscape elements and pedestrian refuges to improve the visual quality of the street environment. In many cases travel lanes and turn lanes can be narrowed at intersections, to encourage slower travel and reduce cross-sectional width. Landscaped curb extensions can both improve pedestrian safety and introduce green elements. Medians can often be created or extended further towards the intersection to add pedestrian refuges and landscape elements.

CURB RADII

In traditional American cities and towns, curb radii were very tight in all locations, minimizing the size of intersections and the distances pedestrians needed to travel to cross the street. These tight curb radii (though often loosened a bit through retrofitting) can still be seen in older New Mexico communities. However, during the twentieth century successive waves of street design standards encouraged looser curb radii to speed traffic turning motions. Such fast turning traffic has frequently been hazardous to pedestrians and a major contributor to public perceptions that intersections are dangerous and unattractive. Now the pendulum is swinging back, with many cities nationwide adopting much tighter curb radii guidelines. Instead of 25-30' radii, as is common currently, AASHTO's recent Pedestrian Guidelines recommend 10-15' radii in many locations. 5-10' corners are desirable in areas with slow traffic speeds and/or heavy pedestrian traffic. AASHTO also recommends taking into account the "effective radius" of the corner, including the extra space provided by parking lanes and bike lanes that makes motor vehicle turns more gradual. Doing so provides additional justification for very tight corner radii.

Tight curb radii decrease the distance pedestrians must travel to cross the street, increase their visibility, and slow motor vehicle turning movements. Often a 6-10' curb radius may be sufficient for locations in which the design speed of the roadway is in the 30 mph range.

CURB DESIGN

Curb extensions—in some locations also called bulb-outs or bump-outs—are an additional way to make intersection corners more pedestrian-friendly. These features

reduce pedestrian crossing distance, increase the visibility of pedestrians to motorists, and provide pedestrians with a better view of oncoming traffic. If landscaped, curb extensions can also help improve the aesthetic quality of intersections.

Typically curb extensions are used in main street locations where a parking lane exists, and move the curb outwards the width of a parking lane. Cut-through channels covered by steel plates can help handle runoff (see photo). As with a traditional corner, the corner radii of curb extensions should be kept relatively tight, generally 5-10', to encourage slow motor vehicle turning speeds.

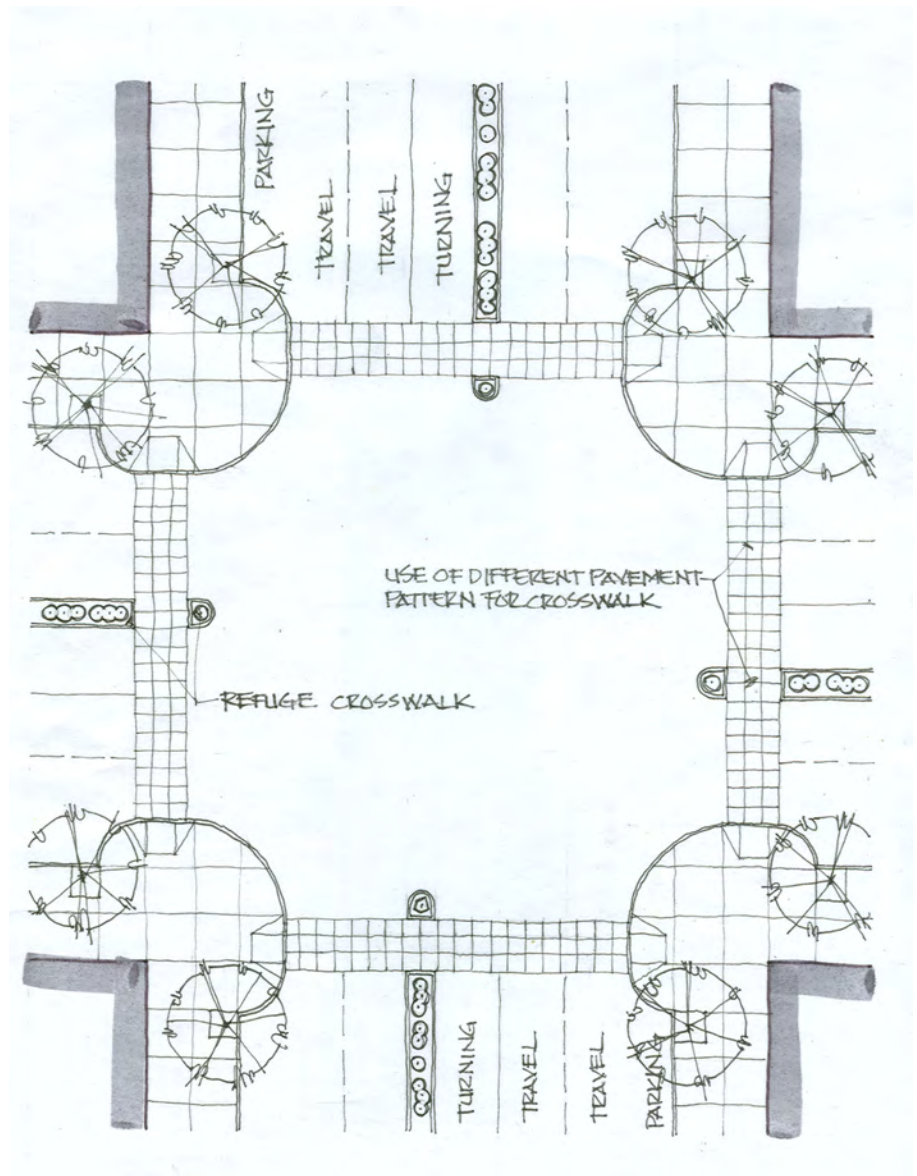
Curb cuts at intersections are an essential element of ADA compliance. The preferred design creates two curb cuts each facing more-or-less directly across one of the streets, rather than placing a single cut diagonally on the corner. The latter approach forces wheelchair users to enter a trafficked area and then to execute a turn in order to cross in either direction.

FREE-RIGHT-TURN LANES

Free-right-turn lanes are commonly found at New Mexico intersections involving major arterials, but are problematic from the point of view of cyclists and pedestrians. They facilitate motor vehicle traffic by allowing fast turning movements, often without waiting for a signal, but create an extra lane for pedestrians to cross and lead to an island space in the intersection which may be difficult to landscape or make attractive. For cyclists, free-right-turn lanes are particularly dangerous. If they are traveling at the right-hand side of the street from which a free-right-turn lane originates, fast traffic may cut them off or strike them as drivers begin to make their turn. For these reasons, such lanes are not desirable in urban or many semi-urban locations.

INTERSECTION LANDSCAPE DESIGN

Traditionally trees and other elements of planting design have often been avoided at intersections due to visibility concerns and lack of planting space. How-



ever, the physical space for such plantings can be provided through curb extensions, planting strips, and median extensions. Moreover, low plantings and trees without lower branches are no more of a visibility hazard than the utility poles, signal boxes, and parked vehicles that often clutter New Mexico intersections currently, and could help enormously to improve the visual quality of these areas. In main street locations where traffic speeds are relatively modest, plantings should be used near intersections as part of an overall strategy to slow traffic and improve the attractiveness and pedestrian friendliness of the street environment.

ROUNABOUT DESIGNS

Modern roundabouts, long common in Europe, are making their appearance in North America and offer a way to ensure smooth, continuous, relatively low-speed flow of traffic at intersections. Roundabouts can handle relatively large volumes of traffic without the backups, multiple turn lane requirements, or often confusing proliferation of signal heads at our current arterial intersections. By keeping speeds relatively slow (around 20-25 mph), they decrease the severity of any accidents. Roundabouts also offer dramatic possibilities for aesthetic design treatments. These large traffic circles create sites for monuments, fountains, public art, gateway treatments, or extensive landscape design within urban or suburban areas.

RURAL INTERSECTIONS

If the intersection is located in rural surroundings, its design should be kept relatively simple and straightforward so as to fit into the rural context. The addition of multiple turn lanes, numerous signal heads, and complex signal patterns will convey a much more urban or suburban character than may be desirable. Overall paved surfaces should be kept to the minimum amount consistent with safety.

vi. Bicycle Facilities

Recreational cycling and use of the bicycle for daily transportation needs are both common in New Mexico. Each leads to particular design applications for the state's transportation projects.

Recreational cyclists typically travel substantial distances at relatively fast speeds and benefit from facilities that allow long distance bike travel without stopping. Wide, safe, paved shoulders along rural and suburban roads are important for this user group. Grade-separated trails within urban areas with bike/pedestrian bridges to cross free-ways, major arterials, and waterways are desirable as well. These features can improve the overall attractiveness of the roadway, and increase the comfort of motorists who have to worry less when passing cyclists.

In contrast, bicycle commuters or novice users may need a more intensive level of street design treatment within urbanized areas. In general, these users will want as many safe streets as possible to travel upon, and like to travel on specifically designated bicycle spaces such as bike lanes. On-street bike lanes, safe intersection crossings, cautionary signage for motorists, and moderate traffic speeds are all desirable design elements.

As with pedestrian facilities, consideration of the overall network of bicycle facilities is important. Many urban or suburban jurisdictions will have determined a bikeway system, and these plans or maps should be consulted.



*Rural Bike Route, Netherlands
Photo: Alf Simon*

FACILITY DIMENSIONS

In general designated bike lanes are only likely along a state highway if the relevant local jurisdiction has designated the roadway as part of its bike network, or in exceptional cases if existing or likely bicycle traffic makes such design treatment desirable. However, cyclists' safety should be considered even if a specific bicycle facility will not be a part of the roadway project, as some cyclists may use any street and future use patterns cannot be determined.

For comfort and safety of bicyclists, a designated bicycle lane should be a minimum of 4' and preferably 5' or even 6'. (Any more than 6' raises the risk that motorists will view the bike space as a travel or parking lane.) In a confined right-of-way it may be desirable to narrow vehicle lanes to accommodate the bike lane, as narrower vehicular lanes assist in slowing the speed of traffic, increasing the safety of bicyclists.

Along a state highway in a rural context, a level shoulder width of 6' will provide a safe riding area. It is important to clean and maintain the shoulder if it serves as a bikeway.

SIGNAGE

Signage is important for both motorists and cyclists. Pole-mounted signage and pavement markings should be provided where appropriate to warn motorists of the presence of cyclists. Signs should be placed more frequently in areas heavily used by cyclists. The "Share the Road" message is becoming increasingly standard nationally and is desirable in urban locations. Other messages may also be possible to indicate that the road is designed for multiple modes of travel, and to encourage motorists to be courteous to bicyclists.

For cyclists, signage is important to designate bike route systems, especially at intersections or where bike routes leave one road for another. Increasingly, regional metropolitan planning organizations are designating regional bike route networks, and coordination with these authorities may be necessary to determine appropriate network signage. Having motorist-oriented signage also helps cyclists feel safer and more comfortable on the road.

MOTORIST SPEED

Lowering the speed of motor vehicles in locations heavily used by cyclists and pedestrians improves their safety and reduces the severity of injury. The table below shows how the severity of pedestrian injury correlates with motor vehicle speed (a similar correlation almost certainly holds true for severity of cyclist injuries).

In general, keeping motor vehicle speeds below 30 mph keeps serious bicyclist and pedestrian injuries to a minimum. State highways in urban areas should aim for this goal if at all possible. Doing so means adopting this as the design speed as well as the posted speed. On arterial streets, a design speed of 30 mph may require a package of strategies to reduce vehicle speeds, such as relatively narrow travel lanes, bulb-outs or pavement extensions, planting of trees or other landscape materials along the sides of streets and medians to narrow the perceived width of the street, pedestrian-scale lighting, and signage warning motorists of bicyclists and pedestrians.

Table 5.b.vi.1: Correlation of Motor Vehicle Speed with Pedestrian Fatalities

Impact Speed (mph)	Probability of Fatality (Pasanen)	Ages 0 to 14; Probability of Fatality (Davis)	Ages 0 to 14; Probability of Serious Injury (Davis)	Ages 60+; Probability of Fatality (Davis)	Ages 60+; Probability of Serious Injury (Davis)
20	5%	1%	30%	4%	74%
30	40%	5%	71%	54%	45%
40	80%	25%	71%	97%	3%
50	~100%	70%	30%	~100%	0%

Sources: Pasanen, E. *Driving Speeds and Pedestrian Safety; a mathematical model. Technical Report No. REPT-77, Copenhagen, Denmark, 41 pp., 1992*; Davis, Gary A. "Relating Severity of Pedestrian Injury to Impact Speed in Vehicle-Pedestrian Crashes." *Transportation Research Record 1773. Transportation Research Board, 2001.*

AMENITIES

If the project area is in an urban area, amenities such as bicycle parking and places to rest are important. This street furniture can help build a sense of place and enhance the environment for pedestrians as well as cyclists. Lighting at a pedestrian scale (12-18') can also make a place feel more comfortable for cyclists.

Within regional bike route networks, rest facilities should be placed at distances appropriate to cyclists. These can be combined with existing historic monuments, scenic pull-outs, etc. They can include features such as benches, shade structures, route map signage, trash cans, and water fountains (in places where this is feasible).

INTERSECTIONS

Intersections are dangerous for both vehicles and cyclists because the number of potential turning movements and crash points. Communication with local bicycle associations can help identify problematic intersections and potential solutions. One main goal is likely to be keeping vehicle speeds slow, especially during turning movements. As previously mentioned, intersections with free right turn lanes are particularly dangerous for cyclists because the bicycle lane must cross vehicular traffic to remain beside the through traffic. This movement is facilitated by painting a taper lane with dashes to help guide the cyclist to the correct position. These marks help the driver be aware they are crossing the bicycle lane, and are often paired with a painted road sign that indicates the vehicle should yield.

At intersections with heavy bicycle and pedestrian use, a variety of indicators should be used to alert drivers of the presence of these other travel modes. This can be done with different pavement textures at the pedestrian crossing that indicate a shared space to the motorist, "Look Left/Right" signs on the street that notify pedestrians and cyclists to be aware of the vehicular traffic, and other design treatments.



*Integrated Bike Lane & Signage, Netherlands
photo: Alf Simon*



Bike-sensitive loop detectors for signalized intersections allow a cyclist to trigger the light to change. Often cyclists are forced to dismount in order to press the pedestrian crossing detector on the signal post; locating these where cyclists can activate them without dismounting. These devices should be set to a threshold of one cyclist to change the flow of traffic.

BICYCLE BOXES

The bicycle box is an excellent solution for dealing with bike lanes that cross intersections with heavy traffic where cyclists may need to turn across traffic. According to an FHWA report evaluating bike boxes,

“The box is a right-angle extension to a bike lane at the head of the intersection. The box allows bicyclists to get to the head of the traffic queue on a red traffic signal indication and then proceed first when the traffic signal changes to green. Such movement is beneficial to bicyclists and eliminates conflicts when, for example, there are many right-turning motor vehicles next to a right-side bike lane. Being in the box, and thus at the front of the traffic queue, also tends to make bicyclists more visible to motorists.” (Evaluation of an Innovative Application of the Bike Box, FHWA Publication No. FHWA-RD-00-141, page 1.)

SURFACE TREATMENTS

One innovative surface treatment commonly used in Europe is colored pavement, which clearly indicates the presence of a bicycle lane. Color can either be integral to the pavement or added as paint. Red is the usual color in countries such as Switzerland.

Lane markers should not be raised in places where cyclists might cross over them because this is a safety concern for cyclists. Paint or thermoplastic should be selected so as to not be slippery in the rain. In some cases, abrasive may need to be added. Lanes should have a level, well-paved and maintained surface.

BIKE LANE TAPERS

In cases in which a bike lane approaches an intersection, special pavement signage may be necessary to direct the bicyclist. Lane tapers can be used when a right turn lane begins, to allow cyclists to continue through an intersection. They should be used when a bicyclist needs to cross traffic lanes in order to turn at the intersection, or to safely redirect the route.

HYBRID BICYCLE LANE

The hybrid bicycle lane incorporates a wide curb lane that allows sufficient space for the motorist to overtake the cyclist. The hybrid lane integrates the cyclist into the flow of traffic. Hybrid lanes should have pavement markings that indicate the lane is a shared space as well as signs on posts. Hybrid lanes are easier to maintain than traditional bike lanes because debris does not accumulate to the same extent as in a traditional bike lane.



*Separated Bikeway, Tramway, Albuquerque
Photo: Sherry Gwyn*

vii. Traffic Calming

Since the 1960s the international movement known as traffic calming has influenced the design of many streets throughout the United States. One set of traffic calming devices is appropriate for residential streets. These tools include speed humps, speed tables, traffic circles, chokers, chicanes (staggered parking along the street), divergers, and other forms of barriers. However, it is unlikely that NMDOT will be extensively involved in such projects.

Another set of traffic calming techniques is appropriate for arterial and collector streets. Especially in main street locations, the ideal is often a package of traffic calming elements that ensures slow and smooth traffic flow. These details include corner or mid-block curb extensions, planted medians or islands, highly visible crosswalks, pavement or roadside signage, extensive landscape design, pedestrian-scale lighting, and lowered speed limits.

REDUCING THE SPEED LIMIT

Reducing posted speeds can be an effective technique to increase safety and create a more urban street environment when highways enter towns. However, if other elements of the road design do not support the lower speed, drivers frequently fail to comply. In towns, it is usually best to combine several traffic calming measures to create an environment that is conducive to slow traffic. This urban environment typically has a narrow right-of-way, with small building set-backs, to create a sense of enclosure. Human scaled architectural elements also contribute to reducing vehicular speeds; as opposed to monumentally sized signs and buildings that are designed to be seen from a vehicle traveling 40 miles per hour. The more the street takes on the qualities of an outdoor room, the slower motorists are likely to proceed.

STREET AND LANE WIDTH ADJUSTMENTS

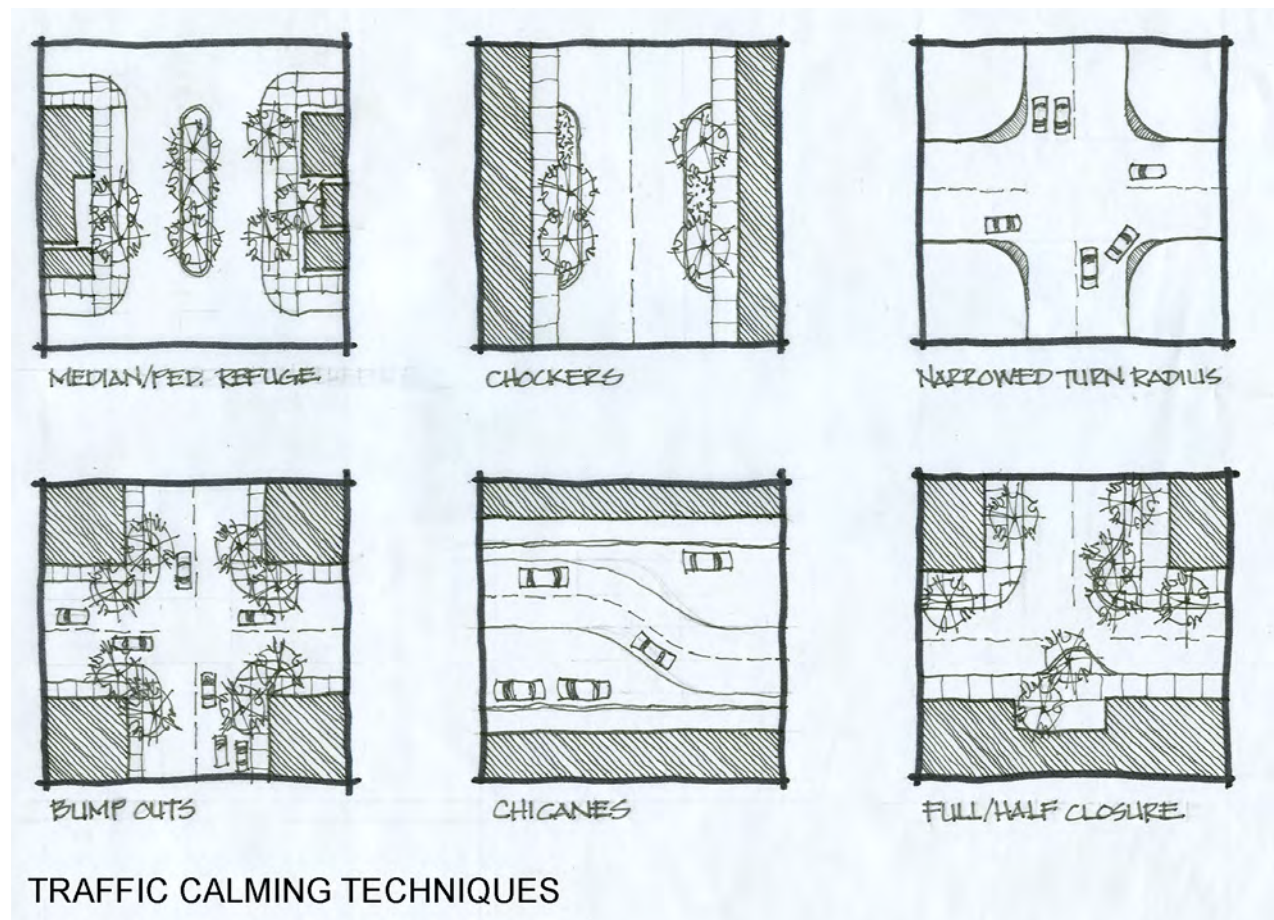
The perceived width of the street and travel lanes has a significant impact on a motorists' speed. Generally, the narrower these are, the slower the motorist will travel. The street can be narrowed perceptually by decreasing lane widths and overall pavement surface, adding medians and curb extensions, more clearly demarcating different road spaces through pavement signage, and adding trees and other plantings. Reducing building setbacks along the street is important as well, but this is controlled by local zoning codes or design guidelines. If travel lanes are narrowed, there should be other design elements that also encourage reduced speeds. This is because narrow lanes, on their own, may not be sufficient to reduce speeds, and could pose a safety hazard.

MEDIANS/CROSSING ISLANDS/PEDESTRIAN REFUGES

Medians provide an opportunity to respond to the local context as well as to increase safety. The median should be designed wide enough to provide a refuge for crossing bicyclists, pedestrians, or equestrians in areas with considerable non-vehicular traffic. Turn lane bays are often necessary if the street involved has high traffic volume or speed. However, devoting excessive space to such bays can substantially decrease the size and presence of a landscaped median. In general these bays should be kept as short as practicable to maximize median space. Medians are discussed further below.

Crossing islands can be an effective device to improve pedestrian safety for a roadway that does not have a median, where the median is only painted, or where the roadway uses a three- or five-lane design in which the middle of the street is dominated by turn lanes. These islands provide a raised refuge for the pedestrian at the center of the street, and can also contain landscaping to beautify the street environment. They should include a cut-through for wheelchair access and ADA compliance.

Both crossing islands and medians can serve as mid-street pedestrian refuges. However, if medians are terminated too far in advance of the intersection, they lose this function. Although exact configuration will depend on the geometry of the specific intersection, in general medians should be brought as close as possible to the curb line of the cross street so as to retain this pedestrian function, while permitting moderate speed motor vehicle turns from surrounding streets.



SURFACE TREATMENTS

Changes in the color or texture of the road surface can be used to catch motorists' attention and designate a pedestrian-oriented zone. This treatment is especially appropriate for heavily used crosswalks to signal that they are a shared space. As discussed

in the bikeway section, bicycle lanes can also be colored to indicate a distinct realm on the roadway. Using color to demarcate parts of the roadway surface can help reduce perceptual roadway width. Having the shoulder a lighter colored pavement or stabilized soil will cause the driver to be more cautious due to the perceived narrowness. Color treatments can be done by painting the road surface, using colored asphalt or concrete, or by simply mixing local materials into the asphalt in certain areas.

LANDSCAPE DESIGN

Landscape design along segments of a roadway helps calm traffic by providing an interesting and aesthetic contrast to non-landscaped parts, and by perceptually narrowing the roadway. Continuous rows of trees are particularly effective in this regard, and have been used along both urban and rural roadways throughout the world. Further planting details are discussed in a later section.

SIGNAL SYNCHRONIZATION

Setting a sequence of signals along a particular roadway on a timed cycle allows traffic to move at a steady and constant flow. This technique is frequently used as a highway moves through a town so that the traffic is able to easily continue through. The timing of the signals can be designed to force motorists to drive more slowly, for example at 25 or 30 miles per hour, and this is frequently desirable in locations in which a more pedestrian-oriented environment is preferred.

CURB RADII

As previously mentioned, large curb radii (20'+) have frequently been used at intersections to facilitate turning motions by motor vehicles. However, creating much tighter curb radii of 5-15' can help slow turning traffic and add to a pedestrian-friendly environment.

CURB EXTENSIONS

A central traffic-calming technique in main street locations, curb extensions also offer landscape design possibilities that can greatly increase the attractiveness of the streetscape. Mid-block curb extensions should be considered as well as corner bulb-outs, and can help add landscape design elements along the entire street corridor in a constrained right-of-way where there would not be space to create a median or planting strip next to the sidewalk.

Other traffic calming strategies such as chicanes, traffic circles, speed humps, speed tables, and traffic diversion are usually used on low-volume residential streets and so are not covered here.

viii. Planting Design

Careful landscape design in conjunction with a transportation project provides multiple benefits, from shade and the creation of outdoor pedestrian places, to the creation of a safer street environment. Far from being an 'add-on,' plantings should be an integral part of any context-sensitive project, and should be considered throughout the design process. Community input to planting design is also particularly important.

The following issues must be considered regarding planting:

- The species of plants must be hearty to the region.
- The plant species should be adaptable to a low water environment.
- Maintenance of these plantings must be built into the maintenance budget
- Planting design should be expressive of the local character of the culture and landscape.
- Planting design provides a comfortable shaded pedestrian and vehicular environment.
- A change in planting design can signal the entry into a town, commercial district or residential neighborhood.
- A heightened awareness of pedestrian use can be signaled by planting design.
- Planting design should be considered an extension of commercial business creating an indoor-outdoor relationship between the business and the street.
- Planting design can be utilized to calm aggressive traffic patterns.
- Planting design expresses a sense of pride, value and care in the community.



Street tree in large well
Photo: Alf Simon

Planting design is central to context sensitive design practices because plants easily express native landscape characteristics, create pedestrian friendly spaces, physically denote commercial, neighborhood or historic district areas and display a sense of pride for the community. Planting design is just as important of an infrastructural design element as paving types, street widths and lighting. Planting design contributes to a sense of character and uniqueness to New Mexican towns.

PLANT PALETTE

Choice of a plant palette that is hearty to the region is key to successful planting design. New Mexico has many climate regions at many elevations. A plant palette must be unique to the region in which it is utilized. When hearty well-adapted plants are chosen, the level of maintenance they require decreases, and their life span increases. The use of hearty plants is an economically sustainable approach to planting design.

Similarly, low water use plants should be utilized in the streetscape. When using hearty plants, these plants are typically well adapted to desert and droughty conditions. Low water using plants also lowers maintenance levels, economic inputs and the use of precious water resources.

Taking these key factors into consideration and choosing economically sustainable choices for planting design enables a more realistic maintenance program. Even when using hearty and native plants, maintenance is key to maintaining a sense of place and more importantly a sense of community pride. Maintenance includes annual pruning, mulching, and replacing ill or damaged species. Choosing plants that are adapted to the climate lowers these costs, but by no means eliminates them. Some communities have involved community members in the maintenance of plantings, having a designated day or weekend devoted to maintaining mainstreet or neighborhood plantings as part of a “pride in our community day”.



Street Planter
Photo: unknown

CULTURAL HISTORY

Planting design should be an expression of cultural context and town history. Though large street trees are typically thought of as the way to institute planting design, many regions of New Mexico should consider using desert species. The use of, for example, chihuahuan desert plant species in southeastern New Mexico for planting strips, medians, and sidewalk planters might be an appropriate way to express the philosophy of context sensitive design. Those towns that dwell within the Jemez Mountains, for example, need not to plant species that are more common to the Rio Grande Valley. Similarly, the use of plant species that are associated with the history of a town should also be considered. Even though cotton-

woods pose certain maintenance issues, the use of them as street trees may express the cultural history of a town. In such instances towns could consider a similar, more hearty tree that would provide the same visual experience, while not posing maintenance problems.

Community involvement should be key to the institution of all of these planting choices – the use of hearty, low water use, culturally expressive plant species. Community input insures respect for, and community investment in, new planting design.

PEDESTRIANS, PLANTINGS, AND THE STREET ENVIRONMENT

Planting design frequently designates a pedestrian zone. Plantings can provide shade, act as a buffer to traffic lanes, and enhance commercial and neighborhood street life. All types of plantings can enhance the street environment, from large shade trees to cactus and other lower growing plant species. The presence of plants mitigates reflective heat, creates a more human scale environment, and creates visual interest and variety along a roadway. Shade trees cool pedestrians and parked cars. Planting design combined with sidewalk amenities such as benches, waste receptacles, and lighting create a safe and pleasant environment for pedestrians on a frequently busy road. Planting design, through its visual qualities, can designate a commercial or cultural district to motorists. All of these benefits of planting design express the core philosophies of context sensitive design.

These planting design elements create an inviting relationship between the street and commercial business. Planting design combined with other sidewalk amenities can create spaces that act as outdoor extensions of businesses. These outdoor extensions can serve as welcoming entries, areas to meet and greet, expressions of civic pride on the part of the business owners, and outdoor seating for restaurants or cafes.

Planting design, and at a more holistic level, streetscape design should be designed to uniquely fit business and neighborhood facades and entries. For example, to plant trees on center at a regular interval along a street may conflict with doorways, facades, etc. Context sensitive planting design should fit into the existing built fabric and accommodate the needs of the stakeholders along these roadways. Trees and planting areas can be spaced at varying intervals that honor doorways, heavy pedestrian areas, historic building facades and valued near and distant views.

This sensitive approach to planting design demonstrates respect for the community and its needs. When community members are involved in this process the resulting planting and streetscape design fits the communities needs and helps community members feel as sense of ownership for the design choices.



Street Trees
Photo: Alf Simon

Additionally, planting design facilitates a safer pedestrian and vehicular environment. Planting design, by varying and narrowing the visual characteristics of a roadway slows motorist. In turn, planted and cared for roadsides signal the presence of pedestrians, potentially heightening motorists awareness to their presence. Combined with legible crosswalks, lights allowing sufficient pedestrian crossing time and signage, planting design facilitates pedestrian safety along these corridors.

ix. Drainage

The standard drainage design for urban roadways is the curb/gutter/catch basin model connected to a larger subsurface storm-water sewer infrastructure. Some of the systemic environmental problems with this technique have been well documented. The movement toward developing *green environments* is an attempt to address these and other problems in order to make our built environments function in healthy and regenerative ways (for example, see Metro, 2002). *Green streets* can mitigate issues related to surface runoff, and although it is always difficult to let go of existing standards and methods for any form of building, the green street strategies deserve very serious consideration in a flexible approach to context sensitive design. By using a variety of plantings and swale designs, green drainage strategies can also create a more attractive streetscape than standard curb-and-gutter treatments.

A **green street** incorporates strategies for managing storm-water runoff in the right-of-way, that minimize the volume of water piped directly into rivers and streams; reduce the intensity of runoff, or peak flow, normally exacerbated by impervious surfaces; and improve water quality. The advantages of the **green street** system are:

- it attempts to mimic natural drainage systems, and can be extended into, and be an extension of, those systems
- it absorbs and utilizes the water falling in the right-of-way to support trees and other plant materials, which provide numerous additional aesthetic, social and environmental benefits for the roadway environment
- the plants that are present in the corridor, supported by the runoff, also become bio-filtration systems for dealing with sediments and pollutants
- by recycling the water that falls in place, the fundamental process of water and landscape is incorporated into the visual expression of the roadway and the community
- it is a cost-effective system, particularly when environmental, social, aesthetic and quality-of-life benefits are factored in.

A green street system for storm-water drainage needs to be designed in accordance with specific local conditions, such as right-of-way width, corridor type, soil conditions, slopes, location of the water table, and the general climate and precipitation profile. The elements of a green street strategy are as follows:

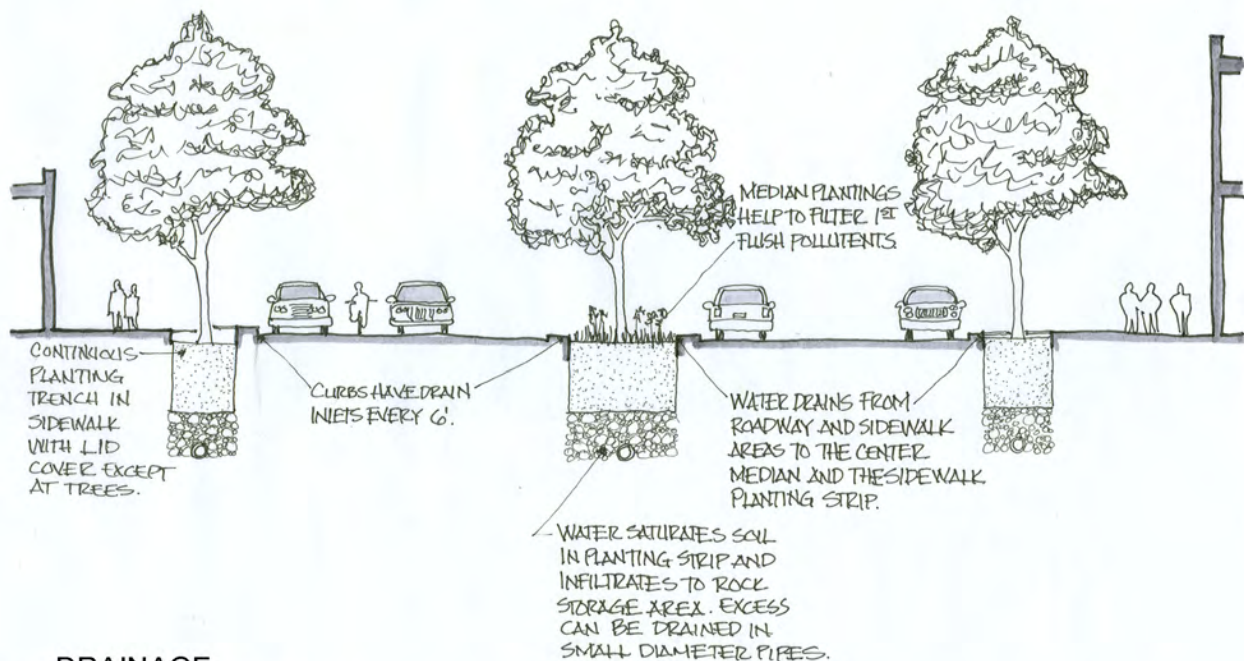
REDUCING THE AMOUNT OF IMPERVIOUS SURFACE

Impervious zones will become 'sponges' for the absorption of surface runoff. There are various opportunities to create these sponges, depending on the width of the corridor and the corridor zone type. The easiest and most common location for a permeable zone is within a center median. Others include planted buffer strips at the edges of the roadway, or continuous tree planting trenches in the pedestrian zones. Porous pavements may be used in some cases, but these are normally best suited to lower volume traffic zones within the right-of-way, such as parking strips.

DESIGNING THE CROSS-SECTIONAL GRADIENT TO ALLOW RUNOFF TO FLOW TOWARD PERVIOUS ZONES

Curbs can be designed with inserts or perforations every 2-4 feet in order to allow the water to flow into the pervious areas. The grading of the entire roadway can be oriented so as to facilitate such runoff.

CREATING FILTER STRIPS AND SWALES IN THE PERMEABLE ZONES



DRAINAGE

Use of medians as bioswales

These strips allow water to both flow along them and to infiltrate. They are normally planted with grasses or other ground covers, as well as trees. The types of vegetation chosen should have the ability to absorb excess nutrients, filter out sediments and break down pollutants typically found in surface runoff from roadways. Their root systems should be deep and robust enough to keep the soil structure loose and permeable. Swales can be between a 2-6% gradient, and could incorporate features that act as check dams, slowing the water and increasing residence time.

CREATING STORAGE AND INFILTRATION TRENCHES

Infiltration trenches are filled with coarse aggregate, and could be combined with a filter strip or swale, or constructed under permeable paving zones. Some infiltration trenches will allow a slow rate of discharge in a small diameter perforated pipe. Others act as subsurface storage in rock cisterns. With a filter strip or swale over the trench, sediments and possibly some pollutants may be removed.

CREATING DETENTION BASINS

In areas of high runoff, and where space permits, it is desirable to create temporary storage areas for excess water. The water in the basins may infiltrate, some may evaporate, and in areas with soils unsuitable for infiltration, the water can be discharged slowly. The basins may be within or outside of the right-of-way, and be designed in a variety of shapes to conform to the available opportunities, as long as the storage capacity has been calculated for the local precipitation and runoff conditions.

DESIGNING STREET TREE PLANTING SYSTEMS TO MAXIMIZE ABSORPTION OF RUNOFF

Typically, street trees are planted in small tree wells, with each one isolated from the others. This is not only confining for the trees and will almost certainly result in a very short life (about 8 years), but it is also a missed green street opportunity. Alternatively, a street tree system can capture runoff from the sidewalk, as well as from the roadway. Two possible strategies are to connect each of the tree wells with a drainage trench, or to plant the trees in a continuous trench. The latter solution has many benefits, such as a reduction in soil compaction and a greater root growth zone. The trench can be lidded except at the tree openings, to maximize the space within the sidewalk zone. Perforated curbs will allow surface runoff from the roadway to find its way to the trees.



*Drainage along rural roadway
Photo: Alf Simon*

x. Structural Elements

Identifying important existing structures and other roadway artifacts within the project context, and where appropriate, integrating new elements into a particular roadway design, is an important part of context sensitive design. Apart from local buildings, structures such as bridges, walls, fences, lighting devices, planters, benches, and bollards may establish local styles and character that should be considered when designing the new project. An acknowledgement of structural forms, materials, details, textures, colors, and finishes can help celebrate and enhance the existing character of the community.

WALLS AND FENCES

New Mexico has a wonderful tradition of using local, natural materials in fence and wall construction. The use of local materials such as wood, stone, rock and adobe, when appropriate, and a reference to local styles in the construction of walls and fences, can reinforce geographic and cultural expression. Retaining walls, sound walls, visual privacy walls and property demarcation boundaries are common applications along urban roadways. Agricultural fences to mark property boundaries and to prevent livestock from wandering are more common in rural areas, as are property fences of woven stick and branch construction or walls built from dry stacked stone or adobe brick.

The scale and materiality of an urban wall will depend on the corridor use and type. Tall sound walls and retaining walls are more common along urban freeways, while privacy and property demarcation walls may be more common along corridors in suburban and/or urbanizing zones, and may not be within the scope or control of a project. Walls of any type will be less common along main streets and downtown commercial streets.



Interstate Sound Wall
Photo: Jamie Stich

Because of the scale and length of sound walls, some form of surface treatment can mitigate their monotony. Formed surface impressions and textures are commonly used techniques. An alternative strategy of covering the wall with native vines can help to absorb sound as well as provide seasonal color. Retaining walls may be used in urban freeway applications where lowering or raising the roadway results in steep slopes. Retaining walls can be used to create terraces that stabilize slopes, control drainage, provide interesting planting areas, and lend a sculptural quality to freeway embankments. While the design of the retaining walls should reference the local and/or regional landscape, the materials could be derived from the material palette of the larger constructed landscape of the freeway.

In rural areas, many traditional fences throughout the southwest are made from natural materials that can be found on site. New construction of these types will likely be labor and maintenance intensive and may not be practical for a roadway project. However, new designs may make reference to scale, density and texture of older traditional walls and fences to create newer, more appropriate interpretations that fit the surroundings. In retaining or embankment walls in zones where the roadway crosses an arroyo, the use of local stone gabions can be an attractive and cost-effective material for erosion control and for expressing the intersection of the roadway and arroyo systems.

BRIDGES

There are a variety of bridge types and scales, including arroyo or stream crossings, wider river crossings, canyon crossings, overpasses, rail yard crossings, bridges over sensitive areas such as wetlands, and pedestrian crossings. The bridge structure may have more of a presence and architectural expression in certain contexts and scales, but in all cases the bridge should be a celebration of 'crossing'.

Good bridge design is normally a successful synthesis of engineering and architecture. Whether the design is historicist, or a very modern structure that references broader, contemporary culture, bridges can have a significant visual impact in a landscape. A bridge may attempt to 'fit in' or it may be a bold, contrasting statement, a landmark that creates a strong identity for the region. Depending on the overall structural design, the opportunities for contextualizing a bridge may reside at the larger architectural level, or at the level of design detailing. An understanding of the character of the local and regional landscapes could be the inspiration for new and innovative context sensitive bridge designs. If references to local forms, history and patterns are used, they should be incorporated into the substantial design idea of the bridge, rather than be applied as a decorative act.

Vehicular bridges in urban areas may be used by thousands of people daily. Bike lanes, lighting, and safe, comfortable pedestrian movement are important considerations in the design of the bridge right-of-way. Different surface treatments, colors and vertical separations may help to demarcate movement zones. Overpasses are also underpasses, experienced by those moving under the upper roadway, and these underpass zones offer an opportunity to incorporate public art to enrich the experience. Bridges in rural areas that may cross a river, stream, canyon or arroyo, may be modestly designed to privilege the experience of the landscape change and the crossing, rather

than focus on the structure itself.

Pedestrian footbridges might be built in urban areas to cross a freeway or very busy roadway. In addition to providing a safe connection for the community, these structures offer sculptural and visually expressive opportunities. Running, biking or horse paths that run alongside a rural roadway may incorporate small bridges to cross arroyos or streams. These connections are an important part of the movement network and provide opportunities for more modest design that fits in with the landscape.



*Pedestrian Bridge
Zurich, Switzerland
Photo: Tim B. Castillo*



STREET AND SITE FURNITURE

Planters, benches, drinking fountains, garbage containers and other pedestrian amenities all present opportunities for visual expression consistent with the character and development of the street. Many of these elements are standard items produced by different manufacturers and available in a variety of designs. In some cases the community can become involved in developing these artifacts through design competitions. Benches, for example, might be designed using local materials and produced by local fabrication shops, as a unique expression of the street. Sometimes these elements can be multi-functional, such as planters that are also used as seating. The scale and visual design of the street furniture should be consistent with the roadway type and use.

Along rural roadways, pull-outs or picnic areas will require a variety of elements such as waste containers, picnic benches, shade structures and washrooms. Although these elements should be designed to fit into a rural landscape setting and reflect a New Mexico character, it may be desirable to develop a set of furniture and pull-out structure designs that can be used throughout the state for such sites.



Various elements of street furniture: light, hydrant, bench, bollards, planters
Photo: Unknown



Street Furniture along sidewalk
Photo: unknown

xi. Buildings and Facades

The buildings and their facades along a road corridor contribute significantly to the visual character, and are a reflection of the history, character, architectural style, and materials of the region. Building height, density, architectural elements, fenestration, relationship to adjacent buildings and roadways, orientation of the entry, and the design and type of ground floor land uses can all help shape the roadway context. The design of visual elements along the roadway might draw inspiration from the existing buildings. In many cases the buildings will be older and steps should be taken to avoid structural damage during the construction process.

An important element of urban roadway design is the 'street edge' created by the building facades. In main street zones it is particularly important to maintain a continuous edge along the street in order to create the enclosure, scale and ambiance that produce a pedestrian and driving environment that is both comfortable and rich in character. Breaks in the building wall, such as empty lots and parking lots, can become opportunities to develop public art along the streetfront edge of the properties. This can result in a colorful and expressive gesture along the street that completes the edge as well as reinforces the character and values of the community, and engages community participation. The art pieces may be temporary installations that hold the edge until a new infill building is constructed, and would be carried out with the cooperation of the property owners. Another possibility for empty lots is to create mobile park installations with benches, potted trees and shrubs that can be placed in the lot until it is developed, at which time the park can be moved to another site.

Pedestrians first perceive enclosure in denser urban environments when the ratio of building height to street width is between 1:3 and 1:2. In lower density suburban environments a height-to-width ratio of 1:4 creates an appropriate enclosure on the roadway.

In suburban and urbanizing areas the roadway tends to be wider, and the spatial enclosure generally has a looser feel. Buildings may be in the form of strip malls, set back from the roadway with parking in front. In newer areas many of the buildings are not likely to reflect the historical or vernacular character of the region, but will be generic buildings common in applications of this type throughout North America. While not a vernacular context, this spatial morphology and building style does create its own context, and this should be recognized and analyzed as a visual source for the design of roadway elements.



Building Facade, Tempe
photo: Alf Simon

Many buildings in New Mexico have been designed in the traditional adobe, pueblo revival and territorial styles, with stucco finishes in a brown range, flat roofs, portales and sometimes a courtyard wall. Where there is a consistency of these styles along a roadway it may serve as a reference and inspiration for detailing and design of other structural and architectural elements in the right-of way.

ALTERNATIVE SOLUTIONS

In some cases many of the building facades along a commercial main street may be in poor condition, and some may have, at some time, undergone a facelift design that doesn't contribute positively to the character of the street. Although the buildings are held in private ownership, and will not be under the control of the road project, they are still a major visual presence in the street. One possibility for dealing with this is to provide design assistance to building owners for facade renovations, and possibly a small financial incentive to defer costs for minor renovation, as a part of the project budget. Building owners would submit application proposals to qualify for assistance, and the program could be carried out in partnership with the city or town. The resulting changes will help create a stronger and coherent building façade, and a character and identity for the street.



*Building Facade, Grants, NM
photo: Alf Simon*



Central Ave., Albuquerque
Photo: Alf Simon



Treatment of historic building facade, Switzerland
photo: Tim Castillo

xii. Lighting

The type and amount of lighting used on a roadway varies with the character and location of the road. National and state standards will, to a large degree, dictate minimum light requirements. Nevertheless, in addition to addressing issues of safety, lighting design provides a significant opportunity to enhance the visual quality of the night-time roadway environment.

There are many lighting manufacturers producing a wide variety of lighting types for different applications. There is also a variety of fixture styles that can fit into a range of environments. New Mexico, in general, tends to use less light rather than more. While still conforming to safety standards, the minimal use of light is a more sensitive approach to the experience of the night landscape, and also uses less energy.

In urban areas artificial light comes from two sources: street lights and ambient light coming from sites and buildings. Commercial main street zones generally have building facades with a high percentage of glazing, and light pours out from the buildings. Lighted signs on the storefronts contribute additional light to the street environment. Cobras or similar tall light fixtures are designed to wash light over the road surface. Pedestrian scale lights, popular elements in new streetscape designs, add even more light. The pedestrian scale street light can provide an interesting sculptural quality and rhythm to the street, and the design of the poles and fixtures can reinforce the visual character of the of the street. However, in some cases, the result of all of these lighting sources is over-lighting, where the environment is too bright, and the light is spread too uniformly across all areas.



*Street Lighting
Albuquerque
photo: Susannah Abbey*



*Bollards with lights
photo: unknown*

In suburban and urbanizing zones large lit business signs and parking lot lights contribute to the light already cast by the roadway fixtures. On commercial strips with numerous businesses, fast food restaurants and gas stations, the effect of these combined different light sources can be visually unpleasant and uncomfortable.

In rural areas light is used sparingly, primarily at larger intersections and at the approach to towns.

The real question in the contextual application of artificial light along a roadway, after the safety requirements are met, is how to embed light sources in such a way as to appeal to the visual sense by highlighting particular elements and features, creating a mood that is consistent with the character of the street.

COLOR

The quality of light can be manipulated through use of color. High pressure sodium and metal halide lights offer better color rendering than other types and are energy efficient. In areas where nighttime lighting for safety is already adequate, using colored light can be a way to enhance the aesthetic value of roadside and median plantings, architectural features such as sound walls, and other roadside amenities.



*Street Light sculpture
Photo: unknown*

SPOTLIGHTING

Hidden light sources are not visible street artifacts, but can be very effective in highlighting particular elements or objects, creating a dramatic and a visually pleasing effect. While large-scale uplighting is not recommended due to light pollution considerations, smaller lights with filters, low intensity wash effects, or specific areas of focus can effectively illuminate plantings, low walls and other roadside features.

STREETLAMPS AS OBJETS DES ARTS

Streetlamps, particularly lower, more closely spaced pedestrian scale fixtures, are visible light sources that become repetitive artifacts along the roadway that are visible during daylight hours. They create a street rhythm, reinforce character and offer the potential for integrating art and function. As stated above, the additional light that this type of repetitive fixture can put into the environment makes it important to plan carefully their placement, the focus and coverage of the lamp, and the intensity of light produced.

Because of New Mexico's dark skies initiative, it is imperative to use street lights that reduce or eliminate light radiating more than 90 degrees. Cut-off optics allow no more than 2.5% of the light to radiate above 90 degrees. Full cut-off optics allow none of the light to radiate above 90 degrees.

High light levels—well beyond the brightness needed for a parking lot—overwhelm the eyes at a road intersection. Obviously, energy efficiency is an equally important consideration. Nevertheless, it is possible to use energy efficient semi- and full- cutoff lighting in ways that enhance the visual quality of the street.



Indirect lighting
Photo: unknown

xiii. Signage

Signage serves multiple purposes within any transportation project. It improves safety, provides directional and wayfinding services, and can add historical, cultural, and environmental information about the local context. Many considerations can affect signage design with transportation projects, including established national, state, regional, and local norms, local culture and tradition and project specific needs.

When addressing CSD/CSS, signage multiple factors combine to reinforce wayfinding, while also complementing the landscape and cultural context of a place. This section on signage will address both public and private signage.

Scale is one of the most visually important factors for signage. Scale determines legibility and connectedness to existing landscape context.

Materials used in signs can reflect the local materials of the area and reinforce the meaning of marking historical sites.

Signs, often placed for clear wayfinding and advertising under CSD standards should be sensitive to the physical context in which they are placed.

Signage is a safety measure for motorists, pedestrians and cyclists. Proper signage can reduce dangerous conflicts between these users

SCALE AND WAYFINDING

Signs, both government and private, are wayfinding devices they must be at a scale that balances legibility and context sensitivity. Signs that are out of scale, especially too large, can mar views, distract motorists from signs regarding safety, and generally clutter the visual landscape of small New Mexican towns. This overshadows the inherent cultural value of these places.

While New Mexico, and particularly Route 66, have a legacy of large commercial signage, the nature of this signage must be considered. Large flat rectangular billboards do not reflect the same visual quality as, for example, custom-made neon signs or hand painted signs on the sides of brick buildings (both of which are culturally specific designs for New Mexico). Regulation of the



*Village of Corrales Sign
photo: Anne Godfrey*

size and number of billboards along highways that run through small towns should be considered.

While government highway signs have regulated dimensions to assist the wayfinding process, the scale of commercial signs or historical markers can be contextually sensitive. Overlarge signs, hoping to catch the eye of the passing motorist, can create a visual cacophony, causing the motorist to ignore, rather than read signs. Out of scale signs can block beautiful views, historic facades and obscure destination points. Historical markers often get lost in the sea of commercial signage, their smaller scale unable to compete with the large commercial signs.

MATERIALITY

Signs can express the physical nature of the place through the materials used. Native stone, wood, and vernacular architectural styles can all be used to mark and promote historical, cultural or ecologically significant sites. These materially expressive signs can mark: historic districts, main streets, historic sites, museums, courthouses, scenic byways, historic trails and noteworthy ecological sites. Materially expressive signs are more legible and memorable to both residents and tourists than the typical DOT brown sign.



*Sign of Los Ranchos
Albuquerque
photo: Anne Godfrey*

SAFETY

Signage is one of the most important safety devices in highway design. Signs alert motorists to the presence of pedestrians, bicyclists and changes in the physical character of the road. Signage, while creating a safe environment for pedestrians, can also reinforce a sense of context sensitivity. Signage that associates a lower speed limit with the entry into a commercial area can connect the motorist to unique characteristics of the place. This safety signage, in association in a change of planting pattern, narrowing of street width, curb extensions, crosswalks, more intensive landscape design, and a restriction on billboards may help the passing motorist understand that they are driving through a unique town or a pedestrian oriented district. The combination of these context sensitive design solutions leads to both a safer environment for the local residents as well as a stronger sense of local identity perceived by traveling motorists.

xiv. Public Art

Often not thought of as an element of transportation planning, public art has a long history in conjunction with this field. Historically many bridges, parkways, urban avenues, transit stations, and main streets have contained rich architectural detailing that might be considered “art” as well as specific artistic elements such as statues, friezes, fountains, pavement designs, murals, ornamental planting grates, and decorative lighting fixtures.

Nowadays, there are new public art strategies being employed many places. Prosaic devices such as sound walls and retaining walls are created using decorative patterns, colors, or materials. Locally significant symbols or images may grace signage, overpasses, or transit stations. Locally important color palettes may be identified to beautiful a project, such as were used with the Big I interchange in Albuquerque. Local artists may be hired in conjunction with a project to create ways of incorporating the community’s culture, history, and ecology into the design of facilities. These and other strategies are now an important part of many transportation projects.



*Agave Plant, Albuquerque
Photo: Albuquerque postcard*

Roadside shrines are as one form of public art that is created spontaneously by members of the public, typically to commemorate the traffic death of a loved one. Some take the form of a simple cross or collection of flowers. Others are elaborate altars that may be maintained by community members for many years and are local landmarks. These installations have been problematic for transportation agencies around the country. DOTs typically view them as potentially distracting for drivers and a potential inconvenience for maintenance. Yet it is not clear that such spontaneous public art displays are in fact more distracting than the huge array of billboards and signage that is found along American roadways

already. Neither is it clear that they are a larger problem for maintenance than the variety of historic roadside markers and other signage that is also present. Roadside shrines may instead make motorists more cautious about their driving behavior, and can represent an important element of the local cultural landscape.

Public art in the realm of transportation can take on many forms, be it spontaneous roadside shrines or planned murals, sculptures, or surface treatments. Art can add details and a touch to transportation projects that take the projects to another level. Art has a cultural, aesthetic, and visual value that cannot be quantified, and even simple treatments can make a project more appealing and acceptable to the community.

The following are some of the main types of public art within context sensitive transportation projects:

Functional Public Art

Functional public art includes alterations and design treatments that enhance integral physical components of transportation facilities. Attention to creative detail can transform a structure that may otherwise be non-descript or aesthetically uninteresting. Examples include creative designs, colors, and/or textures on sound walls, retaining walls, bridges, overpasses, lighting fixtures, benches, signage, or even pavement. This type of art can even be in the form of lighting, be it neon lighting, special fixtures, or placement of light.

PLACEMAKING ART

Public art can demarcate or actively create a district, historical area, or special site. Gateways, arches, or sculptures can signify the transition into a main street area or a location known for a particular historical event, natural feature, or character. This form of public art goes beyond simply adding a decorative dimension to functional elements. Rather placemaking art actively enhances the character of the transportation project site. Good placemaking art depends on a thorough understanding of the local identity and involvement with community members who can provide insight into culturally or historically appropriate design elements.



*Public art along roadway, Albuquerque
Photo: Carrie Barkhurst*

ART THAT REFLECTS LOCAL STYLE

Each community in New Mexico has a unique story and identity based on its formation and transformation through time. Often this style is expressed through architecture, signage, lighting, landscape design, or other physical elements. For example, areas along the former Route 66 have often developed particular local styles incorporating neon, freestanding signage, one-story motels, and other forms of 1930s and 40s roadside architecture. Pueblo or reservation areas have a very different style, often with understated signage and far more traditional architecture. Local style can be a basis for public art and the prevailing style is a strong reflection of how the community perceives itself. Local materials, be it stone from a local quarry or timber from a nearby forest, can in themselves add artistic detail to transportation projects.



*Median with Sculpture
Osuna and Jefferson, Albuquerque
photo: Susan Frye*

ART AS A SYSTEM

At times it may be desirable to have consistent artistic elements repeated throughout a transportation system to develop a strong identity for that system. For example, the Railrunner train has developed a striking image of a road runner-like bird that serves as a symbol of the new system. That image appears on trains and may also appear on



*Ribbon Art, Sunport Albuquerque
Photo: Jamie Stich*

station elements, promotional literature, and a web site. A consistent system of art may also be desirable on a highway with a particular historic or scenic identity, on a main street through a historic town, or on a road network within a Native American reservation.

INFORMATIONAL ART

Way-finding maps and historical markers are excellent opportunities to emphasize local character and interest. Stylized informational markers can be incorporated into existing districts or created as stand-alone pieces of art. This type of public art serves a dual purpose: as an aesthetically pleasing element of a transportation system, and as a device to communicate specific information. Care should be taken that this information is clearly conveyed and does not become obscured by the artistic dimension.

INTEGRATED ART AND LANDSCAPE

Public art can reflect local ecology and landscape. Mountain views, the Rio Grande bosque, and desert ecosystems can provide inspiration for art pieces. Significant land uses, animals, or vegetation regimes can be reflected in transportation art pieces in a way that highlights these unique elements.



*Continuous art piece along San Mateo,
Albuquerque
photo: Carrie Barkhurst*

xv. Transit Facilities

As multimodal transportation corridors, many of New Mexico's state highways will need to make accommodations for public transit facilities. Doing so well can enhance the overall attractiveness of the streetscape as well as its functionality for multiple modes of travel.

ROAD DESIGN

In the case of urban freeways, accommodating transit might mean installing High Occupancy Vehicle (HOV) lanes for buses and vehicles with three or more passengers. For mainstreet, urban, or rural settings, it might mean paying special attention to the design and placement of transit stops. Traffic calming, installing "priority green" signalization, and queue jumper transit design are additional road design strategies that can help create a transit-supportive context. In areas where state roads cross bus or light rail routes, installation of Park and Ride facilities can reduce traffic congestion, wear and tear on roadways, and energy consumption by encouraging use of mass transit. Thoughtful landscape design of these facilities can add greatly to their attractiveness and potential use.

FORMS OF TRANSIT

New forms of public transportation are appearing in New Mexico. A bus rapid transit (BRT) system (in which buses emulate light rail service with widely spaced stops and faster service) is operating in Albuquerque, and more BRT lines are planned. Modern light rail service is also planned for that city. Commuter rail will begin service soon between Belen and Bernalillo, eventually extending to Santa Fe. DOT personnel may be directly involved in some of these systems. Each of these systems creates new transit stops or waiting areas which can be designed to be aesthetically pleasing and to fit into the local context. In other places where public transit stations coincide with state roads, installation of park and ride areas, attractive bus shelters, and feeder bus loading areas can make dual-stage commutes more pleasant and convenient.

TRANSIT WAITING AREAS

Important considerations in this category include creating strong pedestrian orientation—i.e., safe access to and from the waiting area, placing stops to minimize flow conflicts, and making sure stops adhere to ADA requirements. Signage and seating



*Bus Stop Shelter Broadway Square, Albuquerque
Photo: Carrie Barkhurst*

should be placed at least 5' from the curb to allow space for boarding and getting off the bus. Seating should be oriented to allow a view of oncoming transit. New Mexico's climate requires safe waiting areas that provide shelter from the sun and wind. The ideal transit stop offers some sort of structure that provides shade and transparent sides to protect waiting passengers from strong wind. These structures can be placed alongside existing or new trees for additional shade, wind and rain protection, but should allow drivers to see waiting passengers. In rural areas, a shelter might only need to be big enough to accommodate one or two people. In main street and suburban areas, the shelters should be at least 8 feet long by 4 feet deep. All should offer seating inside the structure. In urban areas, shelters should be placed so as not to impede pedestrian traffic around them. Ideally, sidewalks should be routed behind the transit shelter and should have an 8 foot minimum width.

VISUAL QUALITY

Bus and light rail stops can contribute to, rather than detract from, the visual quality of their settings, and transit shelters along highways can provide opportunities for context-sensitive architecture incorporating local materials, local architectural styles and locally produced public art. The City of Albuquerque has allowed for part of its public art budget to go into redesigned bus shelters, and boasts several such examples.



*Bus Stop Shelters Nob Hill, Albuquerque
Photo: Carrie Barkhurst*

Aesthetic value and functional value often can be achieved simultaneously. Transit shelters are also de facto gathering places for commuters and should provide as many passenger amenities as resources will allow. Lighting, route schedule information, and trash receptacles are priorities and should be located at every bus shelter.

At transfer facilities in urban areas, construction of an extensive transit center may be appropriate, providing amenities such as drinking fountains, clocks, restrooms, public phones, and bicycle storage facilities. Plantings, paving, and fountains can all contribute to the visual and aural quality of the space. Plantings are especially important materials for mitigating the harsh New Mexico climate. Drought-tolerant trees will provide shade as well as visual quality. Even the most xeric plants, when placed around in urban transit facilities, provide a sense of relief from the sea of concrete, reduce reflected heat and glare, and improve air quality.

TRANSIT STOP LAYOUT

The layout of stops should consider the contextual condition of the roadway type and location. While the standard curbside layout is appropriate for most applications, in main street areas, where on-street parking is allowed, the best type of bus stop is the nub or bulb-out. This design gives high visibility to transit and sends the message to drivers that transit vehicles have priority on that corridor. Bus bays are preferable in rural areas, where bus stopping in traffic lanes is not safe, and where the bus pulling out and merging into traffic will not, in general, delay the route.

Highway traffic should be integrated with larger community development or livability strategies. Where a community is in the process of developing or upgrading a mass transit system, it will be important to emphasize the connectivity of the road and transit. Building multifunctional transit centers that allow passengers to move easily from car to bus to light rail is one way. Another important strategy is to build aesthetically pleasing bus shelters in neighborhoods that are in the process of economic rehabilitation. Since low-income residents, who rely on public transit in great numbers, usually inhabit economically depressed areas, upgraded facilities will go far in helping to give the residents a sense of identity and pride in their neighborhood. The Los Angeles Neighborhood Initiative has partnered with city transportation authorities to rebuild eight economically depressed neighborhoods, starting with bus stops. The bus stops are being redesigned to increase visual appeal.



6.0 Displaying and Communicating Proposals and Ideas

6. DISPLAYING AND COMMUNICATING PROPOSALS AND IDEAS

In preparing design visualization material related to context sensitive design, it is crucial to understand the audience to which the material will be presented. The successful communication of any design proposal relies on the ability of the designers to understand the constituency in which the design will be developed. Visual standards can and do vary from scheme to scheme however; several key issues should be addressed in every presentation.

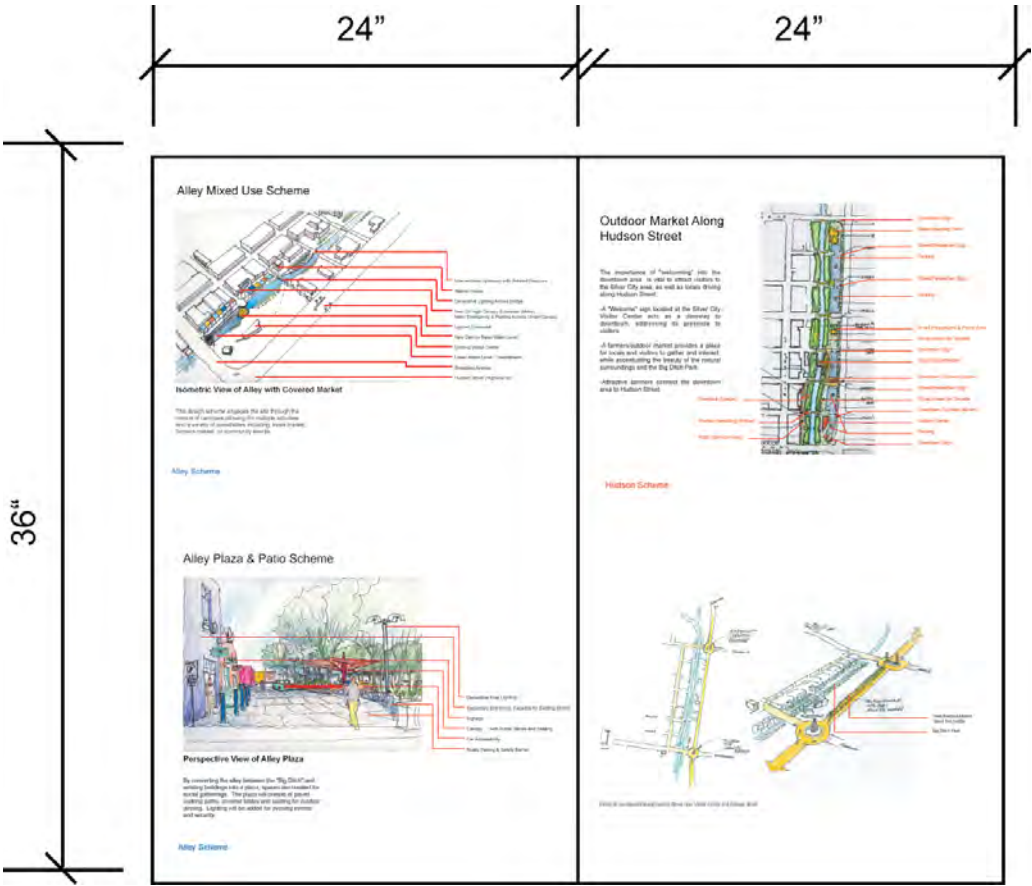
As these projects should always involve community interaction, the communication of the design intention is critical to the success of any design. We feel several standards can be addressed in presenting the material:

1. Presentation Standards:

Large Format:

- a. In order to facilitate visual and design clarity, layout boards should be visually consistent. Suggested layout standards are 24" X 36" or 36" X 48". These can be tiled to accommodate for larger design proposals.

The visual distance to audience should determine format size and orientation.



Small Format:

- b. Include design process literature bound in a booklet to be generated for key community officials. Typical formats include 8 1/2" X 11" or 11" X 17".

2. Visual Clarity

- a. Graphic representation of a design should clearly document context, scale, material and construction methodology.
- b. Text should aid in the explanation of design intentions however, should not dominate the graphic presentation.
- c. Understanding the distance from which the display panels will be viewed is crucial in defining scale of fonts and images.
- d. Community or contextual information should clearly be incorporated (architectural iconography, foliage, historical significant data, etc.).



3. 2-dimensional and 3-dimensional presentation techniques:

Utilizing a variety of presentation techniques can allow an audience the opportunity to gain a realistic understanding of the design intention. Every project will have contextual design criteria and being able to accurately visualize this information is critical. In our experience we find utilizing a combination of both 2-dimensional and 3-dimensional information allows for multiple perspectives into a projects design intention.

a. 2-dimensional presentation techniques:

The use of 2-dimensional or vector-based representation allows for an accurate mapping of site and contextual information. Utilizing programs such as Auto-Cad, Vector Works, Micro-Station, allows the design team the opportunity to input data that defines scale, topography and measured dimensions. By creating several drawing files, plans and sectional relationships can be critically documented.

Utilizing 2-dimensional representation historically has been the visualization technique that many designers have utilized. While it allows for clarity and accuracy to be communicated in the fabrication or construction processes, it does create a visual abstraction for audiences outside the design profession. In our experience the vector 2-dimensional drawing without substantial manipulation, yields a somewhat limited understanding of a project. We suggest articulating the vector drawing by adding material, shadow and color to enhance a more accurate portrayal of the context. We also suggest utilizing post-production software such as Illustrator, Photoshop, Macromedia Freehand or Corel Draw to further enhance 2-dimensional drawings.

b. 3-dimensional presentation

3-D digital modeling

By constructing a 3D model the design can more accurately represent design intentions. In creating a comprehensive digital design database, elements such as topography, foliage, architecture and other infrastructural criteria can be modeled to visualize better design solutions. The digital model is an accurate record of measured drawings that can be used to generate elevations, sections, plans, perspective views as well as computer numeric fabrication models. The flexibility of digital modeling can allow for a variety of representation techniques to be generated such as velocity studies, flybys, and virtual reality real time animations.

We recommend software that can produce kinetic studies. Software such as Maya, 3d studio Max and AutoDesk Viz are highly recommended.

1. Collaged contextual studies

Utilizing a digital format, photographic and video information can be manipulated with digital modeling techniques to produce realistic representation of design intentions. Using computer software, elements in a collaged image can be added, taken out, or otherwise reorganized to evaluate different design strategies. This technique allows all stakeholders to see the differences in proposed design iterations and allows decision-makers to evaluate the potential impact of each scheme.

2. Time Lapse Impact Studies

By incorporating time-lapse studies, projects can accurately depict construction se-

quencing and depict visual impact throughout the evolution of a project.

3. Animated sequence studies

Animations can be a very powerful tool for communicating and analyzing movement in any design scheme. Utilizing blue screen technology and digital modeling a realistic cinematic study can be generated to inform stakeholders of their options.

4. Utilizing Other Presentation Formats

Digital presentation formats such as PowerPoint or Macromedia Director or Flash are recommended for large community presentations. However, if such formats are utilized we encourage that printed booklets or display boards accompany the digital presentation. Providing the audience the opportunity to evaluate the design in multiple formats aids in the clarity of the design proposal.



7.0 Guidelines for Evaluating Alternatives and Decision Making

7.0 Guidelines for Evaluating Alternatives and Decision-Making

Evaluating design alternatives and selecting a final project design is at the center of the decision-making process, and should result in a written analysis of alternatives, a table or other devices to help compare them and to allow stakeholders to understand this comparison, and a final Statement of Decision. A systematic process is essential to ensure that both agency and contextual needs are met.

The following areas of consideration are particularly important:

A. DOES EACH ALTERNATIVE MATCH THE NEEDS ASSESSMENT?

Certain goals or needs led to the project in the first place, and the CSD/CSS process may well have identified additional needs resulting from the place audit, local plans, and stakeholder input. How well does each design alternative address these? And how should these needs be balanced? The project manager or team must address such questions in the design alternatives evaluation process. No alternative may meet every need, but a reasonable balance must be found. Most importantly, each alternative must be evaluated honestly and fairly in terms of how it meets various needs, so that stakeholders can see that the agency is being fully responsive to the project context. Agency staff must be willing to reevaluate the original formulation of needs, incorporate new needs raised by stakeholders, and reevaluate the mix of needs and project goals to fully reflect the context.

B. DOES EACH ALTERNATIVE MEET SAFETY REQUIREMENTS?

Safety is a prime consideration in transportation projects, and each alternative should be analyzed to ensure that it meets safety criteria. Traditionally, many projects have focused primarily on the safety of drivers and passengers in motor vehicles. However, the safety of pedestrians, bicyclists, and others using or living near the project should be considered as well within CSD/CSS evaluation.

Following existing state and national design guidelines is one way to promote safety. AASHTO guidelines, such as the AASHTO “Green Book” (A Policy on Geometric Design of Highways and Streets, 5th Edition) and AASHTO’s Guide for the Planning, Design, and Operation of Pedestrian Facilities, are important guides to safe design and construction. However, in the past such national standards have not always been appropriate for local contexts, and have often slighted the needs of pedestrians and cyclists in favor of motor vehicles. States such as Connecticut have adopted their own design manuals instead. Since NMDOT has relied on the AASHTO Green Book as its design manual, project staff should consult these guidelines. However, they should also exercise their best judgment to determine whether these standards really fit the needs of a particular context, and in general should use standards, guidelines, or warrants developed by national agencies in an advisory but not rigid fashion.

DESIGN ALTERNATIVES EVALUATION TABLE

	Alternative 1	Alternative 2	Alternative 3	No-Build Alternative
Meets Needs Assessment				
Meets Safety Requirements				
Meets Budgetary Requirements				
Meets Stakeholder Concerns				



8.0 Guidelines for Evaluation of Project CSD

8.0 Guidelines for Evaluation of Project CSD

A. PURPOSE OF EVALUATION

As a project is completed it's important to learn from it, in particular whether the CSD/CSS process or outcomes could be improved in future projects. Evaluation is often overlooked given the pressure of new projects. Leaving time and budget for project evaluation in advance can help ensure that it actually occurs. With any relatively new procedure such as CSD/CSS, evaluation is particularly important to help agencies modify and calibrate their project development processes.

B. PROCESS MEASURES

In terms of the process through which CSD/CSS was carried out, particular questions that should be addressed in an evaluation include the following:

How many stakeholders were contacted and in what ways?
 Were all potential stakeholders actually contacted?
 Was there difficulty in contacting or obtaining meaningful feedback from any stakeholders?
 What specific input or recommendations was received?
 How was this input incorporated into project alternatives or design?
 How did participants evaluate community workshops/charrettes?
 How have participants evaluated the entire process?

Some of this data can be summarized numerically, for example the number of contacts made and participants' reviews of workshops. Some data can be presented through lists of constituencies identified, organizations contacted, comments received, and so forth. Other forms of process evaluation will require a written discussion, with frank and honest analysis by the project or process manager.

Specific recommendations on modifications to the CSD/CSS process should be prepared for future projects.

C. OUTCOME MEASURES

In terms of CSD/CSS outcomes, questions that should be addressed through evaluation include the following:

In what ways did CSD/CSS analysis change the eventual project design?
 What specific data or public input led to these changes?
 Were all major public concerns/needs responded to?
 What was the response to each of these public concerns?
 How well does the final project respond to initial project goals?
 How well does it respond to revised project goals if these were modified during the CSD process?

Here again, data should be presented in different ways. A list tabulating public comments, responses, and actual changes in project design is a valuable way to summarize

changes in outcome. Photos and other graphics can help illustrate project design elements that changed as a result of CSD/CSS, and may help inform the design of future projects. Quantitative data showing vehicle speeds, pedestrian counts, accidents, and other relevant performance characteristics of the built project are desirable. A written description of the final project design and operation is essential to pull the evaluation together and provide an overall analysis.

Selected References

American Association of State Highway and Transportation Officials (AASHTO), 2004. Guide for the Planning, Design and Operation of Pedestrian Facilities.

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APPENDIX 1
Environmental Justice

New Mexico Division on Environmental Justice

The New Mexico Federal Highway Administration Division Office follows the guidance established and disseminated by our Head Quarters when considering Environmental Justice (EJ). The heart of recognizing EJ issues lies in evaluating demographics provided by census data. The planning and environmental areas use this data in order to develop transportation improvements appropriately. Environmental documentation and planning regulations require an active statement testifying to the fact that efforts were made to identify EJ situations and also document a conclusion whether an EJ situation exists.

It is recognized in the state of New Mexico that there is a large minority population as well as a large low income population. Public involvement is a cornerstone in the planning and environmental arenas, and communicating in the appropriate language is essential to provide information to decision-makers.

This pro-active approach has been a key in providing complete evaluations of planning and environmental documentation. To date, no EJ violations have been identified and brought to the attention of FHWA and thus we have not been unduly concerned. However in the event of an identification of an EJ violation, the FHWA would be notified and involved in the investigation to provide a resolution to the situation.

In an effort to comply with Executive Order 12898 the New Mexico Division Office reviews and approves the annual NMDOT Title VI/EJ Activity and Accomplishments report. Division office Field Operations staff review all Environmental Assessments for discussion on environmental justice and on Federal oversight projects, and watch for EJ issues throughout the project development and construction. We have the option to randomly select State oversight projects for review of EJ compliance or to perform more general process reviews in this area. Planning and Environmental staff review Title VI requirements as participants in MPO compliance certification reviews every three to four years. The right-of-way specialist oversees compliance with the Fair Acquisition Act (right words?) and other regulations to assure non-discrimination in acquisitions.

The Division Office will support and help enforce the Governors Executive Order and any resulting NMDOT policy developed in response, in so long as it does not conflict with other Federal regulations.

EJ-B

General Summary of EJ references

Governor Richardson's Executive Order 2005-056-

At US DOT – DOT Order to Address Environmental Justice in Minority Populations and Low Income Populations which summarize the Presidential Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations. See DOT Order 5610.2 and DOT Order 6640.23

AT NMDOT OEOP – a posted rule for DBE's that addresses using of Race Neutral and Set-aside practices and procedures for Contractors doing business as primes and DBE's for Construction and Design Development projects. This Bureau manages Title VI – see electronic Publication No. FHWA-EP-00-013.

Within Planning, Development and Design- many EJ practices are currently used and can be summarized in the following Environmental Justice Legislation and Guidance:

- 1) Title VI Requirements in Metropolitan and Statewide Planning,
- 2) Title VI the 1964 Civil Rights Act,
- 3) Title VI Regulation 49CFR 21 revised to 49 CFR 26
- 4) 23 U.S.C. 140 – Nondiscrimination
- 5) Executive Order on EJ
- 6) DOT Order on EJ
- 7) FHWA Order on EJ
- 8) 23 CFR 200.5 Title VI Definitions
- 9) 23 CFR 200.7 et.al – Title VI Policy & State Responsibility
- 10) Uniform Relocation Assistance & Real Property Acquisition Policies Act 1970
- 11) Impacts of the Civil Rights Restoration Act of 1987 on FHWA Programs
- 12) Title VI Legal Manual, US department of Justice, Civil Rights Division
- 13) The Council on Environmental Quality
- 14) NEPA 23 U.S.C. 109(h)

ENVIRONMENTAL JUSTICE

As implemented by the NMDOT

- The NMDOT evaluates the impacts of proposed projects on minority and low income populations as part of its obligations under the National Environmental Policy Act (NEPA), as administered by the Federal Highway Administration (FHWA). NEPA requires the consideration of social and economic issues for every proposed project. Each Environmental Assessment (EA) and Environmental Impact Statement (EIS) developed by the NMDOT includes analysis of demographic and economic profiles of the communities affected by the project. The analysis includes data collection and evaluation of the following:
 1. Demographic information (population size, age and ethnic distribution, income);
 2. Neighborhood composition and boundaries;
 3. Housing factors (type, density, multi vs. single family, owner vs. tenant, availability);
 4. Community facilities and services (location, type, access);
 5. Businesses (number, type, size, distribution, access, clientele demographics, number and demographics of employees); and
 6. Tax base / economy (unemployment rate, income distribution, stability).

The analysis includes identification and evaluation of the effects of each project alternative for the factors listed above, including both positive and negative, direct and indirect, immediate and cumulative. The analysis is then used to help identify the preferred alternative. If the preferred alternative causes a "disproportionately high and adverse impact on minority or low income populations," then measures are incorporated into the project to avoid, minimize, and mitigate those impacts.

Relevant statutes and regulations:

- NEPA, as administered by FHWA: 23 CFR 771
 - Title VI of the Civil Rights Act
-
- The NMDOT Location Study Procedures include FHWA-approved public involvement procedures. The purpose of these procedures is to ensure adequate opportunity for all stakeholders, including minority and low-income constituencies, to be informed about proposed transportation projects that may affect their communities and to provide input on the effects of alternative project locations and major design features. The NMDOT public involvement procedures require that all stakeholder groups be identified and provided the opportunity to affect decisions regarding proposed transportation projects. The public involvement procedures include, but are not limited to, the following:
 1. Public information meetings, open houses, workshops and public hearings, including the use of bi-lingual translators, when appropriate. The most common bi-lingual needs are English-Spanish, although English-Navajo has also been used occasionally. The NMDOT ensures that all public meeting places are accessible to the handicapped.
 2. The NMDOT utilizes Civic Advisory Committees (CACs) for complex or controversial projects, including community representatives from all ethnic groups and income levels.
 3. Special stakeholder meetings are often held to address the issues of specific ethnic or community groups. On a few occasions, the NMDOT has hired an advocate to assist and represent a minority or other stakeholder group that requires special support.
 4. Information regarding proposed projects is disseminated to the public at large and to all identified stakeholders through newspaper advertisements (including bi-lingual advertisements, when appropriate), flyers, mailings, radio announcements, etc.

The public involvement procedures assist the NMDOT in evaluating issues of concern to the public and to stakeholder groups, especially the following:

1. Impacts to minorities, low-income groups, and other special status populations.
2. Changes in neighborhoods or community cohesion (e.g. splitting neighborhoods, displacing residents, inducing new development, increasing or decreasing property values).
3. An increase or reduction in availability and accessibility to local and regional community facilities and services (e.g. direct loss of facilities which would force further travel distances, indirect effects such as loss of population supporting such facilities, barriers to police and fire protection).
4. Increases or decreases in traffic volumes and safety of existing and proposed transportation facilities.
5. Potential local business displacements, indirect effects on businesses which rely on highways for business or other local business centers, the potential for induced commercial growth and associated indirect effects, and effects of permanent or temporary changes in business access.
6. Short and long term effects on the regional and local economy, including shifts in levels of income, employment, and property tax revenues and loss of agricultural lands.

Relevant statutes and regulations:

- NMDOT Location Study Procedures
 - Federal Executive Order 12898 on Environmental Justice
 - Federal Dept. of Transportation Order on Environmental Justice: DOT Order 5610.2
 - FHWA Order 6640.23: Actions to Address Environmental Justice in Minority and Low-Income Populations
-
- The NMDOT consults with tribal governments regarding potential impacts to traditional cultural places (including prehistoric and historic sites, traditional hunting areas, traditional religious sites, etc.). This consultation occurs for all proposed projects, regardless of project location, whether on or off tribal lands. The NMDOT, in cooperation with all New Mexico tribes, the NM Department of Indian Affairs, and the US Bureau of Indian Affairs, has compiled a list of the specific areas of the state that each tribe is interested in. When a transportation project is proposed, all tribes that have expressed an interest in the location of that project are contacted to solicit their input. If tribal traditional cultural places are identified within the project area, the NMDOT designs the project to avoid those sites and the sites are provided special protection during construction.

Relevant statutes and regulations:

- Section 106 of the National Historic Preservation Act
- American Indian Religious Freedom Act
- Native American Grave Protection and Repatriation Act
- NM Cultural Properties Act
- Governor Richardson's Executive Order 2005-003: Adoption of State Tribal Consultation Policy of Sacred Places and Repatriation