Impediments to Context-Sensitive Main Street Design

This paper explores impediments to context-sensitive design of main streets, and suggests ways of overcoming them. It is based on a guidebook for the New Jersey Department of Transportation titled Flexible Design of New Jersey’s Main Streets. Contrary to conventional wisdom, minimum design values in the American Association of State Highway and Transportation Officials’ A Policy on Geometric Design of Highways and Streets (AASHTO’s 2001 Green Book) do not appear to constrain main street design. Nor do tort liability considerations in most states, primarily because of broad design immunity under state statutes and case law.

From case studies conducted for this project, the real impediments to context-sensitive design appear to be: state design standards in excess of AASHTO minimums, and in excess of what is required for driver safety in low-speed environments; minimum level-of-service standards adopted for driver convenience, which may be less important on main streets than pedestrian safety and comfort; over-reliance on typical sections from state roadway design manuals, when multiple cross sections tailored to abutting land uses would be more appropriate; and reluctance to seek design exceptions for purposes of “context savings,” only for purposes of cost savings. Additional impediments include application of new construction standards to 3R and reconstruction projects, even when a street’s history suggests no safety problem; misclassification of streets as rural and application of rural design standards to them, when they in fact run through small urban places; misclassification of streets as arterials, when bypasses and other parallel improvements have caused main streets to function as local streets; and reluctance of state DOTs to assume maintenance responsibilities for street trees, landscaped medians and bulbouts, textured crosswalks, and similar common main street improvements.

Case studies from Albuquerque, NM; Anchorage, AK; Brooklyn, CT; Saratoga Springs, NY, and South Miami, FL, are used to illustrate how these impediments may be overcome through flexible design and decision-making.

by Reid Ewing

The New Jersey Department of Transportation (NJDOT) asked the Alan M. Voorhees Transportation Center at Rutgers University to investigate possible changes in design standards for highways running through New Jersey’s communities. Through our case studies and surveys, we discovered a burgeoning national movement away from strict reliance on state highway design templates and toward more sensitivity to context (King et al. 2000). The movement seems rooted in the notion that the nation’s highways are essentially complete, and working within existing communities will require new sensitivity to context.
In deciding which highways through communities particularly demand context sensitivity, a label was needed. Main Street was chosen as a catchall for highways with mixed functions, not just channels for vehicular movement but places in their own right worth preserving and enhancing. Included are all highways and streets whose adjacent land uses require accommodation of pedestrians and bicyclists, serious consideration of street aesthetics, and a degree of traffic calming. As such, the term includes not only traditional shopping streets but approaches to those streets, other commercial streets with small building setbacks, main roads with fronting residences, and other highways directly impacting people’s living environments.

Context sensitivity implies tailoring designs to adjacent land uses. Flexibility is exercised when design values are chosen to better fit the context. Still, there is much confusion about exactly what constitutes context-sensitive highway design, what latitude exists under current standards and guidelines, what tort liability attaches to such efforts, and what obstacles must be overcome to achieve context-sensitivity. This paper seeks to sort out myth from fact.

**DOT vs. Community Objectives**

Consider these examples of context-sensitive design.

US Route 6 has two narrow lanes as it runs through the town of Brooklyn, CT. Sight distance is less than 250 feet at one point, driveways are closely spaced, and there is little roadside clearance should a driver lose control. Yet, traffic speeds through the town still range up to 54 mph. A 1991 plan sought to correct these dangerous conditions by four-laning the road, straightening the alignment, and adding eight-foot shoulders. The village appealed the plan, and the Connecticut Department of Transportation (ConnDOT) went back to the drawing board. ConnDOT’s next proposal was a bypass around town, which was also rejected. Finally, after years of additional planning, a compromise was reached which maintains the existing alignment through the town center, retains the two-lane cross section, adds narrow shoulders, adds sidewalks, and realigns the road marginally at the most dangerous curve. Over the five-mile section, design exceptions were required for horizontal alignment, maximum grade, superelevation, transition length, and clear zone (from various trees and stone walls).

In Anchorage, AK, engineers proposed the conversion of 15th Avenue into a one-way couplet with 14th Avenue. The proposal arose from a safety study that documented high accident rates and substandard geometrics, most importantly restricted sight distances and lack of separate left-turn lanes at intersections. Residents of adjacent Rogers Park neighborhood had observed one-way couplets in operation—Northern Lights and Benson in midtown, for example—and this was exactly what they didn’t want. The couplets moved traffic efficiently, but divided the community in freeway-like fashion. The neighborhood demanded a say in the outcome, and so began a five-year process of redesign that resulted in a four-lane, tree-lined boulevard on the east end, and a narrowed three-lane cross section on the west end. Lanes will be maintained at 11-foot widths, and shoulders will not be included, as the Alaska DOT had wanted. Instead, a wide gutter pan will provide a refuge area and bike-friendly surface. Sidewalks will be set back from the street for the first time.

In Albuquerque, NM, Isleta Boulevard is a two-lane road with no sidewalks, no curbs, no landscaping or other amenities. The tendency of drivers to use the shoulder to pass left-turning vehicles on the right makes driving on Isleta Boulevard a free-for-all. The engineers’ solution was to widen the southern leg of Isleta Boulevard from two to five
lanes, two travel lanes in each direction and a continuous left-turn lane in the center. Activists, who had witnessed the decline of commerce and street life on nearby Bridge Street after it was five-laned, challenged the Environmental Assessment (EA) of the project and Finding of No Significant Impact (FONSI). Their grounds: safety problems with the current roadway were not documented, only assumed; land-use impacts were never analyzed; and more context-sensitive highway design alternatives were not considered. FHWA agreed and refused to accept the EA and FONSI. This led to a new hybrid design, with the central section of road widened to only three lanes, sidewalks added, and landscaped median islands installed.

In Westminster, MD, on East Main Street, the base layer of the roadway was in need of reconstruction, underground utility lines had to be replaced, and the storm drain system had to be upgraded. The district engineer for the project checked the Maryland Roadway Design Manual and, consistent with the standards at the time, proposed widening the road to 40 feet. Widening would have provided 12-foot travel lanes and eight-foot parking lanes on each side. It also would have eliminated nearly all street trees and reduced the sidewalk width to two feet in places. When she learned of the widening, a citizen activist began a campaign to preserve the street's historic character. She enlisted the mayor, and the mayor convinced the Maryland State Highway Administration to reconstruct within the street’s current dimensions. The result is a classic main street with “bulbout” curb extensions at intersections, mid-block crosswalks, hundreds of additional street trees, and use of brick surfaces in the crosswalks.

In these cases and many others uncovered in our research, the need for road improvements was undeniable. Yet, standard design solutions were unacceptable to the people most impacted, those along the right-of-way. The resulting tension between DOT and community objectives led to compromise and context-sensitive designs. Remember these examples. We will return to them.

Don’t Blame the Green Book

Threatened by roadway “improvements” at odds with community objectives, residents, merchants, and their local elected officials look for someone or something to blame. Highway geometric standards are a convenient target, as is the source of those standards, the American Association of State Highway and Transportation Official’s A Policy on Geometric Design of Highways and Streets (AASHTO’s Green Book). The indictment goes something like this. State and county DOTs blindly follow this bible of geometric design. They do so for fear of tort liability. Tort liability arises when substandard designs result in accidents. The Green Book itself is conservative to a fault when it comes to lane and shoulder widths, vertical and horizontal curve radii, lateral clearances and offsets at the street edge, and other geometric features. As one critic put it: “in the post-Interstate era…the engineering profession’s Green Book devotion has led state transportation officials into some all-but-indeniable decisions” (Ehrenhalt 1997).

The critics’ solution to bad highway design is simple: adopt design standards below Green Book minimums. This illustrates the old saying, “For every complex problem there is a simple solution, which is almost guaranteed to be wrong.”

Despite the latitude afforded by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), our research found that few states have actually adopted sub-AASHTO geometric standards. For those that have, only a handful of design standards have been relaxed and deviations from Green Book values are relatively minor (see Table 1). The difference between the cross sectional width of a three-lane urban arteri-
al with on-street parking under Vermont’s much heralded design standards and under the *Green Book* minimums is only three feet (see Figure 1). Notably, Dave Scott, director of project development and keeper of the Vermont standards, advised our Rutgers study team not to recommend anything less than *Green Book* minimums. There is little to gain on urban main streets and much to lose in the way of time and effort (five years’ worth in Vermont).

This is not to imply that the AASHTO *Green Book* is flawless. Its design guidelines are conservative, often based on dated studies from a time when tires, braking systems, pavements, and vehicle dimensions were less forgiving than today (for examples, see Hauer 2000). However, this mostly affects the design of high-speed rural roads. Let’s consider that perfect main street and the degree to which it can be accomplished under 2001 *Green Book* minimums for urban arterials.

- Low design speed. Design speeds as low as 50 kph (30 mph) are allowed in central business districts and intermediate areas.
- Lanes of 10- or 11-foot width. The minimum lane width is 3 meters, or 10 feet, for urban arterials with little or no truck traffic. A minimum of 3.3 meters, or 11 feet, is prescribed for general traffic on urban arterials designed for speeds up to 70 kph (45 mph).
- Shoulders. Shoulders are encouraged on urban sections, but are not required.
- Street trees hugging the curb and buffering the sidewalk. On curbed sections, the minimum clearance from the curb face is 0.5 meters (1.5 feet). A 1-meter clearance is considered desirable, particularly near intersections and driveways where turning vehicles may overhang the curb.
- Midblock crosswalks. Midblock crosswalks are permitted with warning signs and parking prohibitions nearby to ensure pedestrian visibility.
- On-street parking. Parallel parking is allowed where adequate street capacity is available and traffic speeds are low.
- Tight corners. Corner radii of 3.0 or 4.5 meters (10 to 15 feet) are reasonable under constrained conditions. On arterials carrying heavy traffic, larger radii are recommended (in some cases, much larger) to facilitate turns to and from the through lanes.

### Table 1: States Adopting Sub-AASHTO Geometric Standards

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<th>Connecticut</th>
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<td>Travel Lane Width</td>
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<td>Parking Lane Width</td>
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<td>Intersection Sight Distance</td>
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<td>Stopping Sight Distance</td>
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<td>Maximum Grade</td>
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<td>Vertical Curvature</td>
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<td>Horizontal Clearance</td>
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<td>Superelevation</td>
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</table>
Sight distance at intersections. Clear sight triangles are required only at intersections without traffic signals or stop signs. Even there, sight triangles will be reasonably sized if based on low design speeds.

Pedestrian refuge islands. Median islands are encouraged where space permits. A raised curbed median may be used on low-speed urban streets.

Bulbouts. Curb extensions may be used to reduce pedestrian crossing distances (as long as other geometric minimums are met).

Wide sidewalks. The minimum border width, including sidewalk and planting strip, is 2.4 meters (8 feet). A width of 3.6 meters (12 feet) is preferred.

Vertical curbs. Vertical curbs are encouraged in areas of high pedestrian traffic and low traffic speeds. Under low-speed urban street conditions, they can be placed at the edge of the travel lane without an offset.

It appears, then, we cannot place blame on the Green Book for the state of urban streets.

Tort Liability Is No Excuse

Historically, states were immune from lawsuits due to sovereign immunity. Sovereign immunity, a legal doctrine dating back to feudal England, prevented governments from being sued unless they chose to waive their immunity. Moreover, even if governments allowed themselves to be sued, they could not be held liable for the actions of their employees. Beginning in the 1960s, however, the doctrine of sovereign immunity began to crumble under court rulings or legislative acts, leaving governments subject to tort liability. Governments could be sued for negligence in cases where they, unintentionally, failed to exercise due care in their decisions.

Government decisions were divided into two classes: discretionary or planning decisions and ministerial or operational decisions. Discretionary decisions involve a choice among valid alternatives, and are generally immune from tort claims. Ministerial decisions leave minimal leeway for personal judgment, and are not immune.

As part of our study for NJ DOT, we surveyed statutory and recent case law in 16 states, plus New Jersey. The states were: Alabama, California, Colorado, Florida, Georgia, Illinois, Michigan, Minnesota, New Hampshire, North Dakota, Ohio, Pennsylvania, South Carolina, Texas, Utah, and Vermont. With the sole exception of local roads in Vermont, all states have replaced sovereign immunity with more limited discre-
tionary immunity. The question becomes: Are highway design decisions discretionary, or are they ministerial? The answer is: discretionary, but with caveats.

New Jersey, the state of greatest interest to us, has a Tort Claims Act that leaves the state almost completely immune from tort liability for design-related decisions:

“Neither the public entity nor a public employee is liable . . . for an injury caused by the plan or design of a public property, either in its original construction or any improvement thereto, where such a plan or design has been approved in advance of the construction or improvement by the Legislature or governing body of a public entity or some other body or a public employee exercising discretionary authority to give such approval or where such plan or design is prepared in conformity with standards previously so approved.”

In one New Jersey case, *Manna v. State* (1992), the court further held that: “Immunity is not lost even if new knowledge demonstrates the dangerousness of the design, or the design presents a dangerous condition in light of a new context.” If the right body or official approves a design (or the standards upon which a design is based), even if flawed, the decision is immune from tort liability. Indeed, most highway injury cases brought before the courts in New Jersey result in summary judgments in favor of the state, preventing these cases from ever being heard by a jury.

At the other extreme is the State of Georgia. The Georgia Supreme Court held in *DOT v. Brown* (1996) that the design of a roadway was an operational function, not covered by discretionary immunity: “...only the decision to build, and not where or how it is built, is immune.” Between these extremes are states like California and South Carolina, which provide design immunity but allow it to lapse as conditions change. In *Baldwin v. The State of California* (1972), the California Supreme Court ruled that “where a plan or design of a construction of, or improvement to, public property, although shown to have been reasonably approved in advance or prepared in conformity with standards previously so approved as being safe, nevertheless in actual operation under changed physical conditions produces a dangerous condition of public property and causes injury, the public entity does not retain the statutory immunity from liability.”

Still, from the 16-state survey, we don’t find tort liability much of an excuse for the sorry state of urban streets. If there is lingering doubt about tort liability, a state can always follow the lead of Vermont, whose legislature both compelled the development of alternative design standards and then granted legal immunity as long as the standards were followed.

**The Real Culprits**

If *Green Book* minimums and tort liability aren’t genuine obstacles to good main street design, what stands in the way? The real culprits, from our case studies, are identified in Table 2.

**DOTs More Conservative than AASHTO**

The AASHTO *Green Book* offers design policies and guidelines, not standards. For each design element, AASHTO typically provides a range of acceptable values, from the absolute minimum value to a more desirable target value.

For an AASHTO guideline to become a standard, it must be adopted by a responsible agency. Most states have adopted standards toward the middle or upper end of the AASHTO ranges, on the theory that if some is good, more is better.

An example of how these higher standards may affect roadway design has already been described in the Westminster case study. Maryland’s lane width standards would have encroached on trees and sidewalks. They
exceeded AASHTO minimums. Not only were the Maryland standards thrown out in this case, but the experience convinced Bob Douglass, the Maryland State Highway Administration’s deputy chief engineer, that the standards should be thrown out wholesale.

In 1998, Douglass wrote a memo banning the use of the state’s highway design manual. He found that the templates were generally oversized (especially stopping sight distances and vertical curve radii) and stymied creativity among engineers. The agency was losing legal challenges when an element was below the state minimum value, but above the Green Book value. Now the agency relies exclusively on the Green Book.

### Misclassification of Streets

Streets and highways in this country are classified by location—urban or rural—and by function—arterial, collector, and local. There is a direct relationship between classification and design standards. Classification determines design speed, design vehicle, and also cross section (lane width, shoulder width, type and width of median).

The US classification system has been criticized for failing to adequately differentiate among contexts and functions. An urban arterial conforms to the same basic standards whether a main street or bypass around downtown. The Germans divide roads into six functional classes, and differentiate context by (1) outside or within built-up area; (2) framed by buildings or not; and (3) heavy or light nonvehicular use. In the US, the New

### Table 2: Impediments to Context-Sensitive Design Overcome in the Case Studies

<table>
<thead>
<tr>
<th>Project Location</th>
<th>High State Geometric Standards</th>
<th>Minimum LOS Standards</th>
<th>Reliance on Typical Sections</th>
<th>Limited Use of Design Exceptions</th>
<th>Treatment of 4R Projects</th>
<th>Misclassified Streets</th>
<th>Maintenance Concerns</th>
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Urbanism movement has been trying to redefine the roadway functional hierarchy in its plans and codes. The recently adopted North Carolina street guidelines for New Urbanist developments presents typical sections (each with its own geometrics) for: an alley, lane, street, avenue with parking, main street without a median, boulevard, and parkway (see Figure 2).

Misclassification of streets occurs for two common reasons. A small town, village, or hamlet may fail to meet the definition of urban. This was the case in Brooklyn, CT, before the compromise described at the beginning of this article.

The simple solution to this problem is to treat any place that is built up as urban, regardless of the census designation. FHWA’s policy is simple: If it looks urban, use urban standards. Vermont is applying its new urban standards to villages previously classified as rural. The change in geometrics is dramatic.

The other common case of misclassification occurs as a road’s function changes over time. In the Westminster case, East Main Street had always been part of Maryland State Route 32. It began functioning more like a local street when the State Road 140 bypass opened. Accordingly, this portion of MD 32 was removed from the Maryland State Highway System after the street was reconstructed, and the city assumed responsibility for operation and maintenance. Other cases of changing roadway function and de-designation include Sunset Drive (SR 986) in South Miami, FL; Nottingham Way (SR 33) in Washington Township, NJ; and Springfield Avenue (SR 124) in Maplewood, NJ.

**Level-of-Service Standards**

What makes streets difficult to cross, and unpleasant to walk along due to aggressive driving, isn’t the extra foot or two of width in individual lanes, say 12 feet rather than 10 or 11 feet. Rather it is the presence of multiple travel lanes, plus exclusive turn lanes at intersections. Multilaning of streets is not prompted by geometric standards and safety considerations, but instead by performance standards and driver convenience. While there is a legal imperative to provide safe streets, there is no comparable imperative to provide free-flowing streets. In a downtown environment, in particular, some congestion may be desirable. After all, a downtown that doesn’t generate much traffic isn’t a very exciting downtown.

Virtually all DOTs have adopted level-of-service standards. Typically, the standard for urban areas is LOS C or D in the design year (moderate congestion 20 years into the future). LOS B or C is typical for suburban areas. As traffic volumes increase to the point where the standard is no longer met, a street...
and its intersections are usually widened regardless of impacts on adjacent land uses.

The alternative is to accept congestion in areas that function as destinations. Since 1993, Florida has allowed its local governments to exempt streets through downtowns and urban redevelopment areas from LOS standards. The effective standard becomes LOS F. Many cities and towns have done so.

Sunset Drive (SR 986) in South Miami once functioned as the city's main street, and the city wanted to reclaim the street as part of a downtown redevelopment plan. To slow traffic and reduce crossing distance, the existing four- and five-lane cross sections were narrowed to three lanes. The roadway narrowing permits wider sidewalks, additional street trees, and outdoor dining. The Florida Department of Transportation (FDOT) initially opposed any reduction in level of service on its road. The solution was to de-designate this last section of SR 986, turn the section over to the city, and have the lane reduction occur within the city’s jurisdiction. The two eastbound travel lanes continue through the intersection with US 1 (the western boundary of the city), the inside lane ending in a trap left lane a block into the city. Roadway level of service is thus maintained at LOS E on the eastbound approach, under FDOT’s jurisdiction. But the one westbound lane approaching US 1 has less carrying capacity than the previous configuration, and the westbound approach will fail in the design year. The city is happy to accept the lower LOS in return for a more pedestrian-friendly main street (see Figure 3).

Vermont hasn’t gone as far as Florida in this respect, but will design a main street environment for LOS F if right-of-way is constrained. If drivers have to slow down for half-mile stretches as they travel through Vermont’s many historic villages, Vermont’s Agency of Transportation thinks the trade-off is worth it.

Should this discussion come across as anti-driver convenience and pro-LOS F, it is worth noting that several of the context-sensitive designs studied have improved or at least maintained roadway LOS at the same time they have narrowed roadways. They have accomplished this feat through clever treatment of intersections, where, after all, most of the delay occurs. This is true in the Saratoga Springs case, described forthwith. It is true of Springfield Avenue (NJ 114) in Maplewood, NJ, where the redesign of intersections permitted a shortening of the traffic signal cycle. It is also true on New York State Route 114 through Sag Harbor, where a modern roundabout is improving safety and LOS at the same time.

Over-Reliance on Typical Sections

Nearly all state DOTs include typical sections in their roadway design manuals. These
are standard cross sections that can be applied, as is, to particular settings. If an area is classified as urban, and a road is functionally classified as a principal arterial, the typical section for an urban principal arterial becomes the default roadway. In New Jersey, a single typical section applies to all two-lane highways, and another to all four-lane highways, whether urban or rural.

The use of typical sections runs counter to flexible and context-sensitive design in two respects. The most obvious is that where right-of-way is limited, something has to give. Most often what gives is outside the vehicle traveled way, whether the sidewalk, landscape buffer, parking lane, or bike lane. The more insidious respect in which reliance on typical sections may undermine context sensitivity is the tendency to adopt a single, typical section for an entire stretch of road, even when conditions change along the road. Having a single typical section is convenient for the design engineer and construction crew. But it is not good policy.

Several of our case studies illustrate the problem. The proposed five-lane section over the length of southern Isleta Boulevard in Albuquerque, would have created excess capacity at the midpoint, and correspondingly higher speeds and higher costs. The hybrid design with a three-lane section in the middle will save $4.5 million on right-of-way acquisition and construction costs. The proposed one-way couplet involving 15th Avenue in Anchorage would have far exceeded capacity requirements on the western end of the section, since traffic peals off as it heads west. The western-most segment is instead being converted from four to three lanes. A three-lane conversion can handle 18,000 vehicles per day, more than projected through the design year for these sections of Isleta Boulevard and 15th Avenue.

An even more dramatic example is from Saratoga Springs, NY. South Broadway (US 9) changes from a four-lane semirural highway with a striped median and posted speed of 55 mph to a three-lane urban road with a posted speed of only 30 mph, all in a distance of one-third mile (see Figure 4). The transition was anything but smooth prior to reconstruction. By all accounts, the section in question would have been reconstructed as a uniform four-lane road with a flush median, but for two things. First, in 1999, the New York State DOT started an Environmental Initiative, with context-sensitive design at its heart. Second, the highway passes Saratoga Spa State Park, the Lincoln Baths, and Museum of Dance, and something special, more gateway like, was required.

What was ultimately designed and built was a series of roadway sections that make a smooth transition between the high-speed, semi-rural environment to the south and the low-speed urban environment to the north. For northbound traffic entering Saratoga Springs, the number of travel lanes is maintained initially, but an urban boulevard with landscaped median and urban curb and gutter replaces the striped median and shoulder and swale to the south. The speed limit is reduced to 40 mph just prior to this. One northbound lane ends as a forced left-turn lane into the Baths, leaving only one through lane northbound. The speed limit at this point is further reduced to 30 mph. The one northbound lane continues, with periodic left-turn pockets carved out of the wide median, until the section ends.

**Treatment of 4R Projects**

In many states, roads that are simply being resurfaced, restored, or rehabilitated (3R projects) are subject to special standards below those in the Green Book. In others, like New Jersey, certain 3R projects qualify for automatic design exceptions. They do not have to be upgraded to current geometric standards. The Green Book itself declares that it is “not intended as a policy for resurfacing, restoration, or rehabilitation (3R) projects. The fact that new design values are
presented herein does not imply that existing streets and highways are unsafe, nor does it mandate the initiation of improvement projects. For projects of this type (3R), where major revisions to horizontal and vertical curvature are not necessary or practical, existing design values may be retained.”

On the other hand, under AASHTO and DOT policies, roads that are reconstructed down to their bases have to be brought up to current standards. Since most communities are not building many new roads today, but rather maintaining and upgrading what they have, most of the conflict between DOT standards and community objectives arises from these reconstruction projects.

The rationale for special treatment of 3R projects is that designers already know how a road performs based on historical accident and other data. With a newly constructed road, they would have to guess at the effect of substandard design elements. In this respect, reconstruction of an existing road may be more like a 3R project, when reconstruction is largely occurring within existing curb lines, or more like new construction, when a new cross section or new alignment is being established. In the former case, there is a relevant crash history to draw on, and there may be no need to reconstruct to current standards. The Maryland State Highway Administration reached this conclusion recently, and now leaves existing cross sections alone unless there is a documented crash problem (as in Figure 5).

**Limited Use of Design Exceptions**

Flexibility would seem inherent in the highway design process, as for every standard, there may be an exception. On the National Highway System, FHWA has the power to grant design exceptions. On non-NHS roads, state or local DOTs have the same power. For the period from 1997-1999, NJDOT engineers requested and received design exceptions for 81 projects. These represent almost a third of all projects during the period, and include most major highway projects undertaken by the state. Of the 81 design exception reports reviewed, 50 gave some
consideration to community, historical, or environmental factors. Thus, on its face, the design exception process appears heavily utilized and context-sensitive.

However, looks are deceiving. The typical design exception request reads something like this. A road is being reconstructed for some good reason. A design speed (maximum safe speed under favorable conditions) of X mph, 10 mph over the posted speed limit, requires a minimum horizontal curve radius of Y feet. This particular road has a sharper curve, which would have to be straightened, to meet the standard for horizontal curvature. Straightening the road would take someone’s house or business, encroach on some park or cemetery, etc. So the design engineer checks accident statistics for the location in question, focusing on the types of accidents associated with substandard horizontal curves, and finds that these accidents are not over-represented relative to state norms. Noting that money can be saved by allowing a substandard horizontal curve, improving only marginally on the existing curve, a design exception is requested and granted. The road didn’t have a particular safety problem to begin with, and it will have less of one after the project. So far, so good.

The problem lies in how much weight is given to cost savings in the design exception process, and how little is given to context savings unless it involves an actual taking of property (in which case, cost enters the picture). Of the 50 design exception reports giving consideration to context, all but one project, involving historic preservation, justified design exceptions largely on the basis of cost savings. In this regard, New Jersey appears to be no different from the rest of the United States (Transportation Research Board 1987).

Figure 6 shows the dominance of cost considerations. It also shows that most design exceptions were for substandard design elements unlikely to be found on urban main streets.

Formal design exceptions were sought in only two of our case studies, suggesting a reluctance to seek design exceptions for contextual reasons. One of the exceptions, the 15th Avenue project in Anchorage, would have required three times the budget to bring all substandard geometric elements up to existing standards. The source of funding for the project, the federal Highway Safety Improvement Program (HSIP), does not require that existing standards be met, but instead is performance-based. Under this program, recent accident data are evaluated to determine if the substandard condition is contributing to the number or severity of accidents.
crashes. If the actual number of accidents exceeds the predicted number, then a cost-benefit analysis is done to decide whether the projected accident costs to individuals exceed the costs to the public of correcting the condition. On this basis, the 15th Avenue project will improve safety but still leave some substandard stopping and intersection sight distances, curb return radii, shoulder widths, and clearances to obstructions.

Maintenance Concerns
The next major impediment to context-sensitive main streets is probably the easiest to overcome. It is certainly the hardest to excuse when it does stand in the way. In many case studies prepared for NJDOT, maintenance was an issue. In Westminster, the Maryland State Highway Administration was reluctant to maintain street trees and brick-paved crosswalks along East Main Street. The city assumed responsibility for maintenance after the reconstruction and transfer to the city. In Saratoga Springs, the NYS Office of Parks, Recreation and Historic Preservation agreed to maintain the sidewalks, and the City of Saratoga Springs agreed to maintain the landscaping along South Broadway. And the list of places where maintenance duties were reassigned goes on, including Anchorage, Maplewood, South Orange, South Miami, and York, PA.

Other Impediments
Emergency access, construction costs, historic preservation, and other concerns have stood in the way of good main street design in isolated cases. These, as well as the main impediments, are described in more detail in the NJDOT guidebook, *Flexible Design of New Jersey’s Main Streets*.

Recommendations
In response to the impediments identified in this article, the NJDOT guidebook makes many recommendations. It appears that most are going to be implemented by NJDOT. Among the key ones are:

- As part of any main street project, NJDOT should consider whether the segment should be de-designated and transferred to local government, retained by the state but reclassified to reflect changing function, or retained by the state but made subject to a local maintenance agreement as part of a main street redesign.
- NJDOT should revise its design exception report format to include a subsection on social, environmental, and community impacts of constructing to the standard design value vs. the proposed substandard design value.
- NJDOT should provide for lower design speeds on main streets and add a traffic calming section to its existing roadway design manual.
- NJDOT should elevate certain pedestrian- and bicycle-friendly features to controlling design elements as part of Main Street Overlays.
• NJDOT should exempt 4R projects (3R and reconstruction projects) on main streets from current geometric standards as long as curb-to-curb width is maintained and individual crash history is acceptable.

• NJDOT should relax geometric standards for designated Main Streets to AASHTO minimums.

• NJDOT should qualify streets for this special status based on a minimum score on a “main street” formula, and location in designated Center under the New Jersey State Development and Redevelopment Plan.

Acknowledgments

This article is an outgrowth of the Flexible Design Standards for Communities project, performed by Rutgers University under contract with the New Jersey Department of Transportation. Other members of the Rutgers’ team—particularly Michael King, Petra Staats, Eric Dumbaugh, and Trefor Williams—made contributions to the content of this paper. Our counterparts at NJDOT, particularly William Beetle, Danielle Outlaw, and Arthur Eisdorfer, provided valuable guidance and feedback.

References


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