Plan On It

A Dutchess County Planning Federation eNewsletter

DUTCHESS COUNTY PLANNING FEDERATION

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Shedding Light on Digital Signs

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Over the last decade there has been a dramatic rise in the number of digital signs in our landscape. Some people like them, others not so much. But for members of local boards who are tasked with whether to permit them via the zoning code, or with reviewing proposed signs and considering their approval, modification or denial, it's important to understand the variety of issues surrounding digital signs.

Some of the larger issues include the potential for driver distraction and the visual impact of brightly lit signs in our communities. Another thing to bear in mind is the main purpose of signs. While most local zoning codes list a variety of purposes for signs, such as to be a subordinate part of the landscape or to fit the community aesthetic, the primary function for commercial signage should be to communicate the name of the business. Yet the core purpose of digital signs is to advertise products or events. Should communities encourage changeable advertising via permanent signs dotted throughout the landscape? The more distractions in our environment, the more we have to manage the onslaught of information while driving. A carefully crafted sign code can help reduce the number of things competing for a driver's attention.

The Greenway Guide on Signs (E2) recommends against moving or glaring signs, billboards, and reader-board signs. After a careful review of current sign trends and issues, our Department continues to recommend communities prohibit digital signs. Local municipalities should be aware of the issues surrounding digital signs, and are encouraged to incorporate appropriate regulatory language into their municipal codes – whether to prohibit digital signs altogether, only permit certain types, or permit them with standards and restrictions.

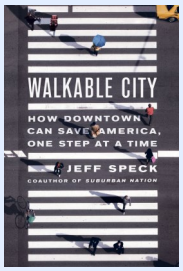
What We're Reading

Ever wondered what your friendly county planners are reading these days? We've launched this new segment to share interesting books, blogs and more to further spark your interest in the how's and why's of placemaking. We hope you find it inspiring!

Heather's Book Review

Walkable City: How Downtown Can Save America, One Step at a Time

by Jeff Speck



Walkability is something we talk about a lot in the planning world, that oddly elusive characteristic so many of our communities strive to achieve. We've all been to places where we are drawn out of our vehicles, happy to stroll between destinations for as long as possible, forgetting about our typical dependence on the car. But back home in our own communities, many of us notice that walking is either unsafe, unpleasant, or feels like a chore.

So what is it about creating walkable places that eludes us? Renowned urban planner and author Jeff Speck shines a light on the key components of walkability in this engaging and often humorous look at the subject. According to Speck, who makes the case for walkability up front and then shares the 10 steps to achieve it, walking must be safe, useful, comfortable and interesting. As with so many things, the devil is in the details. Read the book. Then start eyeing your own community for where and how to best achieve true walkability.

Want a preview? Watch Jeff's TED Talk

What are digital signs?

Digital signs use LEDs (light emitting diodes) to display words and images that are changed by remote or automatic means. They range from single-color to full color, and from static graphics to a constantly changing video stream. The most basic types include digital fuel pricing signs and time/temperature signs. More complex examples include a business sign that advertises products and sales, a school sign that lists upcoming holidays and events, and a drive-through restaurant order screen or pre-order advertising board. Digital signs may also be referred to as Electronic Message Centers (EMCs) or Electronic Message Displays (EMDs).

The fuel pricing sign (left) is a simpler version of a digital sign and can only display pricing information, while the full-color digital sign (right) can display photos and images in addition to text.

Digital billboards are off-premise digital signs typically located along major roadways and used to advertise products and services available elsewhere. They include full-color images and can have complex graphics. The message can change without animation, with animation, or include video.

Issues to Consider

Safety

The question of whether digital signs create a safety hazard along our roadways has long been debated. On a basic level, we are programmed to notice bright lights, making digital signs hard to just ignore while driving, especially if their message is changing frequently. According to Scenic America, "Previous human behavior studies have shown that drivers are hardwired to notice bright, changing lights in their peripheral vision and to anticipate additional motion."[1] And logic would suggest that if advertisers prefer digital signs because they grab our attention, then by default the attention we pay to the road ahead is compromised.

A quick search of the internet finds numerous studies on driver distraction and

> *"The common theme clearly indicates that* ***the more that commercial digital signs succeed in attracting the attention of motorists that render them a worthwhile investment for owners and advertisers, the more they represent a threat to safety*** *along our busiest streets and highways, where these signs tend to be located."*
>
> –Jerry Wachtel, CPE (*Compendium*, p.4) [5]

digital signs, though they tend to focus on billboards. While no study has proven a direct correlation between digital advertising and vehicle crashes, many studies show a connection between the presence of digital signs and an increase in driver distraction. And we have known for years that distracted drivers are unsafe drivers. It is also important to note that many of the studies claiming to disprove a direct connection between digital signs and traffic safety are either directly or indirectly sponsored by the sign industry.

Energy consumption

LEDs are the preferred technology for digital signs, as they are versatile and long-lasting. But is an LED-powered digital sign more energy efficient than an externally illuminated static sign? Probably not. That's due to a variety of factors:[2]

- The number of bulbs involved. Although one LED bulb is more efficient than one incandescent bulb, digital signs are made up of thousands of LED bulbs.
- The number of hours the sign is on. Digital signs are lit all the time, while lamps providing external sign illumination are only lit at night.
- Keeping the LED display cool. Digital signs work best within a certain temperature range. When placed outside and exposed to the elements, they must include a cooling system to ensure the sign doesn't overheat.

A 2010 study on digital signs looked at the rates of energy consumption for a variety of sign types compared to the average home. Here are some highlights from the that study:

Rates of Energy Consumption [3]

Product Type	Annual Usage, kWh*	Annual Cost**
Unilluminated Static Sign	0	$0
Static Billboard w/4 Halide Lamps—calculated	7,008	$960
LED Authority 36"x60" LED sign (full color)	8,760	$1,200
Average US home	11,040	$1,512
LED Billboard	61,032	$8,361
14'x48' LED Billboard (Florida actual reading)	162,902	$22,318

* Energy Usage ((24)(365))/1000
** Average costs per kWh=$.137 (Metro Area)

Light pollution

Light pollution is about much more than our view of the night sky. The "inappropriate or excessive use of artificial light" also results in negative impacts on energy consumption, human health, and wildlife and ecosystem patterns.[4] While planning boards regularly require street and parking lot lighting to be fully shielded to reduce glare and focus light downward, digital signs create both glare and light pollution as the light emanating from them shines outward. With the proliferation of digital signs in some of our communities, the issue of light pollution and its myriad effects should become part of the conversation.

Brightness and Legibility

Legibility refers to one's ability to read the content of a sign. A common complaint of digital signs is that they are too bright, especially at night, causing glare and making them difficult to read. Each pixel can be made up of 1-3 LED bulbs, and each bulb gives off a halo effect or "glow" around it which can blur the message. Some digital signs utilize every bulb, creating a message within a lit background, which can be very difficult to read. Although it's difficult to find admission of this issue in industry-generated marketing materials, one presenter at a Northeast States Sign Association-sponsored conference stated that digital signs using LEDs are often too bright, making the content blurry and hard to read.

This digital sign showcases the characteristic "glow" around LED bulbs that can impede legibility. The use of all-caps and wide letter-spacing also makes it harder to read.

Community Character

While some of our communities welcome digital signs, others prohibit them, and a number of others are not quite sure what to do about the trend. Municipalities should discuss whether or not digital signs support or detract from the community's desired character. While these sign types may blend in a little along busy commercial highways, they can be more jarring in villages and rural areas. One common example of digital signs outside commercial areas are those for schools, fire departments, and other institutions. While well-intentioned, these signs often contain a lot of information and can be difficult to read, increasing the likelihood of driver distraction.

When considering whether or not to allow digital signs, communities should imagine what it would look like if every allowed property had one. Once a decision is made about what direction is best regarding community character, a municipality can review its sign code to make sure digital signs are properly addressed.

This digital sign (shown from afar and up close) is unnecessarily bright and more difficult to read because every pixel is lit up to create a distracting flag motif in the background. With digital signs, simpler is better; an unlit background can improve readability.

Regulatory Issues to Consider

If your community decides to allow digital signs, here are some items to consider including in your zoning regulations:

Message Hold Time: The amount of time between changes to a message or display, sometimes called minimum display time.

- Prohibit hold times of less than 8 seconds; best practice is a minimum display time of 12-24 hours.
  Model Code Language: *Any digital sign message shall be displayed for no less than 12 hours without change.*

View this digital sign displaying constantly changing messaging, a wide variety of flashing/scrolling transitions, and message sequencing. The result is confusing and distracting.

Transitions: The method by which the message changes. Special effect transitions like circles, diamonds, and "jaws" are distracting.

- Prohibit the "sequencing" of messages (when only a portion of the message is displayed at a time).
- Require instantaneous changes without any special effects.
  Model Code Language: *Any change of message shall be completed immediately without pauses and all parts of the message shall change simultaneously*.

This digital sign uses a setting that fades one message into another. The result is a confusing overlap of images during the transition period.

Brightness & Legibility: Overly bright digital signs can be more difficult to read than standard signs, and contribute to light pollution. In general, digital signs with graphics, multiple colors, many words, or small letters are difficult to read, making them more distracting.

- Limit signs to minimal graphics and a maximum of eight words per sign.[5]
- Require single-color text on a dark background.
- Establish clear purpose statements for digital signs.
  Model Code Language: *No sign shall be of such intensity or brilliance as to impair the vision of a motor vehicle driver or to otherwise interfere with the driver's operation of a motor vehicle*.
  Model Code Language: *No sign shall be of such intensity or brilliance that it interferes with the effectiveness of an official traffic-control sign, device or signal*.
  Model Code Language: *Digital signs should be clear and easy to read, without excessive text, colors, graphics, or other features that reduce their legibility*.
- Require signs to automatically dim based on ambient light, and limit brightness to 0.2-0.3 footcandles over the ambient light level at a specified distance based on the sign area.[6]
  Model Code Language: *Digital signs shall utilize automatic dimming technology, as certified by the manufacturer, to adjust the brightness of the sign relative to ambient light so that at no time shall a sign exceed a brightness level of 0.2 footcandle above ambient light*.
- Require a black screen in case of malfunction.
  Model Code Language: *All digital signs shall contain a default mechanism that will cause the sign to revert immediately to black screen if the sign malfunctions*.

Size: Many codes limit the total digital sign area; codes can also specify a maximum percentage of a sign's area that can be digital.

- Limit the total sign area and the digital portion of a sign (e.g., allow a maximum of 25 to 50 percent of a sign area to be digital).
  Model Code Language: *No more than 30% of the total square footage of any sign may be devoted to digital signage*.

Video & Audio: Some digital signs include video and/or audio capability. These can be extremely distracting.

- Prohibit video. If video signs are allowed (such as for a drive-through order screen), require them to be motion-sensor activated so they are only 'on' when a vehicle is present.
- Prohibit sound or auditory components.

Footage of a video fuel pump sign.

Location: Digital signs are most prevalent on commercial corridors, but their proliferation raises concerns for driver distraction.

- Limit digital signs to commercial or highway business zones.
- Prohibit vehicle-mounted and other mobile digital signs, except those authorized by the Department of Transportation.
- Limit the number of digital signs to one per property.
- Limit their proximity to other digital signs.
  Model Code Language: *One digital sign is permitted per site. A minimum distance of 400 feet shall be required between digital signs*.

Enforcement: Include an enforcement clause allowing the Zoning Administrator to require changes should issues develop.

Model Code Language: *The Zoning Administrator shall have the authority to require changes to any digital sign that, in the opinion of the Zoning Administrator, is malfunctioning or operated in a manner that causes or creates excessive glare or intensity of light, visual interference or blind spots. Such changes may include, but are not limited to, requiring that the digital sign be turned off, dimmed, fitted with shields to deflect light, or such other changes as may be required to eliminate the condition*.

Digital Billboards: According to a report for the National Cooperative Highway Research Project, "Of those research studies that have addressed driver distraction and roadside billboards, nearly every empirical study undertaken since 1995, including [those] sponsored by the outdoor advertising industry, have demonstrated that there is an adverse relationship between distraction and digital billboards."[7]

- All of our local communities already prohibit off-premise billboards; an extension of that prohibition to include digital billboards would be appropriate.

The future of digital billboards?

This Russian Start-up Wants to Put Billboards in Space. Astronomers Aren't Impressed, Discover Magazine, Jan. 14, 2019 [Image credit: Orbital Display]

Legal Considerations

Use Variance or Area Variance?

In municipalities or districts where digital signs are expressly **prohibited** by the zoning code, there is often confusion about whether an applicant would need a use variance or an area variance to seek relief from the code. This question can be complicated and depends on the specific code language for each municipality. While the particulars of the zoning code must be carefully evaluated to determine the proper course of action, if digital signs are expressly prohibited in your zoning code, they will most likely require a use variance. We encourage communities to check with their legal counsel when such matters arise.

Are Local Groups Immune from the Sign Code?

Many of our communities prohibit digital signs, but sometimes local schools, fire departments or other civic groups want to erect digital signs and believe they are immune from local zoning. While there may be some instances where local zoning requirements can be relaxed for such groups, digital signs may not be one of them. In the matter of Ravena-Coeymans-Selkirk Central School District v. Town of Bethlehem (2017), the court found in favor of the Town, which first issued a violation when the school district constructed the prohibited sign type, and then issued a denial when the school district requested a variance to allow the digital sign.[8] In its denial of the variance request to allow the sign, "the ZBA provided rational reasons for its determination, including a concern for traffic safety due to the sign's brightness and potential to be more distracting and hazardous to passing motorists than an ordinary sign… That determination was not arbitrary or capricious."[9]

To Glow Or Not To Glow

Communities should carefully consider the long-term implications of whether and, if so, how to allow digital signs. While those who own digital signs enjoy their eye-catching nature and the ability to update content quickly, communities must contend with issues of safety, light pollution, and visual impacts. It is worth noting that digital sign manufacturers' marketing materials often state that digital signs are designed to be attention-getting. It is difficult to understand how they can be attention-getting for the sign owner and not be a safety hazard or visual intrusion for the community.

Municipalities must decide what is more important – the benefit to the digital sign owner, or the safety and visual quality of the community. Through local regulations, municipalities have the power and the right to prohibit or permit digital signs as they see fit.

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[1] Swedish Study Shows Digital Billboards Distract Drivers, Scenic America.
[2] Do Digital Billboards Waste Energy?, New York Times, December 20, 2010;
[3] Illuminating the Issues: Digital Signage and Philadelphia's Green Future, p.4.
[4] Light Pollution, International Dark Sky Association
[5] Schieber, F., Limrick, K., McCall, R., & Beck, A. "Evaluation of the Visual Demands of Digital Billboards Using a Hybrid Driving Simulator," as summarized in Compendium of Recent Research Studies on Distraction from Commercial Electronic Variable Message Signs (CEVMS), Jerry Wachtel, February 2018.
[6] See measurement distance and method in the International Sign Association's Night-time Brightness Level Recommendations for On-Premise Electronic Message Centers, pages 7-12.
[7] Safety Impacts of the Emerging Digital Display Technology for Outdoor Advertising Signs (2009), Jerry Wachtel, CPE, page 145.
[8] Law of the Land: NY Appellate Court Holds that School District had to Comply with Local Sign Regulations, March 23, 2018.
[9] Matter of Ravena-Coeymans-Selkirk Cent. Sch. Dist. V Town of Bethlehem, Justia US Law.

More Information

See footnotes above for additional resources.

ARTICLES:

Astronomers Secure Changes in Electronic-Billboard Proposal, Capitol Media Services, 2017

Are Schools Exempt From Local Zoning Regulations?, New York Law Journal, 2018

STUDIES:

Compendium of Recent Research Studies on Distraction from Commercial Electronic Variable Message Signs (CEVMS), Jerry Wachtel, 2018.

Illuminating the Issues: Digital Signage and Philadelphia's Green Future, Gregory Young.

A Peer-Reviewed Critique of the Federal Highway Administration (FHWA) Report Titled: "Driver Visual Behavior in the Presence of Commercial Electronic Variable Message Signs (CEVMS)," Jerry Wachtel, 2015.

Effects of Outdoor Advertising Displays on Driver Safety, Preliminary Investigation, Caltrans Division of Research and Innovation, 2012.

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This newsletter was developed by the Dutchess County Department of Planning and Development, in conjunction with the Dutchess County Planning Federation.

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