Review of the Application and Regulation of Electronic Signage in the Town of Prescott Valley and Other Recommended Amendments

Draft: December 7, 2011. Joe Scott AICP, Planner

Purpose and Introduction

The purpose of this report is to assess the use of electronic signage in the Town of Prescott Valley and to provide recommendations for the regulation of electronic signage intended to mitigate the level of distraction and minimize visual impacts while recognizing the rights and objectives of business and/or property owners. This report provides summary background on capabilities of electronic signage, current Town Code provisions related to such signage and recommendations for the expanded usage of the technology as part of the Sign Code. The Recommendations also address other minor amendments intended to facilitate more efficient administration of the Sign Code. The Appendix includes additional information on resource documents, regulatory distinctions, traffic safety, code examples and more LED technical issues.

Background

Electronic signs are made possible by LED (light emitting diode) technology which had been used for changeable message displays since the mid 1970s but were available in three colors: red, green and amber and typically used for indoor systems because the light intensity was insufficient for outdoor applications and the durability of the diodes suffered in the hanging temperatures and weather conditions. As technology improved, manufacturers were able to produce displays that had the intensity and long life required for outdoor use, but was limited in the viewing angle from which they could be effectively seen.

Breakthroughs in this field have made available high intensity LEDs in red, green, blue and amber which make it possible to produce displays bright enough for outdoor use with viewing angles that are equal to, or better than, other technologies currently available. They are energy-efficient, can be programmed and operated remotely, and require little maintenance. In addition, the computer software has evolved such that a broad range of visual effects can be used to display messages and images. The spacing of the LEDs can be manipulated to achieve near-television resolution. The LED sign may be changed at intervals by computer controller, microprocessor controller, or by remote control. A digital sign can be displayed a number of ways (indoor, outdoor, LED boards, LCD/plasma screens, projection screens, kiosk touch displays, etc.). What makes it "digital" is that content can be adapted to communicate real-time information. People call them by different names: electronic message boards or displays, but Electronic Message Center (EMC) is one current standard terminology for this technology as it applies to signage. Any name can work as long as the definition adequate (See Appendix E " What is LED " for more technical Information).
(Source: EDERA)

Electronic/digital signage is the most visually intense form of signage due to its potential to display variations in light and color, movement, and changeable messages and television-quality video. Such signs are generally very successful in attracting and holding viewer attention due to their brightness and changing new messages. Due to their visual intensity though, electronic/digital signs can greatly impact the visual character of a community's environment. As such, there is a need to consider the adoption of regulations for the use of this technology in the Town of Prescott Valley. This report will review regulatory provisions that may maximize benefits to the community and businesses, and avoid potential unsafe, distractive and aesthetically unpleasing situations.

This report assumes that the current Town Code provisions for placement, size and message content are legal and enforceable. It is further assumed that an EMC signs have the same rights that a static,

internally or externally light sign would have for display and content. Since off-site signs, including billboards are mostly prohibited in the Town, the discussion regarding policy standards will focus on on-premise signs along with possible off-site Directory signs per Town Code Section 13-23-040(B). The same standards though could apply to any allowed off-premise signage. As discussed in following sections, a code amendment was made allowing for EMCs as wall mounted signs, subject to a Use Permit. This was intended for specific types of public or event information at specific locations. While the main EMC application if for free standing signs, some consideration should be given to this technology being utilized for wall mounted sings. The consensus is that because of the cost, LED signs are best used in high traffic exposure areas. There is still the possibility of such signs being located on different areas of a property and that multiple displays could be further distracting or aesthetically unpleasing. As with all considered regulatory measures, different standards can be applied to different applications as may be desired.

When considering the operational standards for EMCs it should be emphasized that such electronic signs may just replace any exiting static signs and all the existing standards for size and placement on a structure or property would remain the same. For this discussion, any changes to the current area and placement standards would be considered as a separate issue. As will be discussed, regulations generally involve the brightness of EMC signs, particularly during evening hours; movement; animation allowed to occur; distances from another sign, property lines, residential districts or right-of ways; and duration of messages. Other possible regulations may be applied for dissolve, fade, frame, frame effect, scroll, transition, and travel based on desires of the community, the regulations may be as restricted or as liberal as desired. Also presented in this report are issues related to traffic safety and driver distraction. Within the regulatory powers of the governing body, such issues might also be considered in developing operational standards for EMCs.

Existing Town Sign Code

Town Code Section 13-23-10 provides the purpose of the Sign Code: The purpose of this Article is to provide fair, comprehensive and enforceable regulations that will foster a good visual environment for the Town of Prescott Valley, enhancing it as a place to live and do business. Signs are herein regulated to help maintain the health, comfort and well-being of the public; to prevent adverse community appearance from the unrestricted use of signs; to allow signs appropriate to the character of each zoning district and to promote traffic safety. These regulations are intended to improve the effectiveness of signs by allowing adequate and appropriate signs to effectively identify each business location and type of business conducted while not allowing unsafe, oversize or excessive signs which obscure the buildings and natural beauty of the Town and to protect travelers in the Town from injury or damage as a result of distraction or obstruction of vision attributable to faulty construction or improper location of signs

Town Sign Code History Related to EMCs

The Prescott Valley Town Council adopted Ordinance No. 178 on May 26, 1988, enacting a new Town Code which included Article 13-23 “SIGN REGULATIONS” in Chapter 13 “ZONING”. The Council subsequently adopted Ordinance No. 220 on December 14, 1989, repealing and re-enacting Article 13-23 “SIGN REGULATIONS”. The Council adopted Ordinance 542 on April 10, 2003, amending Article 13-23 “SIGN REGULATIONS” to update them and make them more comparable to those in surrounding communities.

One of the goals recently established by the Town Council and the Planning and Zoning Commission at their joint meeting in December 2004 was providing for certain electronic display and directory signage to accommodate the State Route 69 corridor and other commercial areas. The Council previously adopted a Prescott Valley Parkway Redevelopment Plan to restructure and revitalize the Highway 69 corridor and improve the image of the Town in this “gateway”. This includes making efforts to bring new and significant businesses into the corridor. Staff has observed that success of new businesses in this area

may require certain narrowly-restricted off-site signage within the public right-of-way that identifies them to individuals traveling along Highway 69. In the same vein, planned major commercial uses in or adjacent to the Prescott Valley Parkway and other major road corridors (e.g. the Prescott Valley Convention and Entertainment Center) may require some electronic message displays to advertise upcoming concerts and similar events.

Staff prepared proposed amendments to Article 13-13 (ZOA5-007) that defined an Electronic Information Center to be allowed in all commercial districts as a Wall Mounted Sign subject to a Use Permit and also defined an Off-site Directory allowed as a free-standing sign only as part of the Prescott Valley Parkway Redevelopment Plan. The Planning and Zoning Commission reviewed these proposed amendments at its regular meeting on December 12, 2005 and voted to approve ZOA05-007 and forward to the Town Council. On January 26, 2006, the Council adopted Ordinance No. 648 which merely provided a definition of an Electronic Information Center (below) and what constitutes an Off-site Directory but did not include any specific operational standards for Electronic Information Centers or, allow for the use of EMCs for businesses as individual Free Standing Signs. As such, Use Permits granted by the Board of Adjustment may allow for continual operation but specific standards would have to be applied to each approval and therefore equal treatment would be a challenge

Section 13 23 020 Definitions: Sign, Electronic Information Center

A sign capable of displaying words, symbols, figures, or images that can be electronically changed by remote or automatic means. Such signs shall include the following modes of operation:

1. Static. Signs which include no animation or effects simulating animation.

2. Fade. Signs where static messages are changed by means of varying light intensity, where the first message gradually reduces in intensity to the point of not being visible and the subsequent message gradually increases in intensity to the point of visibility.

3. Dissolve. Signs where static messages are changed by means of varying light intensity or pattern, where the first message gradually appears to dissipate and lose visibility simultaneous to the gradual appearance and visibility of the subsequent message.

4. Travel. Signs where the message is changed by the apparent horizontal movement of the letters or graphic elements of the message.

5. Scrolling. Signs where the message is changed by the apparent vertical movement of the letters or graphic elements of the message.

At the September 14, 2006 meeting the Town Council approved resolution No. 1461 for a Comprehensive Sign Package for the Town Center, including the Entertainment District and the Events Center. The primary departure from the existing Sign Code was to allow double sided Town Center Marquee Sign being forty-five (45) feet in height and having one hundred (100) square feet of unlimited graphic and video capabilities, being located adjacent to State Route 69 at Centre Court.

On March 31, 2010, Community Development Department staff met with community business owners and sign manufacturers to consider whether it would be beneficial to the community to include freestanding Electronic Information Centers as an option for property identification signage in commercial zoning districts and for shopping center signage. It was discussed that Ordinance No. 648 allowed Electronic Information signage as either Wall Mounted or for Off-Site Directories in all commercial zoning districts subject to a Use Permit but, did not allow for freestanding Electronic Information Centers. The conclusion of the meeting was that such Electronic Information Centers are appropriate also as Free Standing signs and

there is only a need to also allow for this type of Free Standing signage in Section 13-23-04(B), also subject to a Use Permit.

In pursuing this objective Staff presented Zoning Ordinance Amendment ZOA 10-005 to the Planning and Zoning Commission at the September 13, 2010 meeting with a recommendation to allow free standing, on-site Electronic signage with the approval of a Use Permit. It was discussed that with the approval of a Use Permit, operational criteria for illumination brightness and message changes can be applied as conditions of the use. Use Permits can be granted by the Board of Adjustment without an operational time limit [13-21-110 (H)]. Use of an Electronic Information Center may then operate continually subject to any standards included as conditions of a Use Permit.

During this meeting, Staff presented various materials including a technical manual and visual depictions of electronic signage that is utilized elsewhere in Arizona and throughout the southwest United States. After consideration of these materials, the Planning and Zoning Commission expressed concerns with traffic safety and number if signs leading to a "Las Vegas" appearance and deferred action on the ordinance amendment requesting additional specific information be provided by both the industry and Staff regarding application of this new signage technology within other jurisdictions in the state of Arizona.

Staff conducted further researched as to what other communities have done regarding regulation standards for EMCs. Staff has considered if Free Standing Electronic Message Centers might also be allowed subject to a Use Permit, or instead as a matter of right (along with Wall Mounted Signs) with specific standards of operation. If these uses are to be allowed with approval of a Use Permit then policy should be developed for standards regarding placement and location, as well as limitations on the message duration, intensity of flashing and animation, and brightness of lighting during evening hours of LED signs. If it is determined that such signage, both wall mounted and free standing should be allowed by right, then those standards for regulations regarding placement and location, as well as limitations on the message duration, intensity of flashing and animation, and brightness of lighting during evening hours of LED signs should be added to the Town Sign Code standards.

The sign industry itself has been instrumental in providing guidance on how communities can regulate EMCs while still allowing adequate functionality for businesses. Accordingly, Staff contacted representatives from the Arizona Sign Association and arranged for a representative to be in attendance at a Joint Session of Town Council and Planning and Zoning Commission on December 2, 2010 to make a presentation regarding digital display signs as they have recently been approved in various locations in Arizona.

James Carpentier of Carpentier Consulting, L.L.C., and Director of Government Relations for the Arizona Sign Association made a presentation on Electronic Message Centers to the Joint Session covering the following areas: What is an Electronic Message Center?, Applications, Considerations , Frequently Asked Questions, Regulatory Considerations, The Value of Signs and, Questions. The presentation was intended to better illustrate the operation and display properties of the Electronic Message Display (EMC) signs and consider criteria for illumination brightness and message changes that can be applied as conditions of a Use Permit or to such signage allowed as a matter o right in certain zoning districts. There was no formal action on the matter and it was suggested that Planning Staff to again further study the subject.

<u>Recent Court Decision in Regards to Electronic Signage</u>

As reported in the Arizona Republic November 18, 2011

On November 17, 2011 the Arizona Court of Appeals ruled that electronic billboards along state and federal highways violate the Arizona Highway Beautification Act's ban on intermittent light. The decision could have far-reaching effects in Phoenix and other Valley cities. Phoenix alone has 52 digital billboards, most of them along freeways. Digital billboards are illuminated signs that have more in common with

television than with a standard sign. The messages on the boards change every eight seconds, enabling billboard companies to sell the location to numerous advertisers. In recent years, they have spread around the Valley, generating controversy along the way. In 2008, Scenic Arizona and the Neighborhood Coalition of Greater Phoenix filed suit challenging the Phoenix Board of Adjustment's approval of an American Outdoor electronic board along Interstate 17 near Glendale Avenue. A lower court ruled against them, and they appealed. The appeals court noted in its ruling that it had no guidance on what constitutes intermittent light from other legal or legislative decisions. The law, put in place in 1970, long before digital-billboard technology was available, does not define the term. The Arizona Department of Transportation has been inconsistent in its application of the law, the court said, and two legislative attempts to update the law have failed. The court simply said, "We disagree," in response to American Outdoor's arguments that the lighting on the signs is constant and that the change of message constitutes a change in "copy" -- no different from a human hanging a new sign on the structure. "What American Outdoor calls a change of 'copy' is actually a transition from one lighted image to the next lighted image," the ruling said. "Because the combination of LEDs used to display each brightly lit image on the billboard changes every eight seconds, the billboard's lighting necessarily is intermittent." Later in its decision, the court added, "Intermittent lighting does not become exempt from the statutory prohibition merely because of technology that now allows a myriad of lighting options that were unavailable in 1970." It will remain to be seen if the decision is reviewed by the Arizona Supreme Court. For now, it's clear that the Arizona Highway Beautification Act law prohibits off-premises LED signs where the copy changes adjacent to the "interstate, secondary or primary systems". The Appellate Court clearly invited a legislative fix of the AHBA (along the lines of other states) that will allow off-premises LED signs and comply with federal law.

Does this opinion affect the Town? It is to be determined if State Route 69 falls within "secondary or primary systems" but the Scenic case deals specifically with off-premise billboards which is the focus of the AHBA and which has no authority over the regulation of on-premise signs by a local jurisdiction. Staff recognizes though that some of the same visual issues can arise with on-premise signage, as with a billboards adjacent to State Routes, except for the obvious difference in size and spacing. This court decision then emphasizes the need to develop local provisions for LED signs to define and regulate specific visual aspects related to the change in message, transitions and frame effects, any video/animation display and sign brightness as so not relay on vague terms such as intermittent

Summary and Recommendations

Based on direction provided by Council, staff conducted research on technical issues of electronic (LED) signage and the legal and regulatory framework for defining and controlling specific visual aspects related to the change in message, transitions and frame effects, any video/animation display and sign brightness. The main issue is to develop specific standards for the operation of “Electronic Message Centers” in the Town of Prescott Valley. They are already allowed as a matter of right as a “Sign, Wall or Wall-mounted” but with no specific standards. Standards are intended then for existing Wall Mounted and for a “Sign, Free-standing” as defined in Article 13-23. There are also some other sign issues that have been identified by Staff for Code updates to facilitate more efficient administration of the Sign Code. These include; provision for an Integrated Business Center, a Highway Interchange Zone, Directional and Wayfinding Signs, and clarification of allowed Wall Signs on multiple building elevations (sides). Recommendations addressing these issues are provided in the follow section of this report. The Appendix includes additional referenced code suggestions as well as more in-depth research material from the sources referenced therein along with examples to illustrate how other communities have chosen to regulate electronic signage.

Recommendations for EMCs for allowed Wall Mounted and Free Standing Property Identification Signs in Commercial Districts. (Definition for EMCs already provided in Section 13-23-020)

Display: Allowed Sign area may be full color but all images shall be static; no animation, video, flashing or moving light, no sound and sign copy must not have the appearance of moving text.

Transition Method: Shall be instant change method (No special visual effects of any kind should be permitted to accompany the transition between any two successive messages).

Minimum Display Time: The digital (LED) message shall not change more than once every sixty (60) seconds except changes to correct hour-and-minute or temperature information, which may change no more often than once every eight (8) seconds.

Brightness: No Electronic Message Center Sign shall exceed an illumination level of 0.3 foot candles above ambient light as measured using a foot candle meter at a distance of 100 feet from the sign.

Dimming Capabilities: All permitted EMCs shall be equipped with a sensor or other device that automatically determines the ambient illumination and programmed to automatically dim according to ambient light conditions, or that can be adjusted to comply with the 0.3 footcandle measurements.

Maintenance: Any permitted EMC sign that malfunctions, fails or ceases to operate it its usual or normal programmed manner shall be repaired or disconnected within twenty-four (24) hours by the owner or operator of such sign.

Location restrictions:

1. The maximum height of an Electronic message display sign on a free standing sign located within 50 feet of a traffic signal will be limited to 8 feet. The height can be increased 1-foot for every 12 feet in additional setback from the traffic signal to the maximum height allowed for the Property Identification sign.

2. Electronic Message Center signs must be spaced a minimum of 100 feet from flashing warning signs, including but not limited to, school crosswalks, train crossings, and fire stations.

3. When located within 200 feet of a residential use or a residentially-zoned parcel, the Electronic Message Center sign shall be oriented so that no portion of the sign face is visible from an existing or permitted principal structure on that parcel.

Variations on these standards up to video animation may be considered as part of a Comprehensive Sign Package.

Recommendations for EMCs for allowed Wall Mounted and Free Standing Property Identification Signs in Residential Districts.

Code regulations for churches, non profits and schools in Residential areas should be considered because of fears that signage will mar the residential character of a neighborhood. Below are suggestions for regulating LED business signs in residential areas with a Use Permit, or by right.

- An LED sign may not be displayed within 200 feet of a neighboring sign and must be at least 200 feet away from the nearest residence
- The sign lettering must be amber and no other color
- Scrolling text or animations are prohibited.
- A message must be displayed for 60 seconds before switching to the next message.
- The signs must size and height requirements of the residential district.
- The signs must be turned off no later than 10 p.m. and turned on no sooner than 6 a.m.

Recommended definition of a Comprehensive Sign Package

The Town Code does not currently contain a definition and requirements for a Comprehensive Sign Package. Following is suggested language for such:

A Comprehensive Sign Package provides a procedure for flexibility in signage which is not in strict compliance with the provisions of the district regulations under this chapter, but which is appropriate to the character of the development, provides adequate identification and information and promotes traffic safety. This provision also includes any on-site Directional signage associated with a project. This provision includes expanded uses of EMCs as stated in Section _____ to include up to full video animation. This provision is intended for developments defined as Shopping Centers, Integrated Business Centers (see below) other Planned Area Developments over fifty (50) acres in size. Submittal of a request for a Comprehensive Sign Package shall be in accordance with the requirements of Section_____. (See Appendix B.1)

Possible Standards for an Integrated Business Center

It is suggested that in addition to the current standards for multi-tenant uses that allowable signage be expanded for larger projects. (This example is provided in the context of commercial project such as Crossroads or, combined signage for other defined areas). Existing code provisions for multi-tenant uses is addresses in Section 13-23-040(B) below:

Shopping Centers	C-1, C-2, C-3,		(1) sign per shopping center (2) signs per planned area development of 50 acres or more. No more than (1) sign per arterial roadway with a maximum of (2) per project.
		50 sq. ft*	2-5 units/tenants
		90 sq. ft*	6-9 units/tenants
		130 sq. ft*	10-13 units/tenants
		170 sq. ft*	14-17 units/tenants
		200 sq. ft*	20 or more units/tenants
		*aggregate sign areas	No other monument or pole signs shall be allowed in lieu of a shopping center sign. No single sign may exceed 100 sq. ft; however multiple signs may be used for the total aggregate signage allowed.

Suggested additional standards for an Integrated Business Center:

Multi-tenant projects of Fifty (50) acres or more located adjacent to a numbered and route signed State, US or Interstate Highway. Signage allowed by this section is separate from all allowed building wall signage and freestanding identification signs for businesses on a separate parcel, or on a pad site within a project

A. One freestanding sign structure:

1. Maximum height: 45 feet.
2. Maximum square footage. Total sign area attached to the structure shall not exceed 300 sq. feet.
3. Minimum Setback. Signs shall not project into the public right-of-way. Signs shall comply with requirements for vision clearance areas and special street setbacks.
4. Any Electronic Signage subject to EMC standards and shall not exceed 80 percent of the total square footage allowed and included in square footage maximum.
5. Any variation in sign locations and EMC sign operation display up to full video may be approved with Comprehensive Sign Package.

B. One freestanding sign structure per additional driveway entrance access:

1. Maximum Height: 25 feet.
2. Maximum square footage. Total sign area attached to the structure shall not exceed 150 square feet.
3. Minimum Setback. Signs shall not project into the public right-of-way. Signs shall comply with requirements for vision clearance areas and special street setbacks.
4. Any Electronic Signage subject to EMC standards and shall not exceed 80 percent of the total square footage allowed and included in square footage maximum.
5. Any variation in sign locations and EMC sign operation display up to full video may be approved with Comprehensive Sign Package.

<u>Exceptions for Highway Oriented Signs</u>

It is suggested that there be separate standards for single or multi-tenant uses located adjacent to elevated portions or a State Highway.

The following exception applies to signs located in a commercial or industrial district within 200 feet of a numbered and route signed State, US or Interstate Highway.

Any one allowed freestanding identification sign for a single tenant use, Shopping Center or Integrated Business Center shall not exceed 20 feet above the level of an adjacent raised intersection that the sign is located.

<u>Directional and Wayfinding Signs</u>

Section 13-23-020 currently defines Signs, Directional: Signs limited to directional messages, principally to direct and aid the flow of pedestrian or vehicular traffic, such as “one-way”, “entrance”, and “exit”, building address, etc., <u>as well as providing directional information relating to points of interest, institution, facilities and districts.</u>

Allowed Wall Mounted Directional Signs (commercial districts only) per Section 13-23-040(A)

C-1, C-2, C-3, PM, M-1, M-2	4 sq. ft 5 ft high	(1) per building No advertising copy.

Allowed Freestanding Directions Signs (all districts) per Section 13-23-040(B)

Directional	R1L, R1M, R1MH, R-2, RCU, RS	4 sq. ft 5 ft high	(2) per entrance/exit. Used to direct traffic or provide information of a public or quasi-public nature. On-site only.
		24 sq. ft 5 ft high	(2) per internal community within master planned communities of 50 acres or more. On-site only.
	C-1, C-2, C-3, PM, M-1, M-2	4 sq. ft 5 ft high	(2) per entrance/exit On-site only. No advertising text

Since Directional Signs are intended for On-site use only staff suggests that there should be a distinction made between such signage used for on-site identification and directions and signage used for directional information relating to points of interest, institution, facilities and districts. Therefore staff suggests that the definition for Directional Signs pertain only to On-site and be amended as:

Signs, Directional: Signs limited to directional messages, principally to direct and aid the flow of pedestrian or vehicular traffic, such as "one-way", "entrance", and "exit", building address, etc., ~~as well as providing directional information relating to points of interest, institution, facilities and districts.~~

Staff then also recommends that such On-site signs be exempt from permits if they contain no advertising, electronic changing information and are positioned as to not be a traffic or safety issue. For Off-site types of community wide signs relating to points of interest, institution, facilities and districts staff recommends adopting a definition for Wayfinding Signage.

Wayfinding Signage

The Town Code does not presently contain a provision for Wayfinding signage which generally applies to providing off-site directional information signs to help lead the general public to unique, local tourist destinations. Such signs are generally located at key entrance points to a town or city and along routes to specific areas and sites. The following definition is proposed.

Wayfinding Signage: Intended to provide directional information signs to help lead the general public to unique, local tourist destinations. The signs are posted at key entrance points to the Town and along routes to specific areas and sites. Wayfinding signage is reviewed in conjunction with Town Departments, public safety agencies and those public and quasi public agencies listed herein, and is approved through a Comprehensive Sign Package.

There are three basic types of signs that are used in this program:

- Gateway – used at key City entrance locations
- Directional – used for en-route directional guidance within the City
- Destination – used for and displayed near a specific site Specific tourist-oriented businesses will be provided opportunities to purchase site specific signs and directional information signs with the approval of the City.

Only public facilities and unique, local tourist oriented businesses that attract and are open to members of the general public primarily from outside of the Town limits will be considered for posting. These include one of the following type businesses or attractions:

- Museums and Historical sites - located within the Town limits and open to the general public.
- Unique, local tourist-oriented businesses - businesses that have a large regional draw and are unique in type, including wineries, breweries, Farmer's Markets and landscaping with public viewing areas.
- Meeting facilities - designated halls, retreat centers, resorts and similar facilities availed to the public for retreats, conferences, seminars and similar meetings.
- Public Recreation Facilities - public parks, trail systems, and community center.
- Galleries - artesian galleries.
- Unique Location Businesses - Businesses that do not have multiple locations within the State of Arizona that meet at least one of the other criteria listed in this Section.
- Tourist District Overlay - Businesses that attract large amounts of regional and out of- state visits located within a Planned Area Development of other Town's Tourist Districts.

All political advertising, religious sermonizing, and commercial advertising for businesses not meeting the criteria listed above shall not be permitted upon City Wayfinding signage

Proposed Changes to Code Provisions for the Placement of Wall Mounted Signage.

Staff is seeking to clarify the calculation and placement of allowable wall mounted signage. Signage is calculated based on building frontage which is to be defined as the longer wall fronting a street. Signage area will be calculated at 2 sq. ft of sign per 1 lineal ft of building frontage. Signage may also be placed on other exterior street side or interior side of the building per the standards below:

Town code section 13-23-040 A

Commercial Wall Sign Standards: 2 sq. ft of sign per 1 lineal ft of building frontage.

Proposed changes:

1. Buildings on corner Lots with one (1) defined frontage:

   a. Wall signage for buildings with exterior walls parallel to more than one (1) intersecting street shall be calculated on the longer parallel wall which is considered the building frontage.

   b. ~~In the case of buildings which front on more than one street allowable signage must be placed on the side of the building on which it is calculated.~~ No more than ½ of the total allowable signage or a maximum of 1 sq. ft per 1 linear foot of building side wall shall be placed on the second exterior street side or interior side of the building. ~~or the street side or building frontage may be placed on an interior side of the building.~~

2. Businesses with two (2) entrances on non-intersecting streets:

   a. Businesses which have entrances on two (2) non-intersecting streets shall have two (2) building frontages and a second frontage shall be allowed 1 sq. ft of signage per 1 linear foot of building frontage.

b. No more than ½ of the total allowable signage for the main frontage or a maximum of 1 sq. ft per 1 linear foot of building side wall shall be placed on an additional exterior street side or interior side of the building.

3. If the main entrance to a business does not face any roadway, the tenant shall be allowed two (2) square feet of signage per one (1) linear foot of building frontage on the main entrance side of the building.

a. No more than ½ of the total allowable signage for the main entrance side or a maximum of 1 sq. ft per 1 linear foot of building side wall shall be placed on an additional interior side of the building.

4. Allowed signage shall not be placed on the rear of a building except for one Directional sign if access is provided from the rear of the building.

Conclusion

The preceding information was provided for discussion purposes in considering amendments to Article 13-26, Sign Regulations of the Prescott Valley Town Code. Comments and/or questions should be provided to the Community Development Director or his staff and a response will be given in writing or individual discussion. Based on the information received the Director will instruct the preparation of an Ordnance for consideration at a public hearing before the Planning and Zoning Commission at a future date.

Appendices

A: Referenced Primary Sources
B: Note on Highway Beautification Act
C: Comprehensive Sign Package Requirements
D: Supplemental Background Information
-Regulatory Issues
-Traffic Safety
-Brightness and Visibility
-Code Examples

E: What is LED

Appendix A
Referenced Primary Sources

Model Code for Regulation of On-Premise Signs (USSC Model Code).
Andrew D. Bertucci, Richard B. Crawford, Esq.
For; United State Sign Council (USSC) Foundation 2011

Regulation of Electronic Message Display Signs (EDERA)
By Electronic Display Educational Resource Association (EDERA) 20

Sign Legibility, Considerations for On-Premise Signs
By H. Gene Hawkins, Jr., Ph.D., P.E. Hawkins Engineering
In Cooperation with Urban Design Associates

A Framework for On-Premise Sign Regulations
Alan C. Weinstein, Inc. and D.B. Hart, Inc 2009

Digital Billboards Today
Outdoor Advertising Association o America

Signs and Commercial Speech
International Sign Association

Safety Impacts of the Emerging Digital Display Technology for Outdoor Advertising Signs
Submitted Under NCHRP Project 20-7 (256)
Prepared by Jerry Wachtel, CPE
April, 2009

Inside the Wachtel Report 2009 Digital Display Report: A Commonsense Guide
Version 4.7.10, Prepared by Richard B. Crawford, Esquire
Mercer Sign Consultants
For the United States Sign Council

Appendix B
Note on Highway Beautification Act:

The Highway Beautification Act (23 USC 131) of 1965 calls for control of outdoor advertising or billboards within 660 feet of the nation's Interstate Highway System and the existing federal-aid primary highway system. It was never intended to include on-premise signs under its jurisdiction. Since its passage, the Highway Beautification Act has been consistently interpreted as exempting on-premise signs under its jurisdiction. However, in recent years a few state and federal officials have mistakenly sought to regulate on-premise signs using the Act as justification. ISA believes the Highway Beautification Act cannot be used as justification for government officials to regulate on-premise signs. The HBA does not apply to all signs within 660 feet of a primary aid highway or interstate system. 23 USC 131(c)(2) and 23 USC 131(c)(3) of the Act provide exceptions for on-premise signs, including for on-premise electronic changeable message signs. It was never the legislative intent of the drafters of the Highway Beautification Act or its subsequent amendments to place on-premise sign sunder any federal control
(Inside the Wachtel)

Appendix C
Comprehensive Sign Package Requirements

Planning staff will coordinate the plan review with appropriate agencies for any zoning and safety issues. A recommendation for approval will be made to (three options provided):

The Community Development Director, or
Town Council by Resolution, or
Board of Adjustments

Any person aggrieved by the determination may appeal that decision to the_____

Comprehensive sign packages approved under this section shall be evaluated based upon the following criteria:

1. Placement. All signs shall be placed where they are sufficiently visible and readable for their function. Factors to be considered shall include the purpose of the sign, its location relative to traffic movement and access points, site features, structures, and sign orientation relative to viewing distances and viewing angles. In commercial centers in which some tenants are in locations having little or no street visibility, in order to provide identification, wall signs may be placed on walls of the building in which such tenants are located, even though not a wall of the space occupied by those tenants.
2. Quantity. The number of signs that may be approved within any development shall not be greater than that required to provide project identification and entry signs, internal circulation and directional information to destinations and development subareas, and business identification. Factors to be considered shall include the size of the development, the number of development subareas, and the division or integration of sign functions.
3. Size. All signs shall be no larger than necessary for visibility and readability. Factors to be considered in determining appropriate size shall include topography, volume of traffic, speed of traffic, visibility range, proximity to adjacent uses, amount of sign copy, placement of display (location and height), lettering style and the presence of distractive influences. Specific justification must be made if a request is submitted for a freestanding or wall sign to exceed by more than 50 percent any maximum height standard or by 25 percent any maximum area standard allowed in the regular ordinance. There shall be no prescribed limit on the percentage by which a comprehensive sign package may allow a directional sign to exceed the area or height restrictions permitted on the site.

4. Considerations. In making its determination to approve additional signs, staff shall consider the following standards:
    a. The views of or from adjacent properties are not impaired;
    b. The signs do not interfere with public utilities, government uses, transportation, landscaping or other relevant factors;
    c. The width of the street, the traffic volume, and the traffic speed warrant the proposed signage;
    d. The signs do not pose a hazard to public safety.

Minor alterations in sign locations resulting from unexpected conditions on site may b approved by the director of planning and development services.

Submittal Package.

Four copies of the following should be submitted with the sign application.

1. A justification letter describing the request and how the sign structure, materials, and colors are compatible with the project's building architecture. Include a list in outline form of each sign requested, both freestanding and wall, to include verbiage, area in square feet, and height.
2. An inventory and photographs of any or all existing freestanding signs.
3. Preliminary Site/Landscape Plan.
    a. A vicinity map showing the location of the property in relationship to adjoining properties.
    b. Provide a north arrow, date of plan preparation, with subsequent revision dates; project title and address; architect and/or consultant's name, address, and telephone number; property owner name, address, and telephone number.
    c. Provide a data table on the site plan that includes existing zoning and the net site area.
    d. Show property boundaries and dimensions.
    e. Show adjacent street right-of-way, existing and proposed; and existing/proposed street and sidewalk improvements noted to center line.
    f. Show location of conceptual or existing landscape concepts including trees, shrubs, ground covers, berms, and screen walls.
    g. Show location of proposed freestanding signs including dimensions, height, materials and colors, and method of illumination.
    h. Include elevations of buildings showing wall sign locations with dimensions.
    i. When more than one sign is located on a property, or where more than one building or business is located in a single development project, such as a shopping center, a comprehensive sign package shall be submitted demonstrating consistency and uniformity among signs within the project. The requirements of a comprehensive sign package shall apply to all businesses within a related project, even if the properties have been subdivided. Revisions or amendments to the comprehensive sign package shall require documentation from all tenants on the property prior to approval.

Appendix C
Supplemental Background Information
Regulatory Issues
Traffic Safety
Brightness and Visibility
Code Examples

Consideration of Regulatory Issues:

It is understood that local officials have some legal authority to regulate the aesthetic appearance of their communities. The International Sign Association (ISA) states that, while this authority properly applies to regulating the physical appearances of homes, buildings, streets, trees, etc., some important limitations apply to regulation of various communications media, including on-premise signage. ISA recognizes that the commercial speech embodied in on-premise signs is subject to certain protections under the First Amendment of the United States Constitution. The combination of words, symbols, colors, fonts, shapes, textures, etc., on commercial, on-premise signs presents a unique and recognizable message that is valuable to sign users and potential customers. The total presentation of a sign is inseparable from its message, and aesthetic restrictions that limit this presentation could result in the loss of creative expression, loss of conspicuity and readability, or perhaps in de facto censorship of commercial speech. Successful businesses typically prefer to have aesthetically pleasing signs that are easy to detect and read.

Likewise, trademark usage plays a vital role in our consumer economy, as it allows consumers—at a glance—to form a familiar mental association with known information. Congress adopted the Federal Lanham Trademark Act, 15 U.S.C. §1051, et seq., in an effort to preserve and protect the integrity of federally registered names, marks, emblems, slogans, and colors. The Act specifically prohibits any unit of state or local government from requiring the alteration of such marks for display purposes. The visibility, identity, and brand recognition afforded by trademarked logos on signs plays a powerful role in consumer choice and the success of a business.
(Source:ISA)

The history of the regulation of electronic signs has been largely marked by polar extremes in regulation. A number of zoning and sign codes have treated such signs as any other sign, with no special regulations. Others have attempted to prohibit their use in the entirety, largely out of concerns for traffic safety, and in some cases in the stated interest of aesthetics. Community attitudes toward viewing digital images have changed nationwide, with personal computer use and exposure to electronic signs becoming widespread. People are simply accustomed to the exposure to such displays, more so than in years past.

Conversely, some have argued that municipalities have a legal basis under the First Amendment to ban or severely restrict EMC technology based on aesthetic concerns alone. Several questions should be thoroughly explored at the outset: (1) can a benefit to the community be substantiated or quantified in an objective fashion, without reliance on subjective or individual opinions? (2) if one municipality can ban EMC signs based on aesthetic considerations under the First Amendment, then all municipalities across the United States can implement such a ban. Therefore it follows that all sign users can be denied what is essentially more modern sign technology, and the entire EMC sign industry can be extinguished, if a ban can be implemented under the First Amendment, based on aesthetics.

These and other questions should be given appropriate consideration. Another area where municipal regulation could create unforeseen legal challenge is in regard to the frequency that an EMC sign can change its message. A local Code provision that limits the ability of an EMC to change its message to once every 24 hours, or even once every hour, is essentially a *de facto* ban on EMC technology. Given the significant investment that a sign owner must make in acquiring an EMC sign, severe restrictions on the ability of the sign owner to utilize said EMC will serve as a substantial deterrent to the acquisition of the technology. The very purpose of the EMC technology is to allow a sign owner the ability to communicate

information and different messages in a shorter period of time, and if that ability is severely restricted, the utility of the sign is substantially diminished. The bottom line for municipalities is that there are a wide variety of tools available in creating equitable time, place and manner EMC regulations, and these regulations can be custom-tailored for each municipality or specific zoning district. Different transition operations may be acceptable in different locations. For example, communities like Las Vegas accept full animation as a community standard, whereas others accept full animation only in urban core locations where a sense of visual vitality and excitement is desirable. Some communities may desire not to have an area with such visual stimuli, and elect to prohibit animation everywhere. However, in such a community, fade or scrolling may be acceptable forms of message transitions for static displays. In the most conservative communities, static displays with no observable transition between messages may be the only acceptable course.
(Source: USSC Model Code)

Consideration of Traffic Safety Issues

The most prominent, current, comprehensive and often referenced document on the subject is the 194+ page 2009 National Cooperative Highway Research Program (NCHRP) Report on Outdoor Advertising Signs that use Digital Display authored by Jerry Wachtel, a human factors researcher based in Berkeley CA. The Wachtel Report (Report)report was funded by the National Cooperative Highway Research Program (NCHRP); NCHRP is administered by the Transportation Research Board (TRB). In the Report, the terms Digital Billboard (DBB) and Electronic Message Centers (EMCs) are used jointly, inter-changeably, and at times separately. There have been rebuttals to the study and the findings have not necessarily translated to laws but because the scope of the study it invariably is offered by some as evidence of driver distraction by EMCs.

Others have suggested that drivers engage in a wide variety of activities while operating a motor vehicle. Some activities that drivers engage in have a positive effect on motorist performance, even though the driver's eyes are away from the road. Examples of this would be checking the rear view mirror, checking the side mirrors, or checking the speedometer. Other activities that drivers engage in have a demonstrated negative effect on motorist performance– most notably cell phone use and texting while driving. Finally, other activities appear to have no effect either way – positive or negative – on driver performance, and EMC signs could fall into this category. Elements of the Wachtel report are summarized in the following section along with counter arguments to that report to illustrate the range of opinions on this subject.

The Wachtel Report (Report) was intended to address Digital Billboards (DBB) but states: To the average motorist, the difference between billboards and on-premise signs is transparent. Generally, despite the fact that such displays may use the same technologies as billboards, the owners/operators of these signs are represented by different organizations, and they have been regulated quite differently than have roadside billboards. On-premise sign regulation is typically accomplished through local zoning codes, and may, in general, be far more variable and likely less stringent with regard to the means of the display, display characteristics, or the size of the sign than comparable controls on billboards. Many such codes have changed little in recent years, despite the growth of digital technology for on-premise displays.

From the traffic safety perspective, it is possible that the risk of driver inattention and distraction is higher for some on-premise signs than for some DBBs, because on-premise signs may be larger and closer to the road, mounted at elevations closer to the approaching driver's eye level, and placed at angles that may require excessive head movements, In addition, many such signs may display animation, full motion video, sound, and other stimuli. For transportation agencies and traffic safety organizations concerned about the risks of driver distraction, digital on-premise signs should not be overlooked as a potentially important near-term concern.

Strictly from the perspective of driver safety, agencies might want to consider restrictions for on-premise sign operations at least as rigorous as those for billboards, as well as restrictions on size, height, proximity to the right-of-way, and angular placement with regard to the oncoming driver's line of sight. Of all of the guidelines proposed in this report for DBBs, there may well be an equal or greater need to consider similar controls for on-premise signs. In addition, consideration must also be given to such signs' capacity for animation, flashing lights or other special effects, and full motion video.
(Source: Wachtel Report)

Background, Recommendations and Retort to the Wachtel Report

Nearly 30 years ago, the Federal Highway Administration (FHWA) published the first comprehensive review of the literature on the safety impacts of electronic billboards. FHWA, through the Highway Beautification Act, had, and still has, the authority to regulate off- premise advertising signs (billboards) adjacent to Federal Aid Highways, and these regulations prohibited, in part, any signs that utilized "flashing, intermittent, or moving lights". In the late 1970s, the sign display technology in common use permitted little more than digitally displayed time and temperature information, although some signs could display several lines of text and crude, cartoon-like graphic images. Even then it was possible to change the displayed sign messages simply and quickly in real time, and it was possible for these signs to display a number of different visual effects, such as fade, dissolve, flash, and others. The billboard industry took the position that signs using this technology did not present any of the visual characteristics prohibited in the FHWA regulations, and, therefore, should be permitted under the existing regulations. Because the manufacturers of such signs and their potential users saw a bright future for this technology, and because of FHWA's concern about their potential to distract drivers, the industry presented its case to the U.S. Congress. As a result, the FHWA Office of Research was asked by the agency's Office of Right-of-Way to investigate what was known about such signage when used for roadside advertising, in anticipation of a possible update to the agency's regulations. The product of this effort was a comprehensive and critical review of all available literature in the field, some dating back 30 years or more. Wachtel and Netherton termed these new signs "commercial electronic variable message signs," or "CEVMS." Because this technology was so new, the authors found little research that had been done with such signs, and therefore had to rely on research that had been conducted with traditional, fixed, billboards. As a result, although they were able to identify specific safety issues and concerns raised by CEVMS, especially when combined with their review of accepted needed, and recommended a specific program to accomplish this. Unfortunately, the proposed research was not pursued.

In 2001, with outdoor advertising signs using newer, more powerful technologies, and capable of much higher fidelity displays with higher luminance levels and immediate wireless display and message updates transmitted remotely, FHWA undertook a follow up project to bring its understanding of the state-of-the-art and –practice up to date, and to again propose a direction for research. Although this study did not undertake a critical review of the literature, it brought to bear recent research and psychological constructs on inattention and distraction. During the 20 year gap between the publication of the first two FHWA studies, as well as more recently, a number of other researchers have reviewed the same early studies (along with more recent studies that have since become available), and reached essentially the same conclusions. (See, for example, Bergeron [1996a], Wallace [2003]).

The latest LED technology enables roadside billboards (and on-premise signs using the same technology), to (a) present images, symbols and characters that are extremely bright (such that they can be easily viewed in full sunlight), (b) with visual fidelity on a par with broadcast video, (c) on displays that can be changed instantly and kept on the screen for as long (or short) as desired, and (d) on signs that can be much larger than traditional 14 ft. by 48 ft. billboards. As a result, the question has again arisen as to whether and how these signs should be regulated in the US. Presently, the States are asking FHWA for guidance. While it proceeds with its current research project FHWA has issued interim guidance that addresses characteristics of CEVMS including: message duration, transition time, brightness, spacing, and

allowable locations (Shepherd, 2007). Unfortunately, these guidelines are based on little sound empirical data, and, in several cases, are so subjective as to be open to multiple interpretations. As suggested above, the potential impact from these latest technologies goes far beyond a simple replacement of traditional, static billboards. On premise advertising signs, traditionally given much more freedom by FHWA and local authorities, are increasingly using the same LED technology now appearing on billboards. Shopping centers, auto malls, and many other local businesses are finding that such signs are affordable, and that the display capabilities they offer are unprecedented.
(Source: Wachtel Report)

A response was provided in the document: Inside the Wachtel 2009 Digital Display Report: A Commonsense Guide, Version 4.7.10, Prepared by Richard B. Crawford, Esquire, Mercer Sign Consultants, For the United States Sign Council, 2010. The author contends that the study does not prove or demonstrate that Outdoor Advertising Signs with Electronic displays (DBB or EMCs or CEVMS) cause traffic accidents or create so much Driver inattention that there are crashes. What the "Wachtel" report does is advance a theory that Drivers at times glance at Electronic Billboards for longer periods of time, thereby creating driver inattention or so-called "distraction"; and that this inattention, based on the glances at the Digital Billboards (DBB), causes accidents. Up to this time, opponents of Billboards and Outdoor Advertising Signs have used the political process and our Court system to oppose these signs under the pretext that Billboards and Outdoor Advertising Signs should be restricted and eliminated for aesthetic reasons, and for reasons based on the Highway Beautification Act. What the 2009 NCHRP Wachtel Report presents us with is a theory, advanced by a presumed unbiased researcher, that is not supported by any direct evidence, not based or supported by any new research by the author, and is contradicted by research conducted by reputable universities and professionals in this field. In addition, the NCHRP Wachtel Report goes out of its way to dismiss and "debunk" any research that has been conducted on EMC signs where no driver distraction or accident issues have been found.

The 2009 Wachtel NCHRP report exists in a broad context. That is why questions can be legitimately raised about the 2009 NCHRP Wachtel Report's objectivity and impartiality, and the validity of its assertions, particularly when used by those that oppose EMC signs and modern technology. Items of note in this review of the Wachtel report: The actual Recommendations contained in the 2009 NCHRP Wachtel Report are surprisingly limited in scope in regard to Digital Signs used on Outdoor Advertising Sign structures. The Wachtel Report includes a very basic set of recommendations, covering among other items: minimum message display duration; message sequencing; amount of information displayed; brightness, luminance and illuminance. All of these items are already being regulated or controlled by governmental agencies and end users.
(Source: Inside the Wachtel)

Recommendations From the Wachtel Report

In spite of the extensive review of this subject by the Wachtel Report, there is still controversy and disagreement due to lack of definitive scientific evidence on the details of distractibility. There is also a political side and legal side as has been discussed. The guidelines presented in the report are really within the same realm as those recommended by the various sign industry organizations such as the United States Sign Council (USSC) and Outdoor Advertising Association of America (OAAA) and are provided to further clarify the justification for regulatory measures as they apply to on-premise signage at the local level.

Based on the knowledge gained from the research reviewed in this project, as well as research conducted earlier and reviewed previously, good human factors practice, and guidelines or regulations developed or under consideration in jurisdictions throughout the US and world-wide, the report prepared a set of recommendations that State and local government agencies as well as private roadway operating

authorities may wish to consider for use. The report recognized that there are not yet comprehensive research-based answers to fully inform such guidance or regulation, and, given the complexity of the issue and the number of factors involved, it may be years before such results are available. Nonetheless, the report found that the research conducted within roughly the past ten years has quite consistently demonstrated empirical concern about driver distraction from roadside billboards, and has identified a number of DBB location and operational characteristics that seem to exacerbate the risk and/or consequences of such distraction, that the need for guidelines and/or regulations can be met within our current degree of knowledge.
(Source:WachtelReport)

Suggested Guidelines and Recommendations

MINIMUM MESSAGE DISPLAY DURATION (Message Display or, Hold Time).

Perhaps the most contentious issue to be addressed in guidelines or regulations can be found in debates about the minimum duration of a message displayed on a DBB. For it is here that the goals of the DBB owner and those of the highway safety specialist are most at odds. Since roadside outdoor advertising is sold, to a large extent, on the number of drivers that pass the sign on a daily or hourly basis, and since certain times of day (e.g. rush hour) provide a larger audience, it is clearly to the sign operator's benefit to minimize the time for which any given message is presented so as to be able to offer more messages per unit time. There is, perhaps, a minimum display time below which both advertisers and regulators may agree that message display is unreasonable – for the advertiser because the time interval is too brief for a message to be read; for the traffic safety expert because the display obviously appears to "flash," and flashing signs are almost universally prohibited.

Authors are not aware of any research that has been conducted on the effects on distraction of the duration of time that a message on a DBB remains visible before changing to the next message. The OAAA has, periodically, issued guidance to its members on minimum display duration. It recommends 4 seconds. The FHWA (Shepherd, 2007) has recommended a minimum 8 seconds duration, and the OAAA reports that 41 States have enacted message display minima, ranging from 4 to 10 seconds. To our knowledge there is no empirical basis for any of these recommended or required display intervals. Indeed, as discussed below, good human factors practice would suggest that minimum display duration should differ with sight distance, prevailing speeds, and other factors.

Without the benefit of research, authors rely on human factors principles when attempting to develop a meaningful standard for minimum message duration. There are two human factors concerns that help to inform the analysis for this issue. First, it is widely understood that bright lights and visual change can draw the eye to a stimulus that is brighter than the surroundings, and/or exhibits movement or apparent movement. DBBs possess these properties, particularly at night and when they can be seen from considerable distances. In addition, the Zeigarnik Effect suggests that drivers will be attracted to attend longer to a display whose message changes as they approach it, in an effort to "complete" the viewing experience; in other words, to be able to look at a changeable message sign until he or she has seen the "complete" message. The simple way to minimize both of these potentially distracting effects of DBBs is to reduce to a minimum the likelihood that any given driver will observe an actual message change or to see more than a single displayed image. Given that any driver may come upon a given DBB at the moment of message change, regardless of the message duration, this objective cannot be met. However, it is not unreasonable to place a lower limit on message display duration to ensure that it is highly likely that motorists will be unable to see more than two successive messages (which would, by definition, include one message change). This can be accomplished by determining the sight distance and the prevailing speed (or the posted speed limit) for a road on which such a DBB appears, calculating the time for which a given DBB will be within the view of approaching drivers, and setting the minimum message duration at that interval or greater. Several jurisdictions have adopted this approach (see, for example,

TEC, 1989; TERS, 2007). This is also the approach that was followed by the New York State Department of Transportation during the development of its draft regulations (NYSDOT, 2008a). The result of this analysis in New York was a proposed requirement for a minimum message display time of 61 seconds (This proposed requirement was substantially reduced after a public comment period [NYSDOT, 2008b]). Of course, for different sight distances and different prevailing speeds, this minimum message duration would be different. Although a case-by-case process of setting minimum display durations would be optimum for traffic safety, it is likely that for both regulatory and enforcement purposes and for the ability of sign owners to establish standardized display intervals (and, hence, standardized advertising rates), it would be more practical for a road authority to establish only a small number of display duration minima, based on roads within their jurisdiction that operate with different speed limits and traffic characteristics.

> **Recommendation:** It is recommended that the following formula be used for calculating a minimum acceptable DBB display duration: Sight distance to the DBB (ft) / Speed Limit (ft/sec) = Minimum display duration (sec).
>
> (A basic example might be made from the LED Viewing Table (page_) illustrating that the maximum viewing distance for a 6" letter is 300 feet. If located on State Route 69 the 300 feet / 45 MPH = 6.6 Seconds). This is only a general example of a minimum message hold time without knowing all the variables.

INTERVAL BETWEEN SUCCESSIVE DISPLAYS (Message Transition)

There is little disagreement between those roadway authorities which have promulgated guidance or regulations concerning the interval between successive displays. It is clear and consistent that this time interval should be as close to zero as possible. Some jurisdictions define the change interval as "instantaneous," others describe it as 0.1 s or less. The reason for this position is simple. Given that it is a combination of brightness and motion (real or apparent) that attracts a viewer's gaze to a DBB, a perceptible dark or blank interval between successive displays will increase the sense of apparent motion (i.e. bright-dark-bright is more visually compelling than bright-bright).

> **Recommendation:** Regardless of how it is operationally defined, the interval between successive displays should be essentially zero, such that an approaching driver cannot perceive any blanking of the display screen.

VISUAL EFFECTS DURING TRANITION

If there is not desired Transition then there should be no visual "special effects" of any kind during the transition between successive messages. It is clear that the screen should transition from one message to the next with no perceptible dimming or blanking of the display, and with no visible effects such as fade, dissolve, or animation. Different jurisdictions have described such prohibited effects differently, but the purpose is the same – a seamless, imperceptible transition from one image to the next.

> **Recommendation:** No special visual effects of any kind should be permitted to accompany the transition between any two successive messages. (Of course, it is assumed that no special visual effects are permitted during the time that any message is displayed on the screen).

AMOUNT OF INFORMATION DISPLAYED.

Other factors held constant, the more information that is presented on a DBB, the longer it will take an observer to read the message and the more likely it will be that drivers will slow to read the

message, adversely affecting traffic flow and safety. This concern is exacerbated in situations when a driver might want to memorize or memorialize part or all of a message displayed on a DBB. Dudek (2008). About 85% of drivers can begin reading a message about 800 ft upstream of the sign if the sign uses character heights of 18 in. At a reading speed of one word per second(demonstrated in numerous studies), this translates to maximum message lengths of eight words at 55 mph, seven at 65 mph, and six at 70 mph . One must keep in mind, however, that these message lengths assume a message optimized for legibility and readability. To the extent that message fonts, typefaces, colors, color contrast, and other factors detract from readability, these message lengths must be reduced. To our knowledge, no US jurisdiction places restrictions on the amount of information that may be presented on billboards, including DBBs.

As stated above, the amount of information on official traffic signs is controlled as a result of years of human factors research. Both the outdoor (OAAA) and on-premise sign industries (International Sign Association [ISA]) have, from time to time, provided guidance to their members about the relationship between the effectiveness of a sign and the amount of information presented on it. While it is not be within the power of any government agency or road operating authority in the US to dictate the type or nature of display content or presentation, we believe that it could reasonable for such authorities to impose limits on the amount of information that can be presented.

> **Recommendations:** Specific upper limits on the amount of information that might be permitted on DBBs should differ depending upon sight distance, speed limits (or prevailing speeds), and driver task demands imposed by the design and operation of the roadway. Specific recommendations for the design of DBB advertisements are beyond the scope of this report, and, possibly, outside the authority of regulators. This is an area, however, where considerable guidance is available to advertisers and DBB owners from sources inside the outdoor advertising industry as well as human factors and traffic safety experts, and the MUTCD itself. Stronger industry guidance and self-regulation regarding the design of information presentation on DBBs could go a long way toward reducing their potential for driver distraction.

LONGITUDINAL SPACING BETWEEN DIGITAL BILLBOARDS

As noted by the OAAA, different States have widely varying longitudinal spacing requirements for billboards in general and DBBs in particular. These requirements are typically described by the distance in feet that the nearest billboards must be spaced from one another. Often there is a different spacing requirement for billboards on opposite sides of the road.

From the perspective of potential driver distraction, however, longitudinal billboard spacing should not be based on absolute distance, but upon whether two or more such billboards are within the driver's field of view at the same time, and, consequently, whether the unsynchronized changing messages on such billboards can distract by conveying the appearance of flashing. Accordingly, longitudinal spacing minima may vary depending upon prevailing travel speeds, sight distance, and topography, and thus may vary considerably from one location to another, even within the same jurisdiction.

> **Recommendations:** Governments or roadway operating authorities should establish minimum longitudinal spacing requirements for DBBs such that an approaching driver is not faced with two or more DBB displays within his field of view at the same time. This minimizes the risk of distraction and ensures that a flashing effect (that may be caused by two or more different signs cycling through messages on different programs) will not occur. Any such longitudinal spacing requirements should address signs on both sides of the roadway. If a consistent spacing

requirement is appropriate or necessary within any particular jurisdiction, then the most conservative spacing consistent with the above requirements should be established.

Staff Note. There is a direct correlation between message time and spacing. A longer message hold time will diminish the impact of closer interval spacing of signs.

PLACEMENT WITH RELATION TO TRAFFIC CONTROL DEVICES

Beyond the design and operational characteristics of DBBs themselves (brightness, display duration, etc.) perhaps the most important DBB characteristic with impact on traffic safety is the placement of such signs in relation to driver decision and action points, and to the traffic control devices (signs, signals and markings) that aid drivers in these decisions and guide them in these actions. Specifically, it is understood that the cognitive demands on drivers is greatest (other factors held constant) when they must position themselves to take an exit, enter a freeway, reduce or drop lanes, merge with other traffic, change route, etc. Code examples for the City of Phoenix following sections provide such recommendations.

Sign Brightness Standards

EMCs that are too bright can be offensive and ineffective. EMC brightness is an issue where sign users, the sign industry, and the planning community have a common goal: ensuring that EMCs are appropriately legible. We know the messages that these signs convey can be rendered unattractive and perhaps even unreadable if they are programmed too bright. That's why many sign companies recommend to their customers that in order for these signs to be most effective, their brightness be set at such a level to be visible, readable and conspicuous.

In 2008, the International Sign Association (ISA) retained Dr. Ian Lewin of Lighting Sciences to help the industry develop scientifically-researched, understandable recommendations for EMC brightness. Dr. Lewin is a past chair of the Illuminating Engineering Society of North America (IES), and is greatly respected within the lighting field. His work for ISA was conducted with the input of experts within the sign industry. Dr. Lewin's full report can be found at www.signs.org. *As a result of this research, the recommended brightness level for on premise EMCs is 0.3 foot candles above ambient light conditions when measured at an appropriate distance. This is a lighting level that works in theory and in practice.* The research and the recommendations contained in this report pertain only to EMCs, not traditionally internally illuminated signs, such as these channel letter and neon signs below. EMC's use a different lighting technology than most of these types of signs, and as such the scientific approach differs.

Most electronic displays are designed to produce sufficient brightness to ensure clear legibility during daylight hours. However, daytime brightness settings are usually inappropriate for nighttime viewing. The following general methods are used to dim an electronic display for appropriate nighttime viewing:

1. *Manual Dimming.* Using this method, the sign operator dims the display in response to changing ambient light conditions.
2. *Scheduled Dimming.* Sunset-sunrise tables allow an electronic display to be programmed to dim at the same time that the sun sets and rises. This method is generally acceptable, but is more effective when used as a backup to automatic dimming controls capability, such as photocell technology.
3. *Photocell Technology.* An electronic display that utilizes photocell technology can automatically dim as light conditions change. A photocell sensor alerts the display to adjust brightness according to ambient light conditions.

There are two generally accepted measures of brightness in the sign industry; illuminance and luminance. Illuminance, the preferred method, is a measure of the amount of light intercepting an object at a given distance from a light source and is measured in footcandles or its metric equivalent, lux. Illuminance can be measured with a footcandle meter (also known as a luxmeter), which are relatively inexpensive ($100-1000) and commonly available. The footcandle meter should be accurate to two decimal points for accurate measurements. The second method, luminance, is an absolute measure of the amount of brightness that is being emitted from a light source and is usually measured in candelas per square meter, also known as "nits." Luminance can be measured by use of a “nit gun”, which are expensive ($3,000) and difficult to procure. The preferred method of measurement is illuminance using a footcandle meter because a measure of luminance fails to account for ambient light conditions.

Recommended brightness Standards in footcandles

Example Electronic Message Display (EMC) Lighting Criteria:

The illumination of an EMC shall conform with the criteria set forth in this section.

A. EMC Illumination Measurement Criteria: The illuminance of an EMC shall be measured with an illuminance meter set to measure footcandles accurate to at least two decimals. Illuminance shall be measured with the EMC off, and again with the EMC displaying a white image for a full color capable EMC, or a solid message for a single-color EMC. All measurements shall be taken perpendicular to the face of the EMC at the distance determined by the total square footage of the EMC as set forth in the accompanying Sign Area Versus Measurement Distance table.
B. EMC Illumination Limits: The difference between the off and solid-message measurements using the EMC Measurement Criteria shall not exceed 0.3 footcandles.
C. Dimming Capabilities: All permitted EMCs shall be equipped\ with a sensor or other device that automatically determines the ambient illumination and programmed to automatically dim according to ambient light conditions, or that can be adjusted to comply with the 0.3 footcandle measurements.

Recommended brightness Standards in nits

Most industry representatives recommend using the footcandle illuminance standards. Some communities have adopted luminance standards in nits. It really depends on what equipment is available for measuring brightness levels. Generally daytime levels are not an issue and the concern is with nighttime brightness levels. However, most EMC standards do require automatic adjustment for ambient light conditions such as cloudy days.

Example Electronic Message Display (EMC) Lighting Criteria:

All electronic display signs must be constructed, operated, or otherwise function in such a way as to not exceed the provisions of this paragraph:

1. At the time of installation, electronic display signs may be illuminated to a degree of brightness that is no greater than 7,500 nits between sunrise and sunset and no greater than 1,000 nits between sunset and sunrise.
2. The person owning or controlling an electronic display sign must adjust the sign to meet the brightness standards in accordance with these standards. The adjustment must be made immediately upon notice of non-compliance from the director.
3. All electronic display signs must be equipped with a mechanism that automatically adjusts the brightness in response to ambient conditions and equipped with a means to immediately turn off the display if it malfunctions, and the sign owner or operator must immediately turn off

the sign or lighting when notified by the director that it is not complying with the standards in this section.

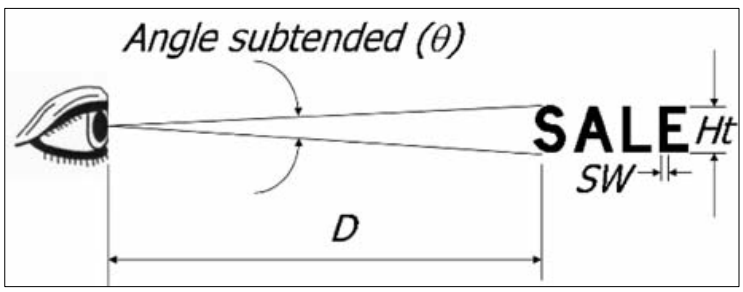
Message and Letter Visibility

The focal point of a sign is the message within the sign. For the message to be visible, it must encompass a visual arc large enough to be discernible by the eye. As applied to reading text at a distance, the human arc can distinguish a stroke width (SW) of 1 minute and a letter height (Ht) of 5 minutes for someone with 20/20 vision. For 20/40 vision, the respective values are 2 minutes and 10 minutes. Figure 3 illustrates the concept of the visual arc. Equation 1 provides the formula that defines the relationship between these elements. By combining Equation 1 with the threshold criteria for visual angle, it is possible to establish a legibility index for observers of various visual acuities. For 20/20 vision (5 minute arc for letter height), the corresponding legibility index is 57.3 feet per inch of letter height (ft/in). For 20/40 vision, the legibility index is 28.6 ft/in. Table 2 indicates the legibility index associated with various Snellen visual acuities using Equation 1. These values are consistent with traditional rules of thumb for the legibility of traffic signs.

Equation 1

$$\tan(\theta) = \frac{Height}{Distance}$$

Figure 3



Table

Snellen Visual Acuity	Visual Angle of Letter (minutes)	Legibility Index (ft/in)
20/10	2.5	114.6
20/20	5.0	57.3
20/30	7.5	38.2
20/40	10.0	28.6
20/50	12.5	22.9
20/60	15.0	19.1

The 2009 Manuel of Uniform Traffic Control Devices (MUTCD) states that signs should be designed using a legibility index of 30 ft/in. In most states, a minimum visual acuity of 20/40 is typically required to obtain or renew a driver license. This equates to a legibility index of about 29 ft/in. In comparison, the MUTCD recommends a legibility index of 40 ft/in. Given that on-premise signs use a range of design characteristics that may reduce legibility to a level less than that used with traffic signs, a legibility index of 30 ft/in would be appropriate for use in a model sign ordinance and would address a wide range of users, sign characteristics, and viewing conditions. Of all the factors affecting legibility, size has the greatest impact. The sign message must have adequate size first. Legibility of a sign message of inadequate size cannot be significantly improved by increasing the luminance or contrast. From a relative standpoint, an increase of a given percentage in message height will result in a greater legibility improvement than an equal percentage increase in luminance or contrast.
(Source: Sign Legibility)

This is summarized to mean that for the average viewer (within an allowable viewing angle) there is a visibility ratio of 40-feet in distance for each 1-inch of letter size. The Industry has developed suggested distance ranges for electronic sign capabilities shown in the table below:

Table LED Sign Viewing Distances Table

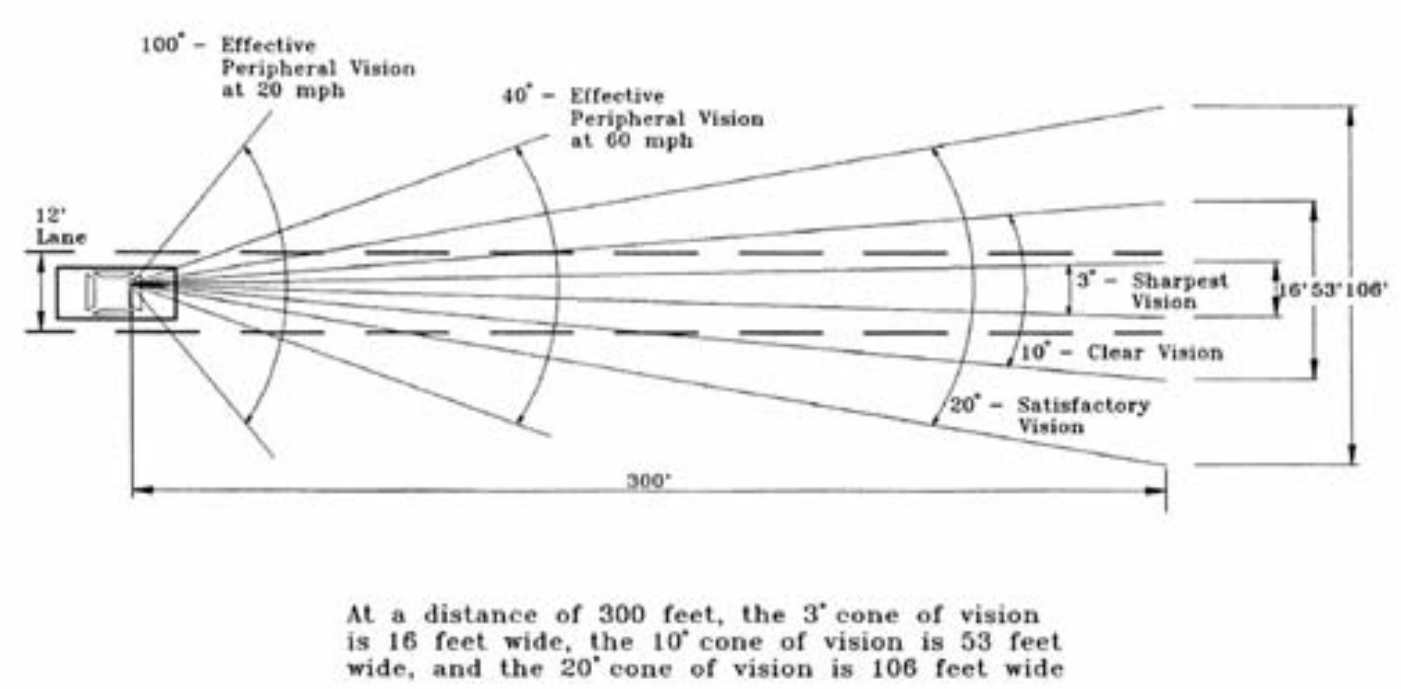
Character Height	Min Distance		Max Distance
2"	10'	-	100'
3"	15'	-	150'
4"	20'	-	200'
6"	30'	-	300'

Staff observes that the specific visual content of a sign such a lettering size, digital or not, should be decided by the sign owner and manufacturer. Research evidence for proper message size may be relevant to discussions regarding if a particular sized sign at a particular location is even a practical sign and, that if certain signs are too small perhaps they are not even safe. Staff has not seen any code examples regulating the actual message size, only duration, transition method and times and brightness which are further discussed.

Location and Angle

Finally, a sign with adequate size, luminance, and contrast serves no purpose and cannot be read if it is located where it is not visible to the viewer. There are many aspects to on-premise sign location. Unlike traffic signs, on-premise signs are not typically located close to the edge of the road. They must be placed on private property behind the right-of-way line. In addition to the offset from the road, they may be placed at a range of heights above the road. Finally, the orientation of the sign with respect to the viewing direction may affect its visibility. A person's sharpest vision occurs when they are looking directly ahead. As a stimulus moves away from the visual axis, it is more difficult for the observer

to detect and read the stimulus. This ability to see and read a sign is illustrated in Figure 6, which shows that the clearest vision occurs within a 3 degree cone centered on the visual axis (Texas Highway Operations Manual 1992). Clear vision occurs within a 10 degree cone, satisfactory vision within a 20 degree cone. For reading purposes, the visual field is 10 degrees or less. A driver's ability to observe and react to a sign outside the cone of vision drops rapidly outside this limit.



However, objects outside the cone of vision can be detected in peripheral vision. When stationary, peripheral vision is almost 180 degrees. As speed increases, the driver's ability to detect objects at the limits of peripheral vision decreases as indicated in the figure above. The ability to detect a sign is related to the sign luminance and any motion in the sign.
(Source: Sign Legibility)

Staff Note: With regards to concerns about multiple EMCs on State Route 69, Staff observes that the efficacy of such signs may be greatly diminished because of the distance to the property line off of the travel lane. ADOT r-o-w is 300' plus frontage roads putting sign visibility well beyond the 20 percent range. There is also the issue of deciduous trees located either in the ADOT r-o-w and/or the Parkway improvements that could block sign messages along sections of the corridor.

How Do We Regulate?

This report has reviewed the concepts that go into making a sign functional for its intended purpose and reviewed those aspects of an on-premise sign that is protected under the U.S. Constitution. Information is now provided to address aspects of a sign that can be regulated through a local sign code. The focus should be on the operations used for the change in message, and frame effects that accompany the message display and brightness. The community may also want to consider traffic safety issues and interval of signs that have a changing message. Many of these transition operations and frame effects are quite subtle, or otherwise acceptable from a community standpoint. Along with brightness, it is now

possible to define these operations, in the code itself, with sufficient specificity to be able to enforce the differences between what is acceptable and what is not.

Review of EMC Regulatory Distinctions

There are different ways to define regulatory measures but based on the preceding information the following Four Key Regulatory Distinctions are appropriate to address the issues that are unique to the operational capabilities of EMC's.

1. Message Hold Time
2. Transition Method (a.k.a "Frame Effect")
3. Transition Duration
4. Brightness

This constitutes "Setting the "Speed Limit" on Electronic Display

Regulatory Distinction #1: Message Hold Time. How long a message must remain fixed in place before it can transition to another message? The shorter the hold time, the more beneficial it is for the user / business. Provides ability to communicate sequential messages (directions, event times).

Regulatory Distinction #2: Transition Method (a.k.a. Frame Effect) Examples include: Fade, Dissolve, Travel, Scroll, Fly in, Zoom in Etc…

These Transition Methods can be summarized in four easy to understand levels (Levels 1 –4).

Level 1 Static Display Only (messages changed with no transition)
Level 2 Static Display with "Fade" or "Dissolve" transitions, or similar subtle transitions and frame effects that do not have the appearance of moving text or images
Level 3 Static Display with "Travel" or "Scrolling" transitions, or similar transitions and frame effects that have text or animated images that appear to move or change in size, or be revealed sequentially rather than all at once
Level 4 Full Animation, Flashing and Video

The message transitions and frame effects are probably the greater focus, from a sign code standpoint. It is during the message transition or frame effect that the eye is most likely drawn to the sign. What is acceptable is a matter of community attitude. Flashing is a frame effect that is prohibited in many communities, but other more subtle transitions can be accepted. It is relatively easy to define four basic levels of operational modes for message transitions that can be incorporated into a sign code:

Regulatory Distinction #3:Transition Duration

How long it takes the transition method/frame effect to go from one message to the next.
(Idea: Keep transition to one second or less to minimize community complaints.)

Regulatory Distinction #4: Brightness/Luminosity

Luminosity Restrictions – Because of the potential brightness of such signs there is a need for standards as to how bright any sign can be. Displays need to have a built in auto dimming feature as well as a manual adjustment. Discussed in the Model and adopted Code example are provisions for regulating the illumination level of EMCs particularity in the evening and during the day.

Developing Policy and Standards

The next decision point for a community seeking to regulate electronic signs is procedural. Some signs may be acceptable always, while the community may determine that others are acceptable only in certain given circumstances. Alternatives to be considered for a sign code are as follows:

- Permit electronic signs "as a matter of right"
- Permit electronic signs with certain transitions "as a matter of right"
- Permit electronic signs, subject to a Use Permit or other review process
- Permit electronic signs, with certain transitions, subject to a review procedure
- A hybrid of the above

EMC technology is not a one-size-fits-all, and different area of Town may require different standards as previous mentioned. One community may find it acceptable to permit electronic signs, with full animation, as a matter of right. Other than a straightforward sign permit, no other review is required. In another community, the sign code structure may permit: 1) Static displays with no transitions as a matter of right, 2) static displays using fade or dissolve transitions as a matter of right in certain commercial zoning districts, 3) static displays using travel and scrolling transitions and animations in certain commercial districts, subject to approval of a special use permit, where the approving board can consider compatibility with surrounding land uses and attach conditions on the rate of message changes, and 4) Fully-animated/video displays in the downtown commercial district only, subject to approval of a special use permit. The level of procedure involved should be tailored to the acceptance level of the community, and the resources available should public review be desired.

The use in Off-site EMC signs may also be discussed in context of selected use in conjunction with a Communities Facilities District or other area of Town when there is a sign that may be placed on Town right-of-way with some agreement for use my multiple property owners. There is perhaps a need for creation of more detailed provision for Integrated Business Centers i.e. Crossroads. Fully-animated/video displays may be appropriate in the downtown commercial district, subject to approval of a special use permit.

Generic Model Code Provisions

This model language suggests code scenarios based on each of the four levels of display transitions that can be applied to different zoning districts or location of the Town. It also provides alternative language, for some scenarios, to either incorporate a special review procedure or not. The model language may be tailored to allow review and approval of Level 3 and 4 perhaps subject to a Use Permit.

Level 1-Static Display *(Message Changed with no Transition)*

a. *Operational Limitations.* Such displays shall contain static messages only, and shall not have movement, or the appearance or optical illusion of movement, of any part of the sign structure, design, or pictorial segment of the sign, including the movement or appearance of movement of any illumination or the flashing, scintillating or varying of light intensity.

b. *Minimum Display Time.* Each message on the sign must be displayed for a minimum of (insert reasonable interval) seconds.
c. *Message Change Sequence.* [Alternative 1: The change of messages must be accomplished immediately.] [Alternative 2: A minimum of 0.3 seconds of time with no message displayed shall be provided between each message displayed on the sign.]

Level 2-Static Display *(Fade/Dissolve Transitions)*

(Would include current Town definitions for EMCs)

Electronic Message Displays may be permitted [with the approval of a Use Permit] [in the _____ zoning districts] subject to the following requirements:

a. *Operational Limitations.* Such displays shall contain static messages only, changed only through dissolve or fade transitions, or with the use of other subtle transitions and frame effects that do not have the appearance of moving text or images, but which may otherwise not have movement, or the appearance or optical illusion of movement, of any part of the sign structure, design, or pictorial segment of the sign, including the movement of any illumination or the flashing, scintillating or varying of light intensity.

b. *Minimum Display Time.* Each message on the sign must be displayed for a minimum of (insert reasonable interval) seconds.

Level 3-Static Display *(Travel/Scroll Transitions and Animations)*

Electronic Message Displays may be permitted [with the approval of a Use Permit] [in the _____ zoning districts] subject to the following requirements:

a. *Operational Limitations.* Such displays shall be limited to static displays, messages that appear or disappear from the display through dissolve, fade, travel or scroll modes, or similar transitions and frame effects that have text, animated graphics or images that appear to move or change in size, or be revealed sequentially rather than all at once.
b. *Minimum Display Time.* Each message on the sign must be displayed for a minimum of (insert reasonable interval) seconds.

Level 4-Video/Animation

(Would include current Town definitions for EMCs)

Electronic Message Displays may be permitted [with the approval of a use permit] [in the _____zoning districts]

<u>Code Examples for Regulation of EMC's</u>

<u>City of Phoenix</u>
The Arizona Sign Association (ASA) in conjunction with Carpentier Consulting LLC has worked with various communities in the State to develop standards for the use of electronic message displays on ground and wall signs. Ordinance No. 5534, regulating such signage was approved by the City of Phoenix July 7, 2010. Under the Phoenix Ordinance electronic message display signs are allowed only on signs located in commercial and industrial zoning districts and for nonresidential uses located in residential zoning districts,

subject to obtaining a Use Permit. Electronic message display signs are allowed only on signs located in commercial and industrial zoning districts and for nonresidential uses located in residential zoning districts, which are subject to obtaining a Use Permit. The size and placement of electronic message display signs will be the same as other ground and wall signs with the following exceptions:

4. The maximum height of an electronic message display sign on a ground sign located within 50 feet of a traffic signal will be limited to 8 feet. The height can be increased 1-foot for every 12 feet in additional setback from the traffic signal to the maximum height allowed for the ground sign.
5. Electronic message displays signs are allowed only adjacent to freeways or major arterial, arterial or collector streets, as designated by the City of Phoenix Street Classification Map
6. Electronic message display signs must be spaced a minimum of 100 feet from flashing warning signs, including but not limited to, school crosswalks, train crossings, and fire stations. Electronic message display sign copy must not have the appearance of moving text or images, flash, contain intermittent or moving lights, or produce the optical illusion of movement. No part of the sign structure or cabinet can move or rotate except as allowed by other parts of Section 705 of the Zoning Ordinance.
7. Electronic message display sign copy must be displayed for a minimum of 8 seconds. The Zoning Administrator or Board of Adjustment can increase the length of the display time if the sign is located within 100 feet of another electronic message display sign. Any increase in display time can be either (i) in 8 second increments, to a maximum of 32 seconds, or (ii) to a longer period if requested and agreed to by the applicant.
8. Electronic message display signs must include photocell technology that will vary the intensity of lighting depending on present-time level of ambient light (e.g. daytime, nighttime, or cloudy conditions). The intensity of lighting must not exceed 300 NITS from dusk until dawn.
9. Electronic message display signs must not be illuminated between 11:00 p.m., and sunrise when it is: 1) located within 150 feet of single family residentially zoned properties and 2) visible from these properties. (This standard applies to the illumination of all on-premise signs in Phoenix per Section 705.C.6.d of the Zoning Ordinance.)

City of Gilbert

ELECTRONIC CHANGEABLE MESSAGE SIGNS. THE ENTIRE FREESTANDING MONUMENT SIGN AREA MAY BE AN ELECTRONIC CHANGEABLE MESSAGE DISPLAY, SUBJECT TO ADMINISTRATIVE APPROVAL AND THE FOLLOWING OPERATIONAL LIMITATIONS:

a. DISPLAY: DISPLAYS MAYBE FULL COLOR. WHEN VISIBLE FROM PUBLIC RIGHTS-OF-WAY, DISPLAYS SHALL BE STATIC MESSAGES. FLASHING OR ANIMATED SIGNS ARE LIMITED TO INTERIOR PROJECT LOCATIONS AND SHALL NOT BE VISIBLE FROM PUBLIC RIGHTS-OF-WAY.
b. MINIMUM DISPLAY TIME: THE DIGITAL MESSAGE SHALL NOT CHANGE MORE THAN ONCE EVERY EIGHT (8) SECONDS.
c. TRANSITION METHOD: SHALL BE BY INSTANT CHANGE METHOD.
d. ILLUMINATION LEVELS: SHALL INCORPORATE PHOTOCELL! LIGHT SENSORS, WITH AUTOMATICDIMMING TECHNOLOGY THAT APPROPRIATELY ADJUSTS TO AMBIENT LIGHTCONDITIONS. DISPLAYS SHALL HAVE A BRIGHTNESS LEVEL OF NO GREATER THAN 0.3 FOOT CANDLES ABOVEAMBIENT LIGHT CONDITIONS AS MEASURED BY FOOT CANDLE METER.
e. MAINTENANCE: ANY PERMITTED ELECTRONIC CHANGEABLE MESSAGE SIGN THAT MALFUNCTIONS, FAILS, OR CEASES TO OPERATE IN ITS USUAL OR NORMAL PROGRAMMED MANNER SHALL BE REPAIRED OR DISCONNECTED WITHINFORTY-EIGHT (48) HOURS BY THE OWNER OR OPERATOR OF SUCH SIGN.

Seymour Indiana

Electronic Message Center Sign:

Location requirements for Electronic Message Center Signs:

a. Setback from residential: the leading edge of an Electronic Message Center Sign shall be a minimum distance of one hundred feet (100') from an abutting residential use or residential zone boundary.

b. Setback from other Electronic Message Center Signs: Electronic Message Center Signs shall be separated from other Electronic Message Signs by a minimum of one hundred feet (100').

c. Orientation: when located within five hundred feet (500') of a residential use or a residentially-zoned parcel, the Electronic Message Center Sign shall be oriented so that no portion of the sign face is visible from an existing or permitted principal structure on that parcel.

d. Location: the Electronic Message Center Sign shall be located on the parcel or lot of the use identified or advertised by the sign.

e. No more than fifty percent (50%) of the facing surface of the sign may be comprised of a changeable electronic or digital display.

Operational requirements for Electronic Message Center Signs.

a. Dimmer control: All Electronic Message Center Signs shall be equipped with an automatic dimming photo-sensor control that automatically adjusts the sign's brightness in correlation with real-time ambient light conditions.

b. No Electronic Message Center Sign shall exceed an illumination level of 0.3 foot candles above ambient light as measured using a foot candle meter at a distance of 100 feet from the sign. This provision shall apply to both new and existing Electronic Message Center Signs within the jurisdictional limits of the City of Seymour. As a prerequisite to the issuance of a permit for a new or replacement Electronic Message Center Sign, the manufacturer of the new or replacement sign shall certify in writing to the building commissioner that said sign meets or exceeds the operational requirement of this section. If an existing Electronic Message Center Sign is not capable of meeting this requirement, such sign shall be turned off between the hours of 10:00 p.m. and 6:00 a.m. regardless of the parcel's zoning classification.

c. Audio and pyrotechnics: audio speakers or any form of pyrotechnics are prohibited in association with Electronic Message Center Signs.

d. If an Electronic Message Center Sign is located within one hundred feet (100') of a residential use or zone, it shall be turned off between the hours of 10:00 p.m. and 6:00 a.m.

e. Timing of display changes: Electronic Message Center Signs shall be restricted to a maximum of thirty (30) display changes per minute between the hours of 6:00 a.m. and 10:00 p.m., and

restricted to a maximum of fifteen (15) display changes between the hours of 10:00 p.m. and 6:00 a.m.

Tacoma WA discussion Items

If digital on-premises signs are allowed, should the standards for digital billboards be adopted for on-premises signs, or should they be modified? Are they a good starting place for the discussion? For reference, the key points of those regulations were:

-No flashing signs shall be permitted.
-All images shall be static; no animation or motion pictures are allowed.
-The minimum static image time is 60 seconds.
-The maximum transition time for images is 2 seconds.
-Brightness, foot-candles. Signs shall not operate at brightness levels of more than 0.3 foot candles above ambient light, as measured at a specified distance, depending on the size of the sign face.
-Brightness, intensity levels. The digital sign may not display light of excessive intensity or brilliance to cause glare or otherwise impair the vision of the driver. Digital sign light intensity exceeding the following intensity levels (nits) constitutes "excessive intensity or brilliance."

INTENSITY LEVELS (NITS)		
	Daytime	Nighttime
Full Color	5,000	125

Hawthorne CA Ordinance for Multi-tenant EMCs

Conditional Use Permit is required.

On multiple tenant developments, no permits for electronic message center signs shall be issued until approval of a master sign program is approved by the Planning Commission.

Only 1 electronic message center sign shall be permitted on a Freestanding Of monument sign. However, in the case of multi-tenant developments the City will not restrict any or all businesses within the development use of the EMC. Where a single tenant or multi-tenant development exists ever multiple parcels, including parcels used for parking, additional electronic message center signs shall be permitted on the basis of it being on a separate parcel.

An electronic message center sign shall not exceed a maximum of 50% of the total sign area allotment permitted for the parcel.

limitations on Electronic Message Center signs:

1. No sign shall display animated messages Including flashing, blinking, fading, scrolling, shading, disolving or any other effect that gives the appearance of movement.
2. No sign shall include any audio.
3. Signs shall display static images only and unless otherwise specified, shall not change more than once every 5 seconds. Transitions from one static image to the next shall appear in simultaneously without the appearance of animation.

Signs shall come equipped with automatic dimming technology which automatically adjusts the sign's brightness based on actual ambient light conditions. No sign shall exceed" brightness level of 0.3 foot candles above ambient light. The reading shall be taken with the meter aimed directly at the message Center at the appropriate pre-set distance.

Appendix E
What is LED

Icatch Displays
Electronic Message Systems
http://www.icatchdisplays.com/

LED stands for Light Emitting Diode. Okay, that still doesn't answer the question, what is an LED?

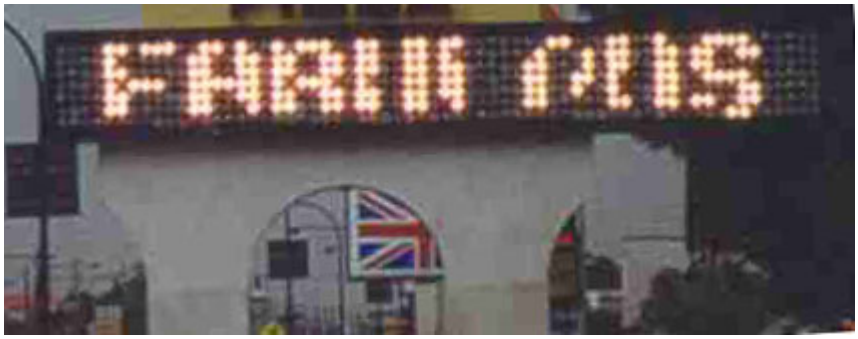
Basically an LED is a small light bulb. However, it is different from incandescent light bulbs in a few key areas:

- They do not have a filament
- They are more efficient
- They have a longer life span

For those that don't know, the filament in an incandescent light bulb is where the light is produced. The filament is heated with electricity and the result is light; sort of. It would be more accurate to say 'The result is light and heat'. Why is that important? Because the object of a light bulb is to produce light which means the energy/electricity used to produce heat is wasted! Have you ever touched a light bulb that had been on for awhile? It took electricity to make the light bulb hot. When your light bulb uses a filament, there is no way around the wasted heat/electricity.

LEDs do not use filaments. That is why they are more efficient, almost all the electricity is used for making light, not heat! In other words, it doesn't cost an arm and a leg to run an LED sign because the LEDs are so efficient. The old variable message signs which used incandescent bulbs ran up massive electric bills of $500 per month OR MORE. With the advent of the LED in signs those electric bills dropped to $50 or less per month.

The LEDs used in most LED Signs are rated to last approximately 100,000 hours (about 11 years). That is a long time.



This is an example of an old incandescent message center

In the old days of variable message signs (which used incandescent bulbs not LEDs) operating the sign was very expensive because you had to have a service contract to have the bulbs changed every month. That alone could cost you $200 or more per month. Luckily the long life of LED signs makes those expensive service contracts a thing of the past.

LED Sign Basics

Now that you know what an LED is, there are 3 industry terms for LED signs you need to understand.

- Pixel
- Pitch
- Matrix

The individual LEDs are grouped together in what is known as a 'pixel'. The number of LEDs in each pixel varies. There could be one LED or there could be 25 LEDs in one pixel.

The major factor which determines the number of LEDs in a pixel is the 'pitch' of the pixels in the LED sign. The pitch is the distance from the center of one pixel to the center of the next pixel. The pitch determines how crisp the image will be.

If there are 2 LED signs sitting side by side and each one is the same height and width but they have different pitches, the LED sign with the smaller, tighter pitch, will have more pixels and thus a better resolution.

Selecting the right pitch when you are purchasing an LED sign may save you money as well as getting you the appropriate resolution for your particular application so make sure you read the section on choosing the right size LED sign.

16 mm pitch 36 mm pitch 89 mm pitch

The third term is 'matrix'. The matrix is made up of the number of pixel high and the number of pixels wide of an LED sign is. The matrix is what determines the physical size of the sign. If an LED sign is 24 pixels tall and 96 pixels wide, the matrix is 24x96.

With monochrome led signs and with an indoor led sign, the matrix determines how many lines of text you can put on the sign as well as how many characters will fit on each line. With programmable color LED signs the matrix determines how much total space you have. A quick word or caution, having the correct height to width ratio is CRITICAL in color LED signs, you should always consult an LED sign professional for help determining the best matrix for a color LED sign.

So to sum it up...

- Groups of LEDs make Pixels
- The distance between pixels, the pitch, determines the resolution
- The number of vertical and horizontal pixels determines the matrix which determines the number of lines in the sign and the number of characters per line.

Color or Monochrome?

The first question you need to ask yourself is do I need a color LED sign or Outdoor Electronic Monochrome LED Displays. Color can be more effective for some applications but not all applications. The only thing you can say about color LED Displays that is true for every application is that it is more expensive than monochrome LED signs.

If you sell insurance there are probably no pictures that will help you sell your product, words will sell your product.

If you sell cars you can definitely sell your product with pictures.

If you answered "No" then properly sized Monochrome Electronic LED Signs are probably the way to go. A properly sized monochrome LED sign is just as, if not more, effective as a color LED sign if pictures and video are not helpful. You will also save a bundle in acquiring the sign.

If you answered yes, you should consider a color LED sign. They do cost more but if images can help you sell, the additional cost might be justified. Talk to an LED sign professional for help determining if a color LED sign is the way to go.

How big should my LED display be?

Properly answering this requires a careful review of the location for the sign as well as the specific application. If you talk to a sign salesperson that does not inspect your property and ask questions about your application, be very wary, they are probably more interested in making a sale than in making sure you get the right LED sign.

There are several factors that must be considered. For instance:

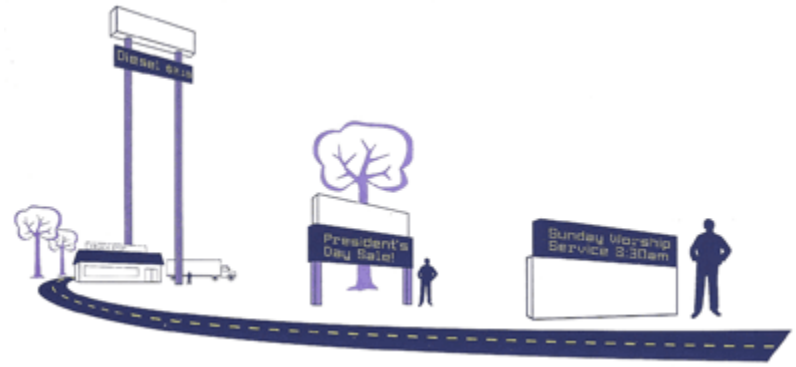
- Speed Limit of Traffic
- Lanes of Traffic
- Stop signs or Stop lights
- Viewing Distance
- Sign Height/Elevation
- Content

And the list goes on.

Of all the items listed above, content is the most involved. If you are getting a monochrome LED sign you need to know what you want to say AND the most effective way to say it. Then you must consider the traffic patterns. The speed limit and viewing distance will affect the viewing time. Your towns sign ordinance can also have an impact here.

Once you have all that information (actually you need more information than that but those are the basics) you can determine your matrix (scroll back up for a review of what the matrix is).

Now you need to determine the correct pitch. A smaller/tighter pitch will make the minimum character size smaller.



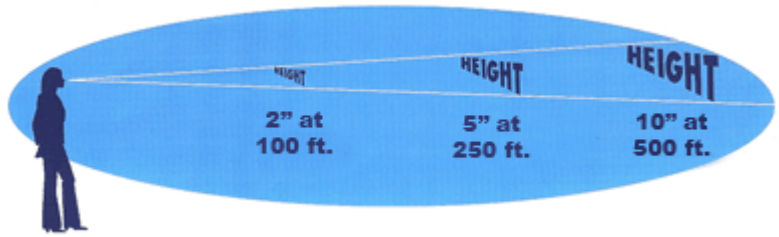
So, if your LED sign will be viewed from a long distance by people in cars travelling 45mph you will need a larger character size to make sure the traffic can read it. That means you will need a larger pitch.

If your sign will be close to the traffic and the speed limit is 25mph you can use a small character size, and smaller pitch, and your message will still be readable.

Determining the matrix and the pitch is even more complicated if you are getting a color LED sign because you must carefully consider the application as well as the aspect ratio.

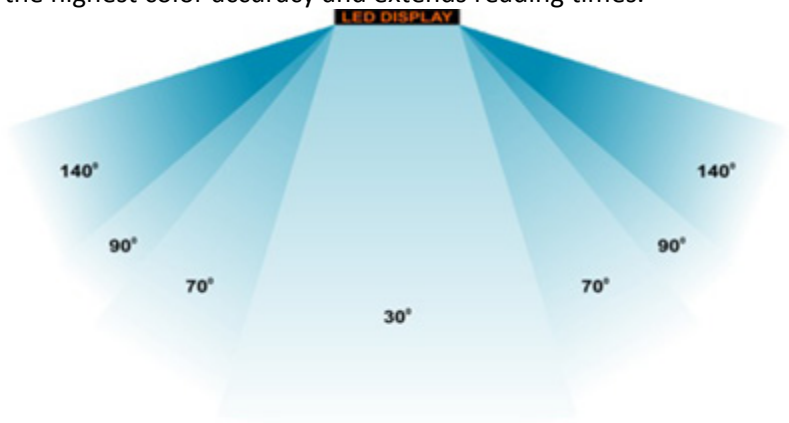
As a rule of thumb, with color LED Displays, the smaller the matrix and the larger the pitch, the grainier the picture on the LED sign will be.

Viewing distance also plays a role in how high of a resolution you need. If the LED sign will be viewed from a long distance you do not need as much fine detail. The closer the viewer is to the LED sign, the more detail you need. You must carefully consider what kind of content you will put on the LED sign and the viewing distance.



Another consideration is the viewing angle of the sign. LEDs can put out a single, narrow beam of light like a flashlight, or they can put out a wide beam across a room like a light bulb. LEDs put out about the same amount of light no matter what type they are - but the "high-beam" LEDs with a narrow angle focus more light into one small spot, whereas the "wide angle" LEDs spread their light across the horizon. So, if you were to stand in front of a sign made from "high-beam" LEDs with narrow viewing angles, you would see an extremely bright sign, as long as you stood directly in front of it, but the minute you walked away from the front of the sign, where the "high beam" is focused, you would see nothing but black.

With wide viewing angle LEDs, the image is visible in consistent brightness and uniform colors throughout the entire viewing range of the display. A quality LED sign will have 140º of viewing angle which maintains the highest color accuracy and extends reading times.



There are 3 ways to build LED signs.

The first is to solder the LEDs directly to the circuit boards AND put a plexiglass face over the LED sign face to weatherproof it. There are several drawbacks to this method. First the plexiglass shield will cause glare from the sun which will make your sign harder to read during the day. Second, beacuse the LEDs are soldered to the circuit board. If one LED goes out you sign has to be turned off, opened up, and an entire board must be replaced. This will cause a quilting effect in your sign where one section is brighter then the surrounding areas.

The second, and next best method, is to solder the LEDs directly to the circuit board but seal the entire face of the sign, without a plexiglass face shield. This eliminates the sun glare problem but it still has all the other drawbacks of the first method.

The third, and best, method is to use individually sealed pixels. With this method each pixel can be removed individually without turning off and opening the sign. This eliminates all the drawbacks of the other two methods.