



45.1.1 Introduction

The guidance in Chapter 45 is intended for the placement of portable HAR devices. The STOC must be contacted if retrofitting a device to an existing system or in any other circumstance where the addition of a traveler information device is being considered.

The HAR system is a low-powered AM or FM radio station which broadcasts messages to motorists who receive signals through standard automobile radios. HAR provides motorist information similarly to VMS but can provide more detailed information. The information broadcast can include:

- Congestion reports,
- Hazardous conditions,
- Travel times,
- Alternate routes,
- Special event information,
- Parking locations,
- Weather and road conditions, and
- Construction information.

HAR systems can be permanent or portable, however WisDOT will only continue to maintain permanent HAR and will not be installing any new permanent HAR. FCC licensing is required, and each HAR site is limited to a maximum of 10-watts of power, unless a special permit is granted. HAR can broadcast either AM or FM radio signals, and the typical message length is up to two minutes.

A HAR installation is made up of six separate components:

- Audio Source
- Radio Transmitter
- Antenna System
- Ground System
- Communication System
- Synchronization System

60.1.1 Needs Assessment

Prior to determining the type and location of a portable HAR, various data needs to be collected, such as:

- Current FCC Licensing Requirements - The designer must obtain the latest copy of the FCC rules (section 90.242)
- Frequency availability - Existing HAR frequencies (airports, convention and visitors bureaus, stadiums, etc.) must be documented, in addition to all other radio frequencies. This list will be used upon determining usable frequencies.
- Availability of alternate routes - An inventory of alternate routes and diversion points is necessary to assist in proper placement of a HAR transmitter.
- Speed limits on HAR routes - The speed limit of a candidate route for HAR will determine the spacing required between the HAR flasher and HAR transmitter
- Site Specific Conditions - Soil properties, terrain, and obstructions for the site in question must be gathered. Uses for this information are explained in further detail in the following sections.

60.1.2 Types

There are three different systems within the HAR category; the one typically used is the 10-watt "Traditional" HAR. This type of HAR is typically used in Wisconsin. For this application, HAR consists of individual transmitter sites (or stations) located along an expressway, with each transmitter broadcasting at a range of 3 to 5 miles. Communications with each transmitter are typically through dial-up telephone, which is a permanent deployment.

Enhanced HAR can transmit at a range of 8 to 12 miles. The transmitter site has a more advanced antenna and pole and broadcasts at more than 10 watts. A special permit is required from the FCC in order to use an enhanced HAR and this permit is harder to obtain than the 10-watt license. This is a permanent deployment. An extended ground plane is needed for enhanced HAR.

Portable HAR transmitters are typically trailer-mounted, with the antenna and grounding plane adapted for a portable application. Portable HAR is typically used for highway construction, incident management and special events with each consisting of a wireless solar power array and cell-phone control. Portable HAR is capable of being transferred from site to site, and has a broadcast range near that of permanently built stations (3-5 miles). Portable HAR is licensed by governmental entities for noncommercial broadcasts that relate to travel, safety and weather.

Synchronized HAR has increasingly become a popular deployment type, using traditional 10-watt transmitters (3-5 mile radius) systematically placed to create a regional "synchronization zone". Motorists hear the same message anywhere within the synchronized zone. Properly deployed, this type of deployment eliminates interference and delivers a universal broadcasts to a synchronized area.

A recent development in HAR technology allows widespread HAR coverage of an entire metropolitan area, with a single transmission from a central source (typically a PC). The central source broadcasts one message to the HAR transmitters in an entire coverage area, but only motorists on affected freeway segments are alerted to the HAR message through use of advisory signage equipped with HAR-activated flashing beacons. These messages are typically generated one of two ways: a computer-generated voice produced from system/HAR software, or via human voice that is recorded on a message-by-message basis, or on a "template" basis where the system software organizes the messages as programmed.

Follow the HAR Design Process checklist shown in the table below:

Table 45.1. HAR Design Process Checklist

1. Collect initial data required for the proposed HAR implementation (see 45.1.1)
2. Obtain licensing and permits. This step must be addressed early in the HAR design process due to frequency requirements, site issues, and duration of the application process. If designing an additional HAR site to an existing system, the designer should crosscheck with FCC requirements to ensure compliance with all regulations. (see 45.3.2)
3. Determine the HAR type required (see 45.1.2)
4. Conduct a HAR site selection analysis (see 45.3.1.2)
5. Conduct final design of the HAR location (see 45.3.1.2)
6. Begin the process to establish electrical service for the proposed location with the local power company. This should be done early in the design process to establish an acceptable electrical service location. (see 45.5.3)
7. Determine the construction details needed for the proposed design, details which need to be modified, and new details which need to be created to provide a complete construction plan. (see 45.5.4)
8. Determine the special provisions needed for the proposed design, special provisions which need to be modified, and new special provisions which need to be created to provide a complete construction plan. (see 45.5.4)
9. Determine the standard specification bid items and procurement items that will need to be included in the estimate and miscellaneous quantities to provide a complete construction plan. (see 45.5.4)