15.1.1 Introduction

The guidance in Chapter 15 is intended for the placement of *new* Closed circuit television (CCTV) cameras as part of new construction projects only. The STOC must be contacted if retrofitting a CCTV camera to existing systems or in any other circumstances where the addition of a camera is being considered.

CCTV cameras are a key part of traffic management systems. The primary benefit of CCTV cameras is the ability to provide visual information required to make informed decisions. CCTV cameras are used for roadway surveillance, verification of incidents detected by other means (e.g., cellular calls, speed detectors, etc.), and for assistance in determining appropriate responses to an unplanned event or incident. Beyond these tasks, cameras can be utilized for:

- Monitoring traffic movements on the mainline and ramps.
- Changeable Message Sign (CMS) verification.
- Verification of stranded motorists and incidents.
- Observing localized weather and other hazardous conditions.

Use of CCTV camera images has expanded outside of Statewide Traffic Operation Center. When local agencies are granted access to the images, CCTV cameras assists in the coordination and efficient use of available resources, such as emergency vehicle deployment. Motorists can access CCTV cameras via the local television stations or the Internet to look at current travel conditions and plan alternate routes to avoid delays caused by incidents, construction, and special events.

15.1.2 Needs Assessment

If there is a need to monitor traffic on the system, CCTV camera should be used. Prior to determining the location of a CCTV camera, various data needs to be collected, such as:

- Corridor spacing requirements (1-mile spacing is typically used in urban areas, where full freeway or arterial coverage is desired. Spot location CCTV camera surveillance may be used in rural interchanges where sight distance is greater and surveillance is needed for incident verification, crash investigation sites, ramp meter operation, or variable message sign verification).
- Site-specific issues or concerns based on an initial site visit (right-of-way, utilities, landscape)

15.1.2.1 Types

Guidelines for choosing the type of CCTV equipment and related hardware are listed below.

- **Dome Cameras:** Should be used for most CCTV camera applications. All moving parts (including pan/tilt/zoom) are internal to the dome, so there is less mechanical failure and maintenance due to weather conditions. Water slides off of the dome exterior so special wiper blades are not needed.
- **Barrel Cameras:** Should be used when extended vertical viewing is necessary (a dome camera can only see to the top of the clear part of the dome) or if there is a special mounting consideration that precludes the use of a dome camera.
- **Infrared Cameras:** Should be used under bridges where there is low light.
- **Inside Dome Cameras:** Should be used inside buildings, such as welcome centers.
- **30 Foot Camera Poles:** Should be used for arterial applications, where a 50-ft or 80-ft camera pole height is not needed to see the roadway corridor. These poles have the option for special powder coat paint (color determined by vendor catalogue at time of procurement) to match existing aesthetic plans.
- **50 Foot Camera Poles:** Should be used for most freeway CCTV camera applications. The height facilitates seeing the roadway for 1/2 mile in any direction, and is typically high enough to be above most tree foliage.
- **80 Foot Camera Poles:** Should be used for locations where terrain and land availability do not allow for the 50-ft camera to view enough of the roadway. These poles are typically deployed in

Interchanges. Also, new technology for cameras is allowing visual distance to be more than ½ mile in a direction (added distance can be from 1-3 miles in a direction) and having a taller pole may reduce the amount of camera pole sites needed for corridor camera coverage.

- **High Mast Light Towers:** Provide for an excellent extended view due to their height but are dependant on the lighting design for location rather than the ideal location from an ITS perspective. CCTV cameras can be installed on new or existing High Mast Light Towers (HMLT) provided that the towers are manufactured with cables and maintenance lowering halos specifically to allow for the installation of a camera on the halo. While the HMLTs manufactured for inclusion of CCTV cameras are made to account for a system in which the video CODEC and communications equipment are installed in an adjacent cabinet, it is possible to install an IP camera, Ethernet radio, and power supply on the halo using the camera power conductors in the tower's cable to power the power supply using 120VAC. Additionally, a 6-foot piece of threaded pipe must be used to extend the drop of the camera to remove it from the glare of the HMLT light fixtures. Close coordination is required with the lighting designer and the party responsible for lighting maintenance.
- **Camera Lowering System:** Should be used for poles taller than 30 feet. This allows for maintenance of the camera without deploying a bucket truck, and one person can perform the maintenance. The Statewide Procurement has 50-ft and 80-ft camera poles equipped with lowering systems. External lowering systems can be applied to camera poles that are currently deployed and do not have an internal camera lowering system (any pole height).
- **Video CODEC:** This equipment is necessary to facilitate the data transfer from the camera to the Operation Center. Video transmission is accomplished through an encoder (deployed at the camera site) and a decoder (deployed at the Operation Center). Communication is facilitated through an ethernet/fiber communication link or a leased line telephone link. Most Video CODEC utilize MPEG2/MPEG4/MJPEG technology for full motion video using 1.5 to 5.0 MB of bandwidth for each camera site.

For specific procurement product information, see Chapter 70.5 State Supplied List. Contact the STOC for product information.

Follow the CCTV Camera Design Process checklist shown in Table 15.1

Table 15.1 CCTV Camera Design Process Checklist

1. Collect initial data	
2. Determine CCTV Camera Type (see 15.1.2)	
3. Assign name to CCTV camera device (see 15.02)	
4. Determine Location of Controller Cabinet (see 15.3.3)	
5. Establish communication Network (see 15.4.1)	
6. Establish Power Service	
7. Prepare underground infrastructure (see 15.3.4)	
8. Perform Cable Routing (see 15.3.5)	
9. Modify/Create construction details and special provisions	
10. Install CCTV camera	
11. Maintenance and reevaluation.	