

## Chapter 29

### Intelligent Transportation Systems Plans

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## Chapter 29

# Intelligent Transportation Systems Plans

### 29.1 General

The incorporation of Intelligent Transportation Systems (ITS) Plans is a relatively new development, yet it is becoming more widespread. This chapter was developed to introduce some standardization for ITS Plans. ITS Plans are usually a component set of plans. Projects with minor ITS involvement may include these features on sheets in the roadway plans set or on the roadway sheets (or on sheets in the signalization plans set or on the signalization sheets if applicable). When prepared as component plans they shall be assembled as a separate plans set complete with a key sheet, tabulation of quantities and all other relevant ITS sheets. When prepared as component plans, the sheets shall be numbered consecutively with the sheet numbers prefixed by the letters "IT".

A complete set of ITS Plans shall include the following sheets:

1. Key Sheet
2. Tabulation of Quantities
3. Plan Sheets or "letter type" plan sets
4. Detail Sheets (as required)

The ITS Plans show the construction details, electrical circuits, and other data relevant to an ITS project. Some of the different systems that may be produced under the ITS component set of plans include, but are not limited to, the following:

- |                                 |   |
|---------------------------------|---|
| 1. Freeway Management System    | 6. Electronic Toll Collection                                 |
| 2. Incident Management System   | 7. Electronic Fare Payment                                    |
| 3. Arterial Management System   | 8. Highway Rail Intersections (under electronic surveillance) |
| 4. Emergency Management Systems | 9. Regional Multimodal Traveler Information                   |
| 5. Transit Management Systems   |   |

In addition, the ITS plans may contain sheets which were prepared separately (perhaps by a sub-consultant) and incorporated into the ITS plans early in the design process (prior to the establishment of sheet numbering). As an option, these may be identified with the following prefixes and placed at the end of the numbered sequence of the ITS plans:

GI-#        Soil Survey and Report of Core Borings normally associated with the ITS plans set.

The Districts have been gravitating toward utilizing a modified plans format for ITS projects. The modified plans format would allow for "letter type" plans and include a table to locate the devices by mile post to three decimal places, plus an offset dimension given for each above-ground structure. Global positioning system (GPS) coordinates can be utilized as supplemental information in the table.

For construction purposes the plans should include the following:

1. Table (spreadsheet) to locate devices by mile post to three decimal places.
2. For above-ground installations, give an offset dimension from the edge of the travelway to the ITS device.
3. For such devices as DMS that require overhead structures, include a cross section using "assumed" elevation.
4. For conduit, include number and sizes.
5. For fiber optic cable, include number of fibers.

Regarding as-built records, aerial photographs may be furnished with the table above to provide supplementary information. The aerials will not include the extra features of the ROW, baseline, or roadway edges being drawn in. The aerials are to be used as a base for the as-built plans with the mile post and offset dimensions provided by the Contractor.

## 29.2 Key Sheet

The key sheet is the first sheet in the component plans set and shall be prepared as described in **Chapter 3** of this volume. The location map, length of project box and contract plans set information are not required on this sheet when shown on the lead key sheet. The index of ITS plans shall be shown on the left of the sheet.

Other data, including name, consultant contract number, vendor number, and certificate of authorization number of the firm (when plans are prepared by a consultant), shall be shown as described in **Chapter 3** of this volume.

If shop drawings are anticipated, the name(s) and address(es) of the Delegated Engineer(s) for shop drawing review(s) shall be shown on the right side of the sheet.

## **29.3      Tabulation of Quantities and Standard Notes**

The tabulation of quantities sheet lists the item numbers, description and quantity of materials. This sheet shall be placed behind the key sheet in plans assembly.

Pay item numbers shall be listed in numerical order. Provisions shall be made to show the original and final quantities per sheet. Pay item notes and general notes that refer to item numbers, description of work to be performed and quantity estimates shall also be shown on this sheet. If space is limited, notes may be shown on a General Notes Sheet.

On contracts with multiple Financial Project ID's, or Federal Aid and non-Federal Aid quantities, provisions shall be made to tabulate and summarize their respective quantities.

## **29.4 General Notes**

General notes pertaining to ITS may be shown on a separate plan format sheet. The general notes sheet lists special ITS design information that is generally not covered in the FDOT Standard Specifications, Supplement or Special Provisions. This sheet shall be placed behind the tabulation of quantities in the plans assembly. On minor projects, general notes may be combined with the tabulation of quantities sheet.

## 29.5 Plan Sheets

### 29.5.1 Format and Scale

ITS Plans shall be prepared on standard plan format. The scale shall be such that all details are clear and legible. See the requirements of **Section 10.1** of this volume as a guide. A north arrow and scale shall be shown at a point of maximum visibility on the sheet.

### 29.5.2 Required Information

The basic information requirements include roadway geometrics, project limits, street names, construction stationing or milepost, curb and gutter, drainage inlets, sidewalks and right of way lines as similarly required on the plan portion of the roadway plan-profile sheets. Those underground and overhead utilities, signing structures, and lighting structures that may cause construction conflicts with ITS components shall be shown. All locations, including existing trees, should be checked for potential conflicts.

If letter type plans are utilized, the table should include at a minimum the device ID, description, milepost, offset, and a comment field. Add an extra column to the table if GPS coordinates are provided for the devices.

All equipment shown on the plan shall be clearly labeled and their respective pay item numbers and quantity indicated. In addition, the following plan elements should be shown:

1. Cabling, fiber optic splicing, and interconnects.
2. System communication devices.
3. Electrical power service equipment and interconnects.
4. Grounding and transient voltage protection details.
5. Structure-mounted or ground-mounted field cabinets for system electronics, maintenance service points, and interconnect.

### **29.5.2.1 Dynamic Message Sign**

Plans for a DMS installation should illustrate the location, placement, and typical details of the following components:

1. DMS display enclosure.
2. DMS controller.
3. DMS support structures (including external walkways, safety railings, ladders, etc.).
4. DMS mounting brackets and hardware.
5. A ground-level access point for maintenance personnel to perform diagnostic work on the sign.

### **29.5.2.2 Highway Advisory Radio**

The design for an HAR installation should illustrate the location, placement, and typical details of the following components:

1. HAR operator workstation and central recording facility.
2. HAR antennas.
3. HAR transmitter and electronics.
4. HAR support structures, signage, and beacons.
5. HAR mounting brackets and hardware.

### **29.5.2.3 Video Display Equipment**

Provide mounting and installation plan sheets for each color video monitor, flat panel display, and rear projection video unit in the video display system. Depict in the mounting plans detailed structural mounting information, including support structures, wall attachment methods, and the weights of the display units. Provide cable routing plan sheets and diagrams for the devices, along with maintenance/service points and structural certification.

The plans should illustrate the location, placement, and typical details of the following video display system components:

1. Video display controller.
2. Operator workstations.

3. Encoders, decoders, multiplexers, and routing equipment.

Develop sheets that detail cross-sections and elevations for all modifications to existing wall systems in the TMC facility and submit them to the Engineer.

For the rear projection video unit mounting and installation plans, include details that illustrate stacking configuration and support design, along with a ventilation and climate control plan. Provide cable routing plans that include detailed connection diagrams for individual and stacked configurations.

### **29.5.2.4 Network Devices**

Plans including network devices should illustrate the following system attributes:

1. System diagrams illustrating network and device interconnect.
2. General network topology.
3. Notes regarding any special configurations or options for specific devices that are required to achieve a specific system function.

### **29.5.2.5 Fiber Optic Cable and Interconnect**

The plans for fiber optic cable systems should illustrate the location, placement, and typical details of the following components:

1. Fiber optic conduits.
2. Fiber optic cables.
3. Fiber optic splices and terminations.
4. Fiber optic cable designating system.
5. Fiber optic cable access points.

## **29.5.2.6 Vehicle Detection and Data Collection**

The plans for vehicle detection systems should illustrate the location, placement, and typical details of the following components:

1. Diagrams illustrating detection system interconnect.
2. General network topology.
3. Notes regarding any special configurations or options for specific devices that are required to achieve a specific system function.

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