

## Chapter 29

### Intelligent Transportation Systems Plans

|          |  |      |
|----------|--|------|
| 29.1     | General.....                                     | 29-1 |
| 29.2     | Key Sheet.....                                   | 29-3 |
| 29.3     | Signature Sheet.....                             | 29-3 |
| 29.4     | Tabulation of Quantities and Standard Notes..... | 29-4 |
| 29.5     | General Notes .....                              | 29-5 |
| 29.6     | Plan Sheets .....                                | 29-6 |
| 29.6.1   | Format and Scale.....                            | 29-6 |
| 29.6.2   | Required Information .....                       | 29-6 |
| 29.6.2.1 | Dynamic Message Sign.....                        | 29-7 |
| 29.6.2.2 | Highway Advisory Radio.....                      | 29-7 |
| 29.6.2.3 | Video Display Equipment .....                    | 29-7 |
| 29.6.2.4 | Network Devices.....                             | 29-8 |
| 29.6.2.5 | Fiber Optic Cable and Interconnect .....         | 29-8 |
| 29.6.2.6 | Vehicle Detection and Data Collection.....       | 29-9 |

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## Chapter 29

# Intelligent Transportation Systems Plans

### 29.1 General

The incorporation of Intelligent Transportation Systems (ITS) Plans is required for projects so identified by the Department. This chapter was developed to introduce standards 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 feasible). When prepared as component plans they shall be assembled as a separate plans set complete with a key sheet, plan sheets, detail sheet(s), tabulation of quantities and all other ITS sheets. When prepared as component plans, the sheets shall be numbered consecutively with the sheet numbers prefixed by the letters "IT".

#### Modification for Non-Conventional Projects:

Delete the fifth sentence from the above paragraph and replace with the following:

When prepared as component plans they shall be assembled as a separate plans set complete with a key sheet, plan sheets, details sheet(s) and all other ITS sheets.

The ITS Plans shall be assembled as follows:

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

#### Modification for Non-Conventional Projects:

Delete Item 2 from the above list.

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

In addition, the ITS plans may contain sheets which were prepared separately (perhaps by a subconsultant) 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 aboveground 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 milepost to three decimal places.
2. For aboveground installations, give an offset dimension from the edge of the traveled way to the ITS device.
3. For devices such as DMS that require overhead structures, include a cross section.
4. For conduit, include number and sizes.
5. For fiber optic cable, include number of fibers.
6. For twisted pair copper cables, include the size and numbers of pairs.

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 Signature Sheet

See **Chapter 30** of this volume for Signature Sheet requirements

## 29.4 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.

Modification for Non-Conventional Projects:

Delete **PPM** 29.4.

## 29.5 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, Supplemental 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.

### Modification for Non-Conventional Projects:

Delete the last two sentences in the above paragraph and replace with the following:

This sheet shall be placed behind the key sheet in the plans assembly. On minor projects where space permits, general notes may be shown on the first plan sheet.

## 29.6 Plan Sheets

### 29.6.1 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.

### 29.6.2 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. Where details normally shown on roadway plans would obscure ITS features, the details may be screened so long as the details remain plainly legible.

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:

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

All equipment shown on the plan shall be clearly labeled. 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.

### **29.6.2.1 Dynamic Message Sign**

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

1. DMS Housing, including details and notes that identify type of display (monochrome, full-color, or tri-color), size of display matrix (height, width, number of lines, and number of characters per line), and type of mechanical construction (walk-in, front access, or embedded).
2. DMS controller.
3. DMS Uninterruptible Power Supply (UPS) system (if required).
4. DMS support structures (including external walkways, safety railings, ladders, etc.).
5. DMS mounting brackets and hardware.
6. A ground-level cabinet for a DMS controller and associated electronic equipment.
7. Telemetry equipment details for remote sensing and control

### **29.6.2.2 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.

### **29.6.2.3 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.

#### **29.6.2.4 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.

#### **29.6.2.5 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.

## **29.6.2.6 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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