

### 2-2.4 Project Orientation

#### **Key Map and Line Index**

A Key Map and Line Index sheet may be required on large or complex projects (i.e. multiple routes, line designations and/or interchanges). Key maps are generally not used on projects with one route, or when the locations of the sheets are sequential. The Key map and Line Index sheet is an aid to clarify relative sheet locations, routes and orientation of alignment lines, or the order of layout sheets when not obvious. The Key Map and Line Index sheet shows all sheet arrangements, routes and alignment lines. The base map or title sheet strip map, which contains all the alignment lines, is an option for developing the Key Map and Line Index sheet. The scale can be adjusted to fit the sheet. Gaps and breaks may be shown where these occur within the project limits.

The Key Map and Line Index sheet identifies the main plan view sheets. Sheets such as Layout, Water Pollution Control, Erosion Control, Contour Grading, Drainage, Utility, Pavement Delineation and Sign Plans are to be shown as needed. The location and orientation of plan view sheets are to be identified with a “clip frame.” Label each clip frame with each plan view sheet identification and number that shares it. A Key Map and Line Index sheet does not replace the need for having Layout sheets.

Sheets such as Stage Construction and Traffic Handling are not to be shown on the Key Map and Line Index sheet as construction areas are not to be repeated within a specific type of plan view sheet. It may be advantageous to have a separate key map for the stage construction section showing the limits for each stage of the project. It may also be advantageous to have

a separate key map for a project with many walls showing an overview of all the various wall locations.

Because of the many landscape plan view type sheets available for use, a Landscape Key Map may be beneficial in identifying the various types of landscape work. Because of the many electrical systems that may be included in an electrical systems bid item or that may be located in the same place, and because electrical systems work is often at spot locations, an Electrical Systems Key Map may be beneficial in identifying electrical systems work. If staging occurs within the Electrical Systems Plans, systems or shared components must not be shown more than once as “proposed work,” but may be shown as existing or already constructed work when appropriate, see Section 2-2.23. If a key map is used for Landscape or Electrical Systems sheets in a project that also has a key map for roadway or wall plan sheets, coordinate the size and orientation of all the key maps with the roadway project engineer for consistency to the extent possible.

#### **Aerial Identification**

An Aerial Identification sheet may be useful in some projects that need to photographically convey unique or specific features to the bidders, the contractor and the Resident Engineer. Only those areas of the project that require a photographic visual should be shown (i.e., toll plaza at the San Francisco/Oakland Bay Bridge). Please note, showing aerial photographs of the entire project is unnecessary.

Aerial photographs are most useful for preliminary plans. The use of aerial photographs in contract plans should be based on engineering need, not aesthetics. Aerial photographs are not a substitute for

required survey and design information necessary to construct a project. Alignment lines, topography, right of way, and contract work are more clearly shown without aerial photographs.

Aerial photographs are not to be used as background for plan sheets such as layouts, drainage, utilities, pavement delineation, etc. They are to be limited only to the Aerial Identification sheets or detail sheets that require emphasis of a specific detail or unique location. In most circumstances, aerial photographs clutter plan sheets and show more physical features (trees, roof tops, grasses, rocks, dirt, etc.) than necessary, obscuring the more important engineering information and items of work.

When Aerial Identification sheets are necessary, station lines and right of way must be shown. If the limits of the project are identified by post miles, key post miles must be shown for ease of location identification. Locations of importance to the project should be identified within a boundary encompassing the specific area and clearly labeled. The same labeling should be carried over to the plan sheets when identifying contract work within that specific area of importance.

The date the aerial photograph was taken and the source of it must be included as a note on the first Aerial Identification sheet. Old or outdated photographs can mislead bidders and contractors about actual field conditions, leading to possible claims and disputes.

The boundary of the aerial photograph should extend far enough beyond the right of way to provide for orientation only. The aerial photograph should never extend to the limits of the maximum clip frame. If there is work beyond the right of way or there are specific

areas identified to assist in the construction of the project, then the aerial photograph should include those designated areas. Specific areas shown beyond the right of way should be directly involved in the construction of the project and be identified in the Right of Way Certification. Aerial mapping should not be plotted at a specific scale and should be identified as “NO SCALE.”

Use of aerial photography on specific plan sheets requires approval from the Division of Design, Office of CADD and Engineering GIS Support, during the development of base maps in the preliminary design stages (usually by 60% completion) NOT at PS&E submittal. Obtain an email from the Division of Design, Office of CADD and Engineering GIS Support unit and include it in the project history file.

### Project Control

A Project Control sheet shall be included in the project plan set when survey and/or photogrammetric data are required for the design of the project. The sheet name is “Project Control.” The sheet identification code for the plan sheet is “PC.”

This sheet shows the horizontal and vertical control used to collect the data. This sheet uses a strip map similar to the title sheet, which identifies the horizontal and vertical control points within the vicinity of the project. A project control monument is a natural or man-made object that represents or references a point of known location and/or elevation. The horizontal datum identified by the California Coordinate System (CCS), Epoch date, and zone, i.e. *CCS83 (2010), epoch 2011.00, Zone 6*, and the vertical datum, i.e. *NAVD88*, must be shown on this sheet. The following note must be included on the sheet, "FOR COMPLETE PROJECT

CONTROL DATA, SEE THE SURVEY RECORDS ON FILE IN THE SURVEYS DEPARTMENT AT THE DISTRICT OFFICE." This note is a cell in the Caltrans cell library (note33). Close coordination with the Survey Department is required to prepare this sheet.

The project control information should be shown on a single plan sheet. The strip map does not need to be plotted at a specific scale and should be identified as "NO SCALE." The following statement is to be shown at the bottom center of the plan sheet, "APPROVED FOR PROJECT CONTROL INFORMATION ONLY." This statement is a Caltrans cell (note36).

The Caltrans standard is to show the northing and easting coordinate values, elevation, station designation, order of accuracy and description in a tabular format with a symbol on the strip map representing the control point.

### **Monumentation**

A monument is a natural or man-made object that is fixed permanently in the land and referred to in a legal description or map identifying the land, controlling the location of a boundary, corner, road, street, highway, or provides horizontal or vertical survey control. Monumentation is the overall process required to meet the legal and ethical requirements relating to perpetuation of the land-net and establishment of the Department's right of way. Monumentation includes locating and perpetuating existing monuments, setting new right of way monuments, and the preparing and filing of maps that completely and accurately depict the relationship between the land-net, the right of way and the project control survey.

Existing monumentation that will be destroyed or impacted during construction must be properly documented and perpetuated in accordance with State law and Chapter 10 of the Survey Manual. If the contractor is required to perpetuate the monumentation, the monuments are to be shown and identified on the Layout sheets.

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