



OC Public Works CAD Standards Manual



JOHN WAYNE
AIRPORT
ORANGE COUNTY



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Chapter 1 - Introduction

Objective of this Document

This Computer Aided Design (CAD) Standard defines the requirements for creating, maintaining and submitting CAD drawings to OC Public Works, herein referenced as OCPW. It establishes requirements for the contents of AutoCAD® or Civil 3d® Drawings (DWGs), including use of paper and model space, handling of externally referenced files, layers to be used, symbology and plotting requirements. It also explains how to correctly organize drawing sheets into drawing sets. Additionally, the Standard explains how to integrate Building and Site Facilities as well as Construction As-Built information into the existing CAD base files. Finally, it instructs how to submit completed drawing sets to OCPW.

Scope of this Document

This document defines requirements for all CAD drawings created or maintained for OCPW, including those drawings developed or used throughout the design, construction, operations, and maintenance phases of a facility or asset's lifecycle, and those exchanged internally at OCPW, or between OCPW and its consultants, agencies, surrounding jurisdictions, and other stakeholders. To facilitate the process, CAD templates (i.e., DWGs with layering, symbology, and object table definitions, but with no populated data) are available from OCPW to facilitate compliance with this document. This standard applies to all consultants and staff responsible for creating or maintaining these drawings. Consultants and staff shall use the latest version of these requirements upon commencement of a project.

Related Documents

This document is related to other documents, some of which contain additional requirements that must be met (i.e., normative references) and some of which contain reference information that may be helpful when developing OCPW CAD DWGs (i.e., informative references). Normative references take precedence over informative reference should there be any conflicts or contradictions. OCPW documents can be provided by the OCPW Project Manager.

Normative References

Relevant requirements in the following documents must be met when developing DWGs for OCPW. Relevant requirements are those that are applicable to OCPW DWGs, unless otherwise specified in writing by the OCPW. These documents include:

- OCPW Project Delivery Manual
- OCPW contracts and agreements that require the delivery of OCPW DWGs.
- If Object Data is required by Contract or Agreement, the fields and values must be as specified in the JWA GIS Standard.
- Airport: If the data being developed is defined as Safety Critical by Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-18 General Guidance and Specification for Aeronautical Surveys, then follow the requirements found here:

https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/74204

- If the data being developed is defined as Sensitive Security Information (SSI) by the Code of Federal Regulations (CFR), Title 49, Chapter XII, Subchapter B, Part 1520, “Protection of Sensitive Security Information (SSI)” it must be handled as required by these regulations. These regulations can be found at:
<https://www.gpo.gov/fdsys/pkg/CFR-2011-title49-vol9/pdf/CFR-2011-title49-vol9-part1520.pdf>
- John Wayne Airport Brand Style Guide
- OCPW Brand Style Guide
- OC Survey Stand Manual

Informative References

The following documents provide additional information that may help developers and users of OCPW DWGs create, update and use the data they contain. Any requirements defined in these documents may be applied at users’ discretion, but are not necessarily required and must not conflict with the requirements of this document. These documents include:

- John Wayne Airport GIS Standard
- National Institute of Building Sciences’ National CAD Standard (NCS), which can be found at:
<https://www.nationalcadstandard.org> A license must be purchased to obtain a copy and use the NCS.

Revision History

This document has and will continue to evolve to meet the needs of OCPW, accommodate requests by consultants that are approved by the OCPW, and enable the use of new technologies. Following is a list of versions of this document and a summary of the changes implemented with each version.

Table 1.1 - Document Revisions

Revision Number	Date Published	Summary of Changes Made
1	June 2021	Initial Version
2		

Consultant Responsibility / Compliance

All communications with OCPW regarding these standards must be in writing. No verbal approvals of any will be given or considered valid regarding any aspect of these Standards. Due to the importance of CAD submittals, final payment on OCPW projects that require DWG submittals will be contingent upon CAD deliverables complying with the minimum requirements of this standard.

Should a project require multiple consultants, the prime consultant, as team leader, will be responsible for the implementation of these standards. The prime consultant will also be responsible for all deliverables to OCPW.

Request for Variance

Consultants and OCPW staff members are encouraged to recommend changes to this document that they feel will improve their ability to meet the OCPW needs. These changes may be clarifications, additions, or deletions. Requests to add layers shall follow the layer naming conventions specified in the latest version of the NCS. Any changes that deviate from the requirements in this document will not be implemented until approved by the OCPW. Approved deviations must be implemented before the first drawings of a contract are submitted. Change requests shall be submitted using the form provided in Appendix C to the Project Manager.

Software Requirements & Resources

Airport DWGs shall be compatible with AutoCAD, AutoCAD MAP 3D®, or AutoCAD Civil 3D® version 2018 - 2020. Users who do not use this software shall ensure that all requirements defined in this document are met in DWGs they create and convert from other software, without any loss of quality or accuracy when they are opened in Autodesk software.

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Chapter 2 – Drawing Objects

The proper structure and organization of CAD files facilitates efficient retrieval and effective maintenance of CAD data. File standard elements such as coordinate systems, geometry linework, drawing and sheet models, sheet assembly, and naming conventions all support a sustainable system of CAD files for OCPW and its consultants.

Objects Types

Objects that depict real-world features must be of the specified geometry type and conform to the rules listed below. The following geometry types are permissible as specified.

- **Points** features such as manholes, valves, and airfield lights shall be symbolized by the appropriate AutoCAD point or block. If blocks are used, the insertion point of the block must be at the actual physical location of the feature. Other features that are connected to the object represented by a block must connect to the block at this insertion point and not at the edge of the block.
- **Lines** features may be represented by lines or polylines.
- **Polygons** features may be represented by closed polylines or polygons.
- **Civil3D Design Features** may be represented by features lines, 3D polylines, survey figures, alignment, profiles, and sections.

Objects in drawings that are used to convey graphical references or alphanumeric information, such as annotations, text, dimensions and leader lines may use other AutoCAD object types, including construction lines, revision clouds and wipeouts. All text used, whether it is annotations associated with features, values within title blocks, or other text, shall be multiline text (MTEXT).

Table 2.1 – Geometry Types

Geometry Types			
Permitted		Non-Permitted	
Lines	Block	Spline	Circle
2D and 3D	MTEXT	Donut	Arc
Polygon	Construction Line	Region	Text
Revision Cloud	Ray	Ellipse	
Hatch	Dimension	Solid	
Wipeout	Multileader		
Point	Feature Lines		
Survey Figures	Alignment		
Profiles	Section		

Coordinate System

Objects in CAD drawings that depict real-world features shall be drawn using the California State Plane Coordinate System, Zone VI referenced to the North American Datum of 1983 (NAD 83), 2011 adjustment (FIPS: 0406; WKID: 6426). This coordinate system is defined based on the following parameters, which may be used by surveyors or geospatial analysts when confirming the coordinate system:

Projection: Lambert Conformal Conic

False Easting: 6561666.666666666

False Northing: 1640416.666666667

Central_Meridian: -116.25

Standard Parallel 1: 32.78333333333333

Standard Parallel 2: 33.88333333333333

Latitude Of Origin: 32.16666666666666

Linear Unit: Foot US (0.3048006096012192)

Geographic Coordinate System: GCS_NAD_1983_2011

Angular Unit: Degree (0.0174532925199433)

Prime Meridian: Greenwich (0.0)

Datum: D_NAD_1983_2011

Spheroid: GRS_1980

Semimajor Axis: 6378137.0

Semiminor Axis: 6356752.314140356

Inverse Flattening: 298.257222101

Vertical coordinates (i.e., Z), as required, shall be based on the North American Vertical Datum of 1988 (NAVD88) referenced to the latest geoid (specific name or clause for exemptions).

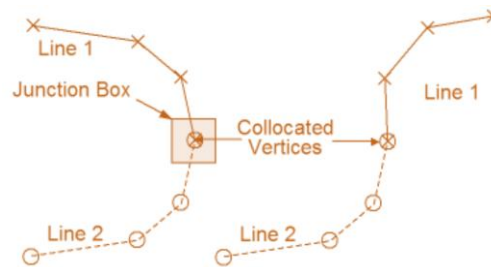
Units for both horizontal and vertical data will be the U.S. Survey Foot (1200/3937 meters).

Topology

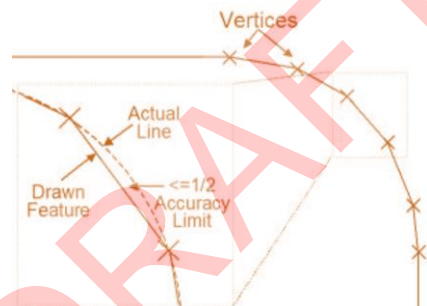
Topology refers to the positional relationship between features. All features are required to meet the following topology rules, excluding topographic maps.

- **Collocated Vertices** - Collocated vertices in two-dimensional data must share the exact same X and Y coordinates out to the same number of decimals. Vertices collocated in three dimensions must share the same X, Y and Z coordinates.

- **Lines Meet at Endpoints** – Line segments and polylines that join to represent one continuous string of linear features (e.g., a utility network) should have collocated vertices as endpoints. .

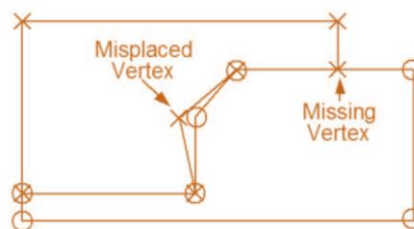


- **Lines Meet at Blocks** – Lines that represent features that connect at a junction point (e.g., to water lines that connect at a valve), must have end points that are collocated with the center point location of the junction. If a block is used to represent the junction, the lines and the centroid of the block must be collocated.
- **Sufficient Density of Vertices** – Lines and polygon edges should contain one or more segments with vertices placed at intervals, so the feature does not stray from the actual object it represents by more than half of the defined accuracy limit.



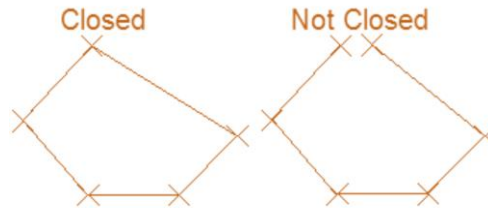
Source: FAA Advisory Circular 18B, Change 1, Page 73

- **Shared Vertices between Adjacent Features** – Features that are intended to be adjacent to one another should share all collocated vertices along their common edge(s), as shown in the figure below. This ensures that there are no unintentional gaps (empty space) or slivers (overlaps) between adjacent features.



Source: FAA, AC150/5300-18B Change 1, Page 74

- **Polygons must always be closed** – The endpoints of line segments that form a polygon must be collocated and closed in the CAD program as shown in the figure below (does not apply to existing features that are not truly closed):



Source: FAA Advisory Circular 18B, Change 1, Page 75

Drawing Organization

Objects shall reside in the appropriate drawing base file. Object data shall not co-exist in multiple drawing base files. More information on object and drawing organization can be found with the Project Manager.

Accuracy and Precision

All features and components of features shall be located within the specified distance of the location of the real-world object or component they are meant to represent (i.e., absolute positional accuracy). The accuracy tolerances where specified must be achieved at a 95% confidence level meaning that statistically 95% or more of the features will be at this accuracy level or better. Coordinate values shall be recorded to a precision (i.e., number of decimal places in the coordinate value) that is at least sufficient to represent the accuracy level specified.

Object Data

Object data associates alphanumeric information such as identifiers, material type, sizes, and other relevant data to CAD objects. It is similar and related to, but not the same as, text annotations that may be added to the drawing. Object data, and therefore this section, are **only required** if explicitly stated in the contract or agreement with OCPW.

Object data tables shall be connected to objects where attribute data and metadata are required within an OCPW Contract or Agreement. These tables are defined based on the feature class to be used for each type of object. Values for object data table fields must be of the type and within the length specified in the OCPW's GIS Unit. Where fields are tied to a domain, the values used must be one of the acceptable values defined in the OCPW's GIS Unit.

Civil 3D Elements

Civil 3D elements shall be organized so the object representation can be easily identified.

Alignments

Name: Should include corridor name and boundary description (e.g. North Ross Street Const. CL)

Stationing: geometry points and station equation shall be labeled.

Surface

Name: Include facility or area name and stated condition (e.g. CAS Building EG or CAS Building Proposed)

Contours: Standard

Major contour interval: 5 feet

Minor contour interval: 1 foot

Style: Based on latest OCPW template

Profile

Name: Should include facility name, stated condition, and feature (e.g. North Ross Street Existing CL or North Ross Street Proposed CL)

Features Line

Name: Feature description. Blank names should be avoided (e.g. North Ross Street North TC)

Site: Should be in named site

Layer: Should be on respective object layer

Section

Name: Include facility name and stationing (e.g. North Ross Street 10+00 – 20+00)

Style: Based on latest OCPW template

Corridor

Name: Include facility name and stated condition (e.g. North Ross Street Proposed)

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Chapter 3 – Graphic Representation

Whether drawing objects are being used to represent real-world features, provide additional information that describes those features, or provide metadata about the drawing as a whole, objects shall use graphics that meet the following requirements:

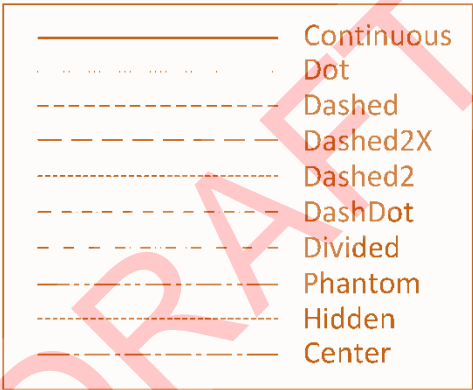
Blocks

Point features are represented by blocks. The insertion point of these blocks is at the location of the object represented by the feature. Blocks defined in the OCPW Standard CAD template file will take precedence over a custom block of a similar feature. Blocks shall not be nested. All block properties shall be set to “By Layer.” All entities that are within the block should be “By Block.” Existing Cell files from MicroStation shall be converted from DGN to DWG and adjust properties to comply with this document.

Line Types

The OCPW accepts both AutoCAD default and custom line types. The linetype styles shall reflect the latest template LIN file provided by OCPW shall be in accordance with industry standards. These generally include center, continuous, dashed, hidden and phantom line types.

Figure 3.1. Predominant line types/styles.



Line Weights

Varied line weights substantially improve readability of drawing objects. The line widths defined in **Table 3.1** provide sufficient flexibility and shall be used. If additional line weights are desired prior approval of the Project Manager is required. Use latest OCPW Standard Template for latest .ctb or .stb file.

Table 3.1 Standard line weights

COLOR	PRINTED WEIGHT (TYP. USES)	WIDTH (In.)	ON SCREEN COLOR
0	DIMENSIONS, LABELS, TEXT, ETC.	0.0085	
1	CENTERLINES	0.0140	
2	PROPOSED IMPROVEMENTS	0.0256	
3	DIMENSIONS, LABELS, ETC.	0.0085	
4	ANNOTATION	0.0100	
5		0.0100	
6		0.0100	
7		0.0100	
8	EXISTING FEATURES, GRID LINES (35% SCREEN)	0.0100	
9		0.0209	
10		0.0100	
11		0.0100	
12	NON-PROJ. R/W	0.0209	
13		0.0100	
14	PROJECT R/W	0.0256	
15	MATCH LINES	0.0472	
30		0.0130	
40		0.0209	
60		0.0276	
97	(35% SCREEN)	0.0100	
117	(50% SCREEN)	0.0100	
191		0.0100	

*ALL OTHER COLORS WITH NUMBERS THAT ARE MULTIPLES OF "10" PLOT "BLACK" WITH 0.0100" WEIGHT

Text Style

Different styles of text fonts shall be used within a drawing to delineate types of information. This text shall be capitalized and be 0.125" height to allow readability to be retained when reproduced at one-half size.

- **Regular font** is to be used for most general notes, labels, dimensions, or title blocks.
- **Italic font** is to be used where text needs to be easily distinguished from other text.
- **Filled fonts** are to be used primarily for titles and on cover sheets.
- **Symbol font** should be used in cases where Greek symbols are used to represent technical information.

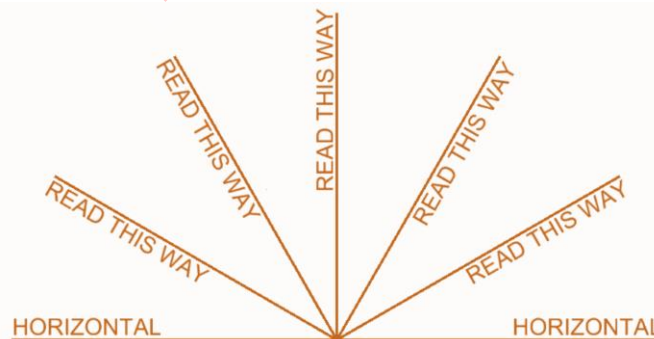
Table 3.2 – Comparison of font types

Font Type	TrueType
Regular	Arial ABCDEFGHIJKLMNOPQRSTUVWXYZ UVWXYZ
Italic	Arial (Italic) <i>ABCDEFGHIJKLMNOPQRSTUVWXYZ UVWXYZ</i>
Filled	Arial (Bold) ABCDEFGHIJKLMNOPQRSTUVWXYZ UVWXYZ
Symbol	Arial (Symbols) ΑΒΧΔΕΦΓΗΘΚΛΜΝΟΠΡΣΤ ΥΖΩΞΨΖ αβγδεφγηηκλμνοπρστ υωξψζ

Source: ERDC/ITL TR-12-1; Release 2.0, Page 45

Text shall be oriented such that it is parallel to the primary base of the drawing. If necessary, text can be rotated at angles up to 180 degrees so long as the orientation is as shown in **Figure 3.2**. Regardless of orientation, all text shall be oriented to be read from bottom to top or from left to right as displayed within the final plotted viewport.

Figure 3.2. Text Orientation



Source: ERDC/ITL TR-12-1; Release 2.0, Page 43

In addition, it is important to consider the following:

- Text shall never be placed over other text.
- Text shall not be placed over feature lines, hatching, or patterning. In case text is unreadable due to the background where is placed, text shall be masked, by turning “Background Mask” for the text properties on, so the text can be clearly read.
- Text justification depends upon the type of text being placed. For example, general numbered notes shall have upper-left justification, elevation labels appearing to the left of a feature shall have bottom-right justification, and elevation labels appearing to the right of a feature shall have bottom-left justification.
- All text shall be Multiline Text (MTEXT).
- If text is moved from the location of the object it represents, a leader line shall be provided to point from the text to its corresponding object in the drawing.

The OCPW Template contains the following text styles

Style Name	Feature Use
OCPW D 0.25	Street name, flood channel facility name
OCPW D 0.125	Typical annotation for design features
OCPW D (Non-Anno)	Un common feature. Flexibility to modify text size and style

Dimension Multileaders

The dimension style has line weights defined for dimension lines and extension lines at 0.006 inches. Extend beyond dim lines and offset from origin lines are set at 0.0625 inches. Arrowheads are closed and filled at 0.125 inches in size. The text height is 0.125 inches with text alignment set to horizontal. The format, structure, and content of the multileader style is like that of the dimension style. The dimension style and multileader style are provided in the. The OCPW Template will contain standard dimension standard.

Drawing Components

Please see example plans in Appendix G for common component style attributes.

Model Space

All drawing objects shall be drawn at either full scale (Engineering) or 1/12th scale (Architectural). Full scale means that the true size of an object is reflected in the same number of drawing units (i.e., 1:1 scale). For example, a 60 foot wide roadway will space 60 drawing units. Architectural drawings may be drawn at 1/12th so long as the scale is clearly indicated in the title block. Dimensions, annotations, and text (as described above) shall be set to Annotative to be displayed at the proper Annotative Scale. Drawing objects shall be placed in the correct geospatial location.

Paper Space

Paper space is utilized for plots (sheet files) of drawings created in model space. It usually contains single or multiple viewports each showing a portion of the features in model space. The viewport(s) typically contain a specified scale and orientation. Cover sheet and title block shall be placed in paper space. Notes, tables, details, diagrams and other entities not requiring scaling or external referencing should be placed in paper space. The paper space tabs shall be renamed to reflect the sheet number or exhibit and usable in Sheet Set Manager when applicable.

Color Table

Color table files (.CTB) control the color objects on specific layers are plotted or printed, regardless of their color in the drawing. If OCPW has customized CTB files, this shall be provided to consultants as part of the CAD standards package prior the start of the project. The latest OCPW.ctb shall be used unless approved by the project manager. If the OCPW.ctb is not used it does not exempt the user from the Standard.

Sheet Size and Scale

Follow the sheet size by department chart below to determine proper sheet sized. Other sizes may be used to accommodate specific project needs, if approved in advance by the respective department.

Department	Sheet Size
Airport	ARCH E1 30" x 42"
Facilities	ARCH E1 30" x 42"
Infrastructure Design	ANSI full bleed D 22" x 34"

Drawings and exhibits should be to scale when appropriate and must clearly present drawing features and annotations. Please see table below for common scales.

Feature	Scale (Full Size)
Vicinity Map	Not to scale
Location Map	Not to scale
Overall Site Plan	Common scale is 1" = 100'. Modify as needed
Typical Sections	Common scale is 1" = 10'. Vertical exaggeration is 2.
Civil Detail (Structural Detail)	Common scale is 1" = 1'. Modify as appropriate.
Civil Detail (ADA Ramp)	Common scale is 1" = 5'
Plan	Common scales are 1" = 20' and 1" = 40'.
Profile	Common horizontal scales are 1" = 20' and 1" = 40'. Vertical exaggeration is typically 5 or 10

Chapter 4 – Drawing Sheet Structure and Organization

The organization and structure of CAD files is important in order to facilitate efficient retrieval and effective maintenance of CAD data. File standard elements such as border and titleblocks, sheet assembly and numbering, and file naming conventions all support a sustainable system of CAD files for OCPW and its consultants.

Border & Titleblock

Drawings that are required to be plotted either in hard copy or Portable Document Format (PDF) must have a border and title block of the proper format that is populated with all relevant information about the drawing (i.e., metadata). The format of this information and fields to be used to populate metadata are described below and provided in the template files. The format of these elements shall not be changed and specific layers, as indicated in **Appendix A**, "Title Block Layers," shall be used. The line weights for the title block are defined through polylines and the layer properties manager. The plotting scheme shall conform to these values. There are small circles located at the corners of the sheet which define the plot area when selecting the centers by window. A bar scale is provided to verify that the plotting is 1:1. Figure 4.1 and 4.2 below shows an example of the required title blocks:

Figure 4.1 –Facilities Title Block

BOARD OF SUPERVISORS ANDREW DG. DOUG CHAFFEE VACANT DONALD P. WAGNER LISA BARTLETT	 SANTA ANA, CALIFORNIA JAMES TREADAWAY, P.E., SE, DIRECTOR PROJECT NAME <div style="border: 1px solid black; width: 100px; height: 15px; margin: 0 auto;"></div>	COUNTY APPROVAL STAMP <div style="border: 1px solid black; width: 100px; height: 50px; margin: 0 auto;"></div>
DRAWING INDEX <div style="border: 1px solid black; height: 150px; width: 100%;"></div>	VICINITY MAP <div style="border: 1px solid black; height: 100px; width: 100%;"></div>	
SITE MAP <div style="border: 1px solid black; height: 100px; width: 100%;"></div>		

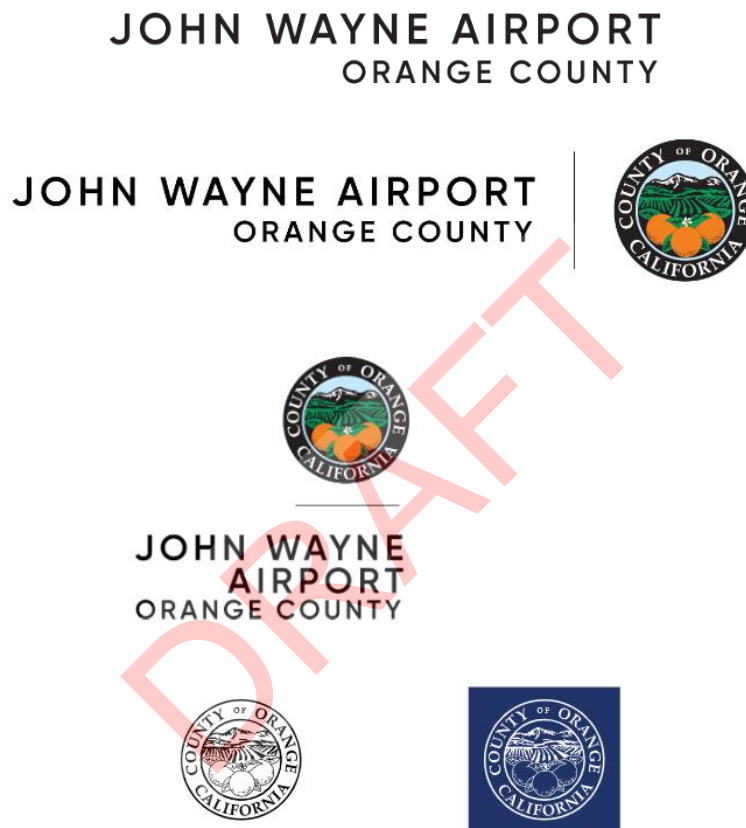
Figure 4.2 –Civil Design Title Block

 VICINITY MAP (NOT TO SCALE)	County of Orange SANTA ANA, CALIFORNIA JAMES TREADAWAY, P.E., S.E., DIRECTOR PLANS FOR CONSTRUCTION OF PROJECT NAME PROJECT LIMITS JANUARY 2021 W.O. NO. EE12345	INDEX OF SHEETS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>SHEET NO.</th> <th>SECTION</th> </tr> </thead> <tbody> <tr><td>1</td><td>TITLE SHEET</td></tr> <tr><td>2-4</td><td>GENERAL NOTES</td></tr> <tr><td>5-7</td><td>SURVEY CONTROL</td></tr> <tr><td>8-10</td><td>TYPICAL SECTIONS</td></tr> <tr><td>11-20</td><td>UTILITY PLANS</td></tr> <tr><td>21-25</td><td>CONSTRUCTION DETAILS</td></tr> <tr><td>26-30</td><td>CONSTRUCTION PLANS</td></tr> <tr><td>31-35</td><td>PLAN & PROFILE</td></tr> <tr><td>36-40</td><td>UTILITY PLANS</td></tr> <tr><td>41-45</td><td>CONSTRUCTION DETAILS</td></tr> <tr><td>46-50</td><td>CONSTRUCTION PLANS</td></tr> <tr><td>51-55</td><td>CONSTRUCTION DETAILS</td></tr> <tr><td>56-60</td><td>CONSTRUCTION PLANS</td></tr> <tr><td>61-65</td><td>CONSTRUCTION DETAILS</td></tr> <tr><td>66-70</td><td>CONSTRUCTION PLANS</td></tr> <tr><td>71-75</td><td>CONSTRUCTION DETAILS</td></tr> <tr><td>76-80</td><td>CONSTRUCTION PLANS</td></tr> <tr><td>81-85</td><td>CONSTRUCTION DETAILS</td></tr> <tr><td>86-90</td><td>CONSTRUCTION PLANS</td></tr> <tr><td>91-95</td><td>CONSTRUCTION DETAILS</td></tr> <tr><td>96-100</td><td>CONSTRUCTION PLANS</td></tr> </tbody> </table>	SHEET NO.	SECTION	1	TITLE SHEET	2-4	GENERAL NOTES	5-7	SURVEY CONTROL	8-10	TYPICAL SECTIONS	11-20	UTILITY PLANS	21-25	CONSTRUCTION DETAILS	26-30	CONSTRUCTION PLANS	31-35	PLAN & PROFILE	36-40	UTILITY PLANS	41-45	CONSTRUCTION DETAILS	46-50	CONSTRUCTION PLANS	51-55	CONSTRUCTION DETAILS	56-60	CONSTRUCTION PLANS	61-65	CONSTRUCTION DETAILS	66-70	CONSTRUCTION PLANS	71-75	CONSTRUCTION DETAILS	76-80	CONSTRUCTION PLANS	81-85	CONSTRUCTION DETAILS	86-90	CONSTRUCTION PLANS	91-95	CONSTRUCTION DETAILS	96-100	CONSTRUCTION PLANS
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Logo & Seal

The logo will appear on all drawings created for or by OCPW. Where possible the County of Orange seal should be included with the Airport logo. Black on white versions of both the seal and the logo should be used, as shown below. The logo and seal must appear in accordance with the John Wayne Airport Brand Style Guide. The logo to use has been included in the template files, as well as part of the Titleblock file. Consultant or other logos may appear on drawings submitted to the OCPW and the Airport, subject to approval by the Project Manager.

Figure 4.3 – Orange County and John Wayne Airport Seal & Logo



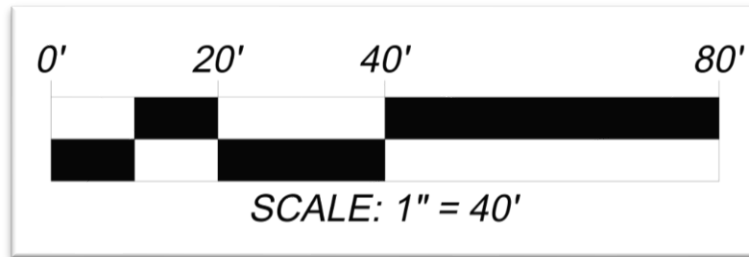
Key Map & North Arrow

A key map will be provided that shows the full extent of the project area and highlights individual sheet limits with a rectangle the area shown on this sheet. An arrow that shows the direction of the True North shall be provided on all Sheet Files that show the horizontal location of features (i.e., planimetric perspective). Such a North Arrow is not required on Sheet Files that contain non planimetric information such as riser diagrams, schematic diagrams, or one-line diagrams.

Scale Bar

A scale bar should be provided in the title block. The scale bar should be in imperial units with a sufficient number of intervals to estimate drawing distances either visually or with a ruler. The scale bar will be provided in the template file as a dynamic block.

Figure 4.4 – Scale Bar



Standard Sheet identification

The purpose of the standard sheet identification standard is to provide consistency and the standard provides flexibility to a wide range of disciplines found in project plans. The identification format has three components which is described below.

Discipline Designator (AA) – Consists of at least one alphabetical character and up to three characters. See below for common disciplines

Sheet Type Designator (B) – Consists of one or two numerical character(s)

Sheet Sequence number (C) – Consists of two numerical characters

The following is a example of the sheet numbering. The following example is for a road improvement plan and profile sheet. The general sheet sequencing for the overall plan set.

Figure 4.5 – Sheet Identifier

AAA-B-CC

Example CRD-1-01

(The following example is the first sheet (01) for a plan and profile (1) for a civil road project (CRD))

Only when there is more than one sheet of a Group or Sub-group shall the sequencing positions be used. When the Sequence positions are used, the implication is that there is more than one sheet for that Group or Sub-group.

Typical Discipline Identifiers

Discipline Designator	Discipline
C	Civil
L	Landscape

S	Survey
A	Architecture
I	Interior
F	Fire Protection
M	Mechanical
E	Electrical
U	Utilities

Designator for civil sub disciplines

Sub Discipline Designator	Sub Discipline
CRD	Civil Road
CSD	Civil Storm Drain
CBR	Civil Bridge
CEC	Civil Erosion Control
CRG	Civil Rough Grading
CPG	Civil Precise Grading
CTS	Civil Traffic Signal
CSS	Civil Signing and Striping
CGT	Civil Geotech

Sheet sequence Number

The sequential number of the sheet within the drawing set and the total number of sheets in the drawing set should be indicated in the title block. The cover sheet should be sheet sequence number 1 (one) with all subsequent sheets numbered sequentially. The order in which sheets should appear in a drawing set is described in the Drawing Set Assembly section.

Milestone/Stage Stamp

The user shall indicate the stage of the facility design and construction process that the drawing reflects. Some examples are “30% Design”, “60% Design”, “90% Design”, “Conformed Set”, and “As-Built”. If not apparent based on the contract or agreement, then the OCPW PM will provide direction as to the stage to be indicated at each phase of the project. The following below is the presentation of the stamp and will be provided in the template.

Figure 4.6 – Milestone/Stage Stamp



Dates

The following dates shall be shown on the plans. Below is a description of dates found within a construction drawing set.

Title Sheet

Date will be the milestone and stamp submittal date. Format shall be “Month YYYY”

Information Block

Plot Date: Date shall be a field. OCPW Template will have this field defined. Format shall be “MM/DD/YY.”

Responsible Engineer Signature Block: Date shall not be field and should be the date of when it has been signed. Format shall be “MM/DD/YY”

Revision Date: Date shall be given when a revision has been submitted. Format shall be “MM/DD/YY”

Date Plotted: This date is located at the bottom right corner of the standard sheet template. This field shall not be removed or manually modified. Format shall be “MM/DD/YYYY HH:MM:SS AM/PM.” OCPW Template will have this field defined.

For Other Dates on Plans and Exhibits

Date format shall be “MM/DD/YY”

Sensitive Information Label (John Wayne Airport)

If the drawing contains Sensitive Security Information (SSI) as defined by the Code of Federal Regulations (CFR), Title 49, Chapter XII, Subchapter B, Part 1520, then the Distribution Limitation Statement, shown below or a more recent version, must appear on the bottom of each sheet that contains SSI, as well as the cover sheet of a drawing set that includes one or more sheets that contain SSI. The protective marking “SENSITIVE SECURITY INFORMATION” must also appear on the top each sheet that contains SSI.

Figure 4.7 – Sensitive Information Label

WARNING: This record contains Sensitive Security Information that is controlled under 49 CFR parts 15 and 1520. No part of this record may be disclosed to persons without a “need to know”, as defined in 49 CFR parts 15 and 1520, except with the written permission of the Administrator of the Transportation Security Administration or the Secretary of Transportation. Unauthorized release may result in civil penalty or other action. For U.S. government agencies, public disclosure is governed by 5 U.S.C. 552 and 49 CFR parts 15 and 1520

Dig Alert

Dig Alert contact information should be shown on title sheet and listed as a general note within all design plan sheets.

Revisions

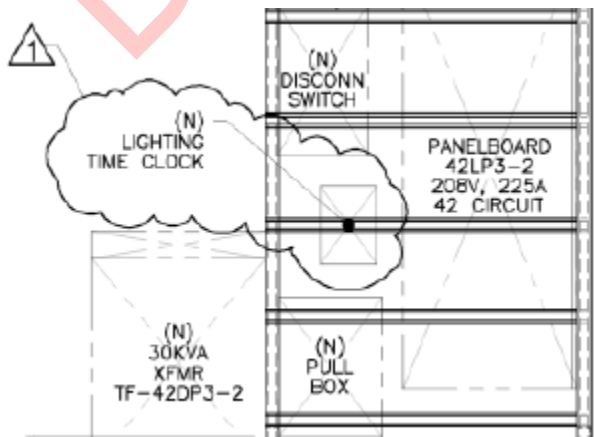
Throughout design development and up to the original version, the drawing shall be indicated as Revision – [applicable revision sequence number]. There may be multiple revisions within a given stage of design or construction. When the drawing is initially submitted as complete within a stage, it shall be Revision 0. Revisions shall be sequentially numbered (i.e., 1, 2, 3, etc.). When a drawing is initially submitted as complete within a subsequent stage the revision sequence number will be reset to 0. If a revision is made, two areas of the drawing shall be changed to show the correct revision number: the drawing area and the title block.

All revised drafting work in the drawing area shall be enclosed by cloud, and each cloud shall have a revision triangle, including the pertinent number, as its callout (see Figure 4.8). The cloud shall be appropriately dark and bold so that the contractor can clearly see what is different from the previous submittal. The title block shall be changed in two places: the revision number (see Figure 4.6), and the revision column (see Figure 4.7). The revision column shall also include the revision triangle, as an exact match to the triangle in the drawing area (see Figure 4.8).

Figure 4.8 – Typical Revision Block

1	ACCORDANCE W/MODIFICATION NO. 1	7/1/2005	TSR
MARK	DESCRIPTION	DATE	APPR.

Figure 4.8 – Revision Cloud



The arc length of the revision cloud symbol shall be 0.25.

Electronic File Naming

Each sheet shall be saved as a separate electronic file. For construction drawings, the name of those files shall match those of the sheet numbers, as shown below:

Table 4.1—Example File Names for Design Base Drawings

Drawing Type	Filename
Design Horizontal (2D) linework	EQ12345 (Design).dwg
Topo	EQ12345 (Topo).dwg Note: May have separate 2D and 3D base files
Utilities	EQ12345 (Utilities).dwg Note: May have separate existing and proposed files
3D Design Design base with Civil3D features (eg., alignment, surfaces, profiles, etc.)	EQ12345 (3D Design).dwg
Boundary ROW lines, centerline and lotlines	EQ12345 (Boundary).dwg

Table 4.2—Example File Names for Civil Construction Drawings

Sheet Number	Revision	Filename
CRD-1-101	0	EQ12345 CRD-1-101.dwg
CSD-100-01-R2	2	EQ12345 CSD-100-01-R2

Table 4.2—Example File Names for Facilities Construction Drawings

Sheet Number	Revision	Filename
P-100-01	0	EQ1000_CRD-100-01.DWG

PDF files of drawings shall be numbered the same as the drawing, with the corresponding revision for the particular revised sheet only, as shown in Table 4.3:

Table 4.3—Example File Names for PDF

Sheet Number	Revision	Filename
CRD-101	0	EQ1000_CRD-101.PDF
M3.3	2	M3_3_R2.PDF

When an entire set of drawings for the same contract is submitted as a single PDF, the file shall be named with the job number, project name, milestone, and latest revision separated by a space, for example: **EQ12345_Project Name_100%_R4.PDF**.

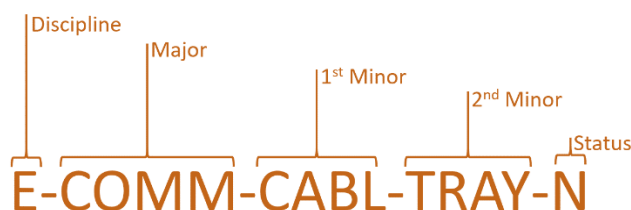
External Reference Files

Base map and related drawings being developed by others may be incorporated into a separate drawing for reference. These externally Referenced (XREF) drawings allow objects to be available for viewing and reference without the need to redundantly store a copy of these objects in the drawing itself. The insertion point for XREFs shall be 0, 0, 0.

All external reference files shall be attached as an overlay (rather than as an attachment) with the relative path unbound and located within the same folder structure to allow for relative path selection. The folder structure **shall be maintained** on the submittal media so as not to require the re-attaching of external references upon receipt by the OCPW. OCPW staff may add XREFs in networked file folders.

Chapter 5 – Layer Assignment

All objects including those that represent real-world features, graphical annotations, title block information, data tables, and other details shall be placed on layers defined in Facilities, Civil, or JWA AutoCAD template (.dwt). Layer names have been established based on the NCS layer naming convention, which is shown in the figure below.

Figure 5.1 Layer Naming Convention


- The discipline shall be a one-character code representing the primary discipline of the objects contained on that layer. This will follow the discipline designators found in the sheet naming convention.
- The major describes the category in which the objects on the layer fall. (eg. Utility,)

- The first minor defines the type of object on that layer. (eg. Storm Drain)
- A second minor is sometimes used to indicate the sub-type of the objects on that layer. (eg. OCFCD (Orange County Flood Control District))
- A status code that indicates the status of the objects on that layer. Status codes as listed in the table below shall be used. Existing features not impacted by a project are to be shown on layers without a status code.

Table 5.1 - Status Codes

Code	Status
AB	Abandoned
P	Planned or proposed future features
U	Unverified
E	Existing

For design and construction projects that will be altering features shown on drawings, the additional status codes shall be used to indicate how features will be altered by the project. These codes should not be used on as-built drawings, which show existing conditions that do not require a status code or may use one of the status codes above where appropriate.

Chapter 6 – Definitions

There are several types of facilities throughout the County and knowing their categories and components is a key factor in understanding the type of data and how to utilize it productively. Additionally, this information will allow consultants and the County to produce, manage, process and maintain CAD data more efficiently.

Building Facilities

This type of facility data addresses all type of information files for those areas contained within building perimeters. A combination of as-built, design and construction drawings served as the base drawings to be used, managed and maintained daily by the County staff. Disciplines to be included within building areas are architectural, mechanical, electrical, plumbing, audio, structural, etc. Building facilities include:

Base Building

These type of data contain existing building condition as per as-built, design and construction drawings information, supplemented by shop drawings and field verification information prior to tenant development. Their function is to serve as base drawings for all tenant construction documents and as background for any other categories and/or discipline.

Tenant Buildout

This category relates to existing building conditions for tenant improvements projects. The tenant improvement information may include but not limited to retail, airlines, food & beverage, car rentals, etc.

Property Management

Includes the ability of tracking all information related to tenants, including but not limited to tenant name, tenant type, lease agreements, area (square footage), etc.

Site Facilities

The data included as Site Facilities addresses information files related to areas located outside of building perimeters such as the airfield, taxiways, aprons, etc. These CAD files will served as the base drawings to be used, managed and maintained daily by the airport staff. Part of site facilities are:

Site Layout

This category relates to base topography features per as-built drawings and/or subsequent field verification or aerial mapping. Their function is to serve as base drawings for all site documents and as background for any other categories and/or discipline.

Utilities

This category serves to documents all utility features. Utility information may include but not limited to above and underground gas, electrical, fuel systems distribution, etc.

Property Management

This category includes the function of tracking of parcels, leaseholds, easements, property lines, boundaries, etc.

As-Built Drawings

As-built drawings reflect ALL deviations from the construction/bid set of documents caused by RFIs, field changes, etc., and reflect the final constructed condition with field verified dimensions, revised product information, quantities, among other items. Correctness of as-built drawings will be verified and payments may be withheld until corrections are completed.

Buildings

In this category is included all as-built documents related to the construction of buildings and/or interior tenant areas, in addition to all related drawings data such as plans, elevations, details, diagrams, etc. Information.

Site

Site as-built data refers to all documents for construction of civil site projects such as roads, grading, pavement, sidewalks, etc. The category also includes all type of drawings related such as plans, elevations, details, diagrams, etc.

Base Drawings

The category refers to the CAD drawing files that contains critical linework for design work, existing topography, boundary lines and etc. Base files drawing can contain entities in either or 2D or 3D environment.

Chapter 7 – Drawing Delivery & Quality of CAD Data

An important objective of this CAD Standard Document is to help create the most accurate and graphically consistent set of CAD drawings for OCPW. Adhering to this standard is an important aspect of achieving the quality of CAD deliverable OCPW expects. Consultants and staff who develop DWGs for the OCPW should check the quality of the data as it is being developed (Quality Control) and prior to delivery (Quality Assurance).

Quality Assurance

Before consultants submit DWGs to OCPW and before staff share DWGs with other staff members or consultants, they are responsible for conducting Quality Assurance (QA) on those drawings. QA should be conducted by an individual who is familiar with the content and the requirements of this document, but who did not directly work on the data in the drawing being checked. QA shall check the drawing(s) against all applicable requirements in this document, including but not limited to:

- ☐ Objects have the correct geometry, adhere to topology rules, and are on correct layers
- ☐ Objects representing real-world features are drawn in the specified coordinate system
- ☐ All sheets have a proper title block with metadata fields filled in correctly and completely
- ☐ Proper cover sheet is used with metadata fields filled in correctly and completely
- ☐ Sheets are numbered correctly, consistently, and provided in the correct order
- ☐ Sheet numbers and descriptions in the drawing index match the sheet numbering and descriptions on each page
- ☐ Filenames are correct

QA should also check to ensure that the data in the drawing is comprehensive, accurate, and correct. It may not be feasible to check all objects on drawings. At a minimum, a statistically valid sample of objects to establish a 95 percent confidence level in the data shall be checked. Objects shall be sampled randomly but their location shall be distributed across the extent of the drawing's contents. Objects on numerous layers shall be selected. All properties of the selected objects (i.e., geometry type, topology, layer, symbology, and object data, if present) shall be checked. If any property is not correctly recorded, then the object shall be considered a failure. All failures shall be corrected. If a pattern of failures (e.g., on a specific layer or in a specific area) is evident or a large number of failures are found, then all content in the drawing shall be thoroughly checked and corrected before QA recommences.

The table in Appendix B defines a series of checks that consultants should use to check the quality of drawings before they are submitted to OCPW. The checklist can also be used as a guide for quality control as the data is developed and may be used at OCPW's discretion for acceptance testing.

In addition, below is a list of common QA issues:

- ☐ Redundant pages
- ☐ Sheet Index not matching
- ☐ Revision block completeness
- ☐ Detail and sheet callouts match
- ☐ Duplicate surfaces
- ☐ Irrelevant linework- construction lines
- ☐ Indicate point of connection or end of line reasoning

Plotted Drawings

Drawing sets shall be printed to PDF for delivery, unless otherwise directed by the OCPW PM. PDFs should be printed at the full sheet size as described above. When printing to PDF in AutoCAD, the DWG To PDF.pc3 plotter configuration file shall be used (or a County approved alternate). The scale shall be 1:1 and the sheet size shall be of the full bleed variety for the paper size selected. Also, the “Include Layer Information” interface shall NOT be checked in the Custom Properties setting within the Plotter Configuration Editor. Electronic Delivery

All PDF Drawing sets shall have searchable and selectable text. Use Truetype fonts for all mtext, dimensions, text in tables, etc.

Drawing sets shall be uploaded to electronic storage location as directed by the OCPW Project Manager. In the case in which an electronic media is required, utilize USB drive to save drawings sets onto. AutoCAD’s eTransmit function may be used for informal exchange of drawings (e.g., as an email attachment), but the formal submittal of drawings shall not be provided using eTransmit and shall be provided in a proper directory structure and not compressed to maintain external reference overlaying. When submitting drawings electronically, the following requirements must be met:

- Physical media must be labelled with the OCPW contract number and name, as they appear on the fully executed copy of the contract; the prime consulting firm’s name, the date of the submittal, the title of the drawing set and the review status. Add it onto USB with tag
- If any drawing, file, or additional information provided on the media contains SSI, then the media must be labelled with the statement SENSITIVE SECURITY INFORMATION along with the SSI distribution limitation statement indicated above. If multiple physical media devices are delivered together as a set, the label must indicate a sequence number and the total number in the sequence. Probation? Sheriff? SSA (Orangewood)?
- Appropriate color table (.ctb) files shall be included.
- A tabulated Index of Sheets (.doc or .xls) shall be included. The table shall be titled “Electronic File Submittal Index—Contract ‘XXXX’” and have three columns: Electronic (AutoCAD) File Name, Drawing Number and Drawing Title. In addition, the table shall include a listing of file names and descriptions of external references. The description shall be placed under the heading of Drawing Title.

The final drawings must be tiled into Paper Space, layer set to 0, zoomed to extents and purged prior to saving and closing.

Signatures

Construction Set- Wet signature okay

Record Set- Digital signatures (image, flattened to ensure security but doesn't take away functionality)

GIS Interoperability

Be sure it is importable into ArcPro

DRAFT

Appendices

Appendix A – Example Plans (Note: Further revisions will include additional sheets e.g. Plan and Profile) Please comment on concept of having example sheets.

County of Orange
Public Works
 SANTA ANA, CALIFORNIA
 JAMES TREADAWAY, P.E., S.E., DIRECTOR

**PLANS FOR CONSTRUCTION OF
 SANTA ANA GARDENS CHANNEL
 BIKEWAY
 (PHASES 2, 3, & 4)**

**FROM W. MONTA VISTA AVENUE
 TO W. FIRST STREET
 ALONG SANTA ANA GARDENS CHANNEL
 (APPROXIMATELY 0.65 MILES)**

JANUARY 2021
W.O. NO. EE17413

FINAL SUBMITTAL

FUNDED BY: BCIP, OC FLOOD CONTROL DISTRICT AND OC PARKS FUNDS
MAINTAINED BY: CITY OF SANTA ANA PER AGREEMENT D12-015
POST-PROJECT OWNERSHIP: OC FLOOD CONTROL DISTRICT, CITY OF SANTA ANA

DEVIATIONS
 CALTRANS STANDARD PLANS:
 CABLE RAILING MODIFIED FROM STD PLAN B11-47:
 - CABLE THICKNESS INCREASED FROM 1" Ø TO 1 1/2" Ø TO PREVENT VANDALISM. EXTRA CABLE STRAND ADDED AT BOTTOM FOR SAFETY.

PREPARED BY
 PREPARED UNDER RESPONSIBLE CHARGE OF:
 JESSICA YARRA, P.E. DATE

OC PARKS DEPARTMENT
 APPROVED: STACY BLACKWOOD, DIRECTOR DATE

CITY OF SANTA ANA APPROVAL
 NABIL SABRA, EXECUTIVE DIRECTOR DATE
 PUBLIC WORKS AGENCY
 LISA KULLOFF, EXECUTIVE DIRECTOR DATE
 PARKS, RECREATION & COMMUNITY SERVICES AGENCY
 EDWIN WILLIAM GALVEZ, CITY ENGINEER DATE

RECORD DRAWING
 PROJECT MANAGER: AMY VELAZQUEZ
 CONTRACTOR: _____
 RESIDENT ENGINEER: JEANENE CASIELLO
 INSPECTOR: _____
 CONSTRUCTION START DATE: _____
 CONSTRUCTION COMPLETION DATE: _____

REVISIONS

INDEX OF SHEETS

SHEET	DESCRIPTION
1	GENERAL NOTES/KEY MAP
2-4	SURVEY CONTROL
5-7	TYPICAL SECTIONS
8-13	CIVIL DETAILS
14-26	DEMOLITION PLANS
27-33	PLAN & PROFILE
34-44	UTILITY PLANS
45-49	SIGNING AND STRIPPING PLANS
50-53	PARK CONSTRUCTION DETAILS
54-56	LANDSCAPING PLANS
57	LIGHTING PLANS

UTILITY OWNER CONTACT

UTILITY OWNER	CONTACT	PHONE NO.
AT&T	DIANE NGUYEN	(714) 818-8151
CITY OF SANTA ANA	JOSEPH MENDOZA	(714) 847-8056
CROWN CASTLE	NICK BELINERY	(724) 416-2449
SOUTHERN CALIFORNIA Edison (SCE)	VINCE HOFFMAN	(714) 873-5722
SOUTHERN CALIFORNIA GAS (SCG)	RANCHO NOVALES	(714) 834-5019
UNDERGROUND SERVICE ALERT		(800) 422-4133

BENCH MARK:
 THE D.C.S. BM
 8A-19-15
 ELEV. = 79.198'
 LEVEL YEAR 2010
 NAVD 1983 (D.C.S. 1985 ADJUSTMENT)

BASIS OF BEARINGS:
 THE BASIS OF BEARINGS FOR THIS SURVEY IS BASED ON THE CALIFORNIA COORDINATE SYSTEM (CCS). ZONE 10, NAD 83, OCS (2011) IS EPOCH ADJUSTMENT. ALL DETERMINED LOCALLY BY A LINE BETWEEN CONTIGUOUS GLOBAL POSITIONING STATIONS (GPS) (GCS) AND (GCS) BEING MEASURED AS DERIVED FROM THE COORDINATES PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC) ALONG WITH DATA SHEETS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

Appendix B – Quality Assurance Checklist

The following checklist should be used to confirm that drawings delivered to the Airport are acceptable. The individual who satisfactorily completes each step should fill in their initials in the corresponding row. The name of another individual within the submitting organization should review the completed checklist to confirm that all applicable tests have been completed. Satisfying the requirements of this checklist does not waive any of the requirements of this document or its normative references.

Table B.1 – Quality Assurance Checklist

Completed By	TOPIC
(initials)	1. General
	Check Drawing Title (against List of drawings)
	Check Drawing Scale and date
	Check standard sheet numbering
	Check revision format
	2. Documentation
	Check the list of deliverables
	3. Project check list
	Check graphic consistency
	Check readability
	Check standard symbols
	Check design correctness/problems, build-ability
	Check spelling
	Check Line weights, Line types
	Check Dimensions and Style
	4. Data check list
	Check data in correct layer
	Check XREF in correct layer
	Check annotations, dimension & notes in correct layer
	Check legend, north arrow and scale bars in correct layer
	Check for extra information to be deleted, file to be purged
	5. Data Structure check list
	Check Relevant Data
	Check if correctly named and or naming convention
	6. Attribute check list
	Check Label is from an attribute
	Check the attribute symbolize use a domain or block reference
	7. Relationship/coordination check list with other services/disciplines
	Check coordination with Civil
	Check coordination with Architectural
	Check coordination with Mechanical
	Check coordination with Structural
	Check coordination with Plumbing
	Check coordination with Interiors
	Check coordination with Electrical
	Check coordination with Telecommunications
	Check coordination with Fire Protection
	Check coordination with Landscape
	Check coordination with Other
	8. Annotation check list
	Check visibility and placement of annotation
	Check overlap and masking

Completed By	TOPIC
	Check Consistent size and style
	9. AutoCAD check list
	Check AutoCAD Layers
	Check AutoCAD Blocks
	Check AutoCAD Viewports
	Check Layout Tabs against List of drawings
	Check AutoCAD XREF (Overlay/attach, relative path, etc..)
	Check AutoCAD Drawing Origin (georeferenced file)
	10. References
	Check Standard Details
	Check General Notes
	Check Abbreviations

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Appendix C – Change request Form

If users of this Standard feel that a change would best meet the needs of the airport, they should complete the following form and submit it to their Project Manager. One form should be submitted for each change, although requests to add or change multiple related layers can be included on one form. Deviations from this Standard are not permitted until such changes are approved by the Airport. Approved changes will be incorporated into subsequent versions of this document.

Change Requested By:

Date of Request: _____

Name : _____

Date Response Requested : _____

Organization: _____

Phone: _____

Email: _____ +++++ _____

Type of Change (select one):

Text: _____ Title Block: _____ Sheet Sizes: _____ Layers: _____

Other (please explain): _____

Location of Change:

Page(s) in latest version : _____

Requested Change (attach additional pages or provide data electronically as applicable):

Rationale for Change (please provide as much details as possible and explain why the current Standard does not address your requirement):

OWNER RESPONSE

Change Accepted: Yes ____ No ____

Reason:

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Appendix D – Acronyms

The following abbreviations are used in this document as defined below.

CAD	Computer Aided Design
CONUS	Continental United States
DWG	AutoCAD Drawing File
EPSG	European Petroleum Survey Group
GeoJSON	Geographic JavaScript Object Notation
GIS	Geographic Information System
IMDF	Indoor Mapping Data Format
NAVD88	North American Vertical Datum of 1988
OCPW	Orange County Public Works
NCS	National CAD Standards
SPCS	State Plane Coordinate System
SSI	Sensitive Security Information
VMP	Venue Management Platform
XREF	External Reference A DWG that is referenced from within another DWG.

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Appendix E – Project ID List (JWA Specific)

The following is the released project listings with the designated ID. This list will be updated as new projects are issued for CAD development.

<u>ID</u>	<u>Description</u>
AA	Airport Administration
AT	Air Traffic Control Tower
EM	Eddie Martin Terminal
EV	Electrical Vault
ES	Electric Substation
F1	Fire Station No. 33
F2	Fire station No. 27
FB	FBO Facilities
FF	Fuel Farm
MT	Maintenance Building
PA	Parking Structure A
PB	Parking Structure B
PC	Parking Structure C
PS	Paint Storage Building
RC	Rental Car Storage
RT	Remote Transmitter
RW	Restroom Westside
TH	Tee Hangers
TR	Thomas Riley Terminal

Appendix F – Sheet Properties (JWA Specific)

Please see Chapter 3 for plot scale for OCPW Projects. The following are standard sheets properties as per JWA discipline designators, including content and Plot Scale.

AR	Architectural	1/8"=1'-0"
Walls, doors, windows, columns, column grids, plumbing fixtures, casework, millwork, stairs, elevators, penetrations, floor patterns, associated notes and dimensions, structural columns referenced.		
AU	Audio	1/8"=1'-0"
Audio speaker system location, wiring, intercom, associated notes and dimensions, architectural group layers referenced.		
CM	Communications	1/4"=1'-0"
Telephone outlets, computer data outlets, wiring, fire alarm system, associated notes and dimensions, architectural group layers referenced.		
FP	Fire Protection	1/8"=1'-0"
Sprinkler lines, sprinkler heads, associated notes and dimensions, architectural group layers referenced.		
LA	Landscaping	1/8"=1'-0"
Planting, irrigation, equipment, associated notes and dimensions, architectural group layers referenced.		
LT	Lighting	1/8"=1'-0"
Lights, switches, circuit wiring and destinations, associated notes and dimensions, architectural group layers referenced		
ME	Mechanical	1/4"=1'-0"
HVAC ductwork, return and supply grilles, thermostats, exhaust hoods and grilles, mechanical equipment, piping, CFM annotations, associated notes and dimensions, architectural group layers referenced.		

MS	Miscellaneous	Varies
Details, elevations, sections, schedules, charts, etc..		
OC	Occupancy	1/16"=1'-0"
Occupancy zones, associated notes and dimensions, architectural group layers referenced.		
PL	Plumbing	1/4"=1'-0"
Storm, sewer, vent, cold and hot water, gas and fuel piping, associated notes and dimensions, architectural group levels referenced.		
PW	Power	1/4"=1'-0"
Junction boxes, power panels & wiring, receptacles & wiring, associated notes and dimensions, architectural group levels referenced.		
RC	Reflected Ceiling	1/8"=1'-0"
Ceiling grids & surfaces, ceiling features, associated notes and dimensions, architectural, sprinkler heads, mechanical grilles and ceiling mounted lights referenced.		
TP	Tenant Placement	1/16"=1'-0"
Room and tenant areas, block areas, square footage and address annotations, architectural group levels referenced.		
ST	Structural	1/8"=1'-0"
Columns, beams, joists, slabs, footings, structural walls, associated notes and dimensions, column grid lines referenced.		

Appendix G – Design Specific

Hyperlinked Files:

- Template File (.DWT)
- Example Plan Set
- Color Table File (.CTB)

Appendix H – Facilities Specific

Hyperlinked Files:

- Template File (.DWT)
- Example Plan Set
- Color Table File (.CTB)

Appendix I – JWA Specific

Hyperlinked Files:

- Template File (.DWT)
- Example Plan Set
- Color Table File (.CTB)

Appendix J – Survey Specific

Hyperlinked Files:

- [Survey Mapping Standards](#) (Chpt. 14)
- Template File (.DWT)
- Example Plan Set
- Color Table File (.CTB)

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