



## PORT OF OAKLAND GEOGRAPHIC INFORMATION SYSTEM (GIS) STANDARDS OF PRACTICE (SOP)

The Port of Oakland maintains a robust GIS system in the Engineering Services Division. The system is Esri based and utilizes ArcGIS Pro and ArcGIS Online. Consultants' GIS data and systems should interface with the existing GIS platform.

The following standards are to provide administrative and technical guidance to all users of GIS within the Port of Oakland as well as outside consultants. It is the responsibility of the Port of Oakland and consultant GIS users to follow the guidance in this document. Port of Oakland should seek GIS vetted consultants: [Esri Partners](#). Before consultants are selected, they must provide a data and/or figure/webmap example to the GIS Administrator. Project teams shall make sure to engage the GIS Administrator during project scoping and kickoff. This document is still under construction and is subject to change.

- Software
  - ArcGIS Pro
  - ArcGIS Online
- Spatial Reference
  - Projected Coordinate System – NAD 1983 (2011) StatePlane California III FIPS 0403 (US Feet)
  - Vertical datum – NAVD88 (ftUS)
- Data Management
  - Data Models
    - Data models must be utilized to maintain consistency.
    - Data models can be adjusted to align with project specific needs with the sign off from the Port of Oakland's GIS Administrator ([lphillips@portoakland.com](mailto:lphillips@portoakland.com)) and the Port Project Manager.
    - Aviation related data needs to align with the FAA 18B data model.
      - <https://pro.arcgis.com/en/pro-app/latest/help/production/aviation/faa-18b-schema.htm>
      - <https://storymaps.arcgis.com/stories/cb5952652fa04d87a7865267c9433bca>
    - Maritime related data needs to align with the Maritime data model.
      - <https://community.esri.com/t5/ports-and-maritime-blog/maritime-ports-data-model-2023/ba-p/1249510>
    - Utility data needs to align with a Port provided data model which reflects the Local Government Information Model (LGIM) and ASCE 38-22 & 75-22
      - <https://www.asce.org/publications-and-news/civil-engineering-source/society-news/article/2022/07/newly-updated-asce-38-22-utility-engineering-standard-and-new-companion-standard-asce-75-22-now-available>
    - Depending on spatial data type, additional data attribute schema may be required to comply with Port's Enterprise Asset Management system. Any Port maintained assets must include Maximo data schema. **This is still under construction.**
  - Data Format
    - The Esri file geodatabase is the standard geospatial data format at the Port of Oakland.
    - A feature class is a collection of geographic features within the same geometry type (point, line, or polygon), the same attribute fields, and the same spatial reference. A feature class is stored within a geodatabase, and individual feature classes may be organized within a geodatabase using feature datasets. Feature classes with different geometry types may be stored in a feature dataset. When possible and/or necessary, feature classes should be organized within a feature dataset.
  - Metadata
    - Metadata should be created for geospatial data as dictated by the project requirements.
      - <https://pro.arcgis.com/en/pro-app/latest/help/metadata/create-fgdc-csdgm-metadata.htm>
- Cartography
  - Understand the design principles of cartography.
  - Utilize Port provided figure templates.
    - The template includes a scratch data geodatabase. This is only for processing purposes. Data provided to the Port should be in a finalized geodatabase.



- Data frames and legend areas can be adjusted based on figure needs. Reach out to the Port's GIS Administrator for any questions regarding this topic.
  - Quality Assurance
    - Consultants must employ quality-assurance (QA) for all GIS deliverables, including figures, analysis, results, calculations, applications, web maps, etc.
    - When delivering spatial data in polygon format, the consultant will be responsible for creating and running a topology for coincident geometry prior to data submittal.
    - When delivering spatial data of any geometry type, consultant will be responsible to deploy vertices snapping for coincident and overlapping geometries prior to data submittal.
    - Anything that does not align with the Port of Oakland's GIS SOP, will be sent back to the consultant for revision.
  - Field Work
    - If consultants are to go out in the field, they must provide information as to how they will ensure accuracy ahead of time.
      - Sub-centimeter is what should be aimed for.
    - When using tablet or mobile-based field solutions, a handheld GNSS receiver shall be required to be paired with devices to ensure higher spatial accuracy.
    - If field work includes non-spatial data types (paper inspection records; CCTV inspection runs; site photos) – consultant will be responsible for providing link to spatial data through relative path in spatial data attributes.
      - Non-spatial field data shall be delivered in an organized folder according to Engineering Services Division data management standards.
  - Google earth
    - Only to be used for visualization purposes
    - Must **NOT** be used for any creating, editing, or adjusting of locations. All editing must be done within Esri.
  - CAD Data
    - All CAD data shall follow the Spatial Reference system specifications detailed above.
      - Local datums shall not be used to create data within the CAD environment.
      - Clear and standardized layer naming conventions shall be applied for all spatial layers (see data model section).
        - Block reference layers and other combined layer types that require post-processing, shall be removed by consultant prior to submittal.
    - Before transferring the CAD data, identify and solve any issues that affect the data quality. Ensure it meets data model standards (see data model section) and repair the geometry (such as snapping lines).
    - If spatial data has been created or edited within a CAD environment, original CAD files must be included in data transfer to Port of Oakland GIS.
      - A .dwg or .dgn file format is required; any rendered drawings, Exhibits or As-Builts pdfs generated from CAD shall be included in the transfer.
  - Spatial Data from Utility Modeling Programs
    - If a project deploys spatial data for the purpose of Utility Modeling (i.e. hydrologic flow modeling, subsurface geologic modeling) the project consultant shall engage the GIS administrator during scoping and kick-off phase.
    - Ensure data interoperability between Esri spatial data and specific modeling software.
    - Spatial data must be in the spatial reference system detailed above.
  - Deliverables
    - All naming conventions should be clear and concise. Consult the GIS Administrator on naming conventions if needed.
    - Provide clear and up to date metadata that aligns with FGDC standards.
    - Data should be provided within a finalized folder that has the geodatabase, map package, CAD drawing files, and/or any other requested data.
      - Folder naming convention: Year\_MonthDate\_CompanyName\_ProjectName (example: 2023\_0823\_KimleyHorn\_APMS)
      - Folder should be placed within Port provided sharepoint Received\_files link
- SEE LAST PAGE FOR FOLDER ORGANIZATION**



- Folder organization:
  - Year\_MonthDate\_CompanyName\_ProjectName  
(example: 2023\_0823\_KimleyHorn\_APMS)
    - Data
      - .gdb
      - Images
        - Any aerial imagery placed in here  
naming convention: SOURCE\_DATEOFCAPTURE  
(example: nearmap\_20230823)
      - KML
        - Kmz/kml  
naming convention: DATATYPE  
(example: utility\_point.kmz)
      - Raster
      - CAD
        - Drawing\_files
          - .dwg  
Naming convention should align with as-built or exhibit naming convention.
          - .dgn  
Naming convention should align with as-built or exhibit naming convention
        - PDFs
          - As-Builts  
Naming convention should align with associated .dwg or .dgn file name.
          - Exhibits  
Naming convention should align with associated .dwg or .dgn file name.
    - Maps
      - Map package
    - Outputs
      - Pdfs  
Naming convention: FigureTitle\_YearMonthDate  
(example:PortofOakland\_DrinkingWater\_20230823.pdf)
      - Xls  
Naming convention: TableName\_YearMonthDate  
(example:GroundwaterElevations\_20230823.xls)
    - Metadata
      - Any XML files related to metadata.
        - Naming convention should align with the feature class  
(example: utility\_point.xml)
    - Inspection
      - Inspection Reports
        - Consult the GIS Administrator for naming conventions.
      - Other Media
        - Consult the GIS Administrator for naming conventions.
      - Videos
        - Consult the GIS Administrator for naming conventions.