



**Memorandum**

**To: Paul Marconi, Sedrick James, Tom Chou**  
**From: Guidehouse, Larry Gelbien, Andrew Dressel, Stephanie Lee, Sarah Bilbao**  
**Date: November 2020**  
**Re: Bear Valley Electric Service (BVES) GIS Gap Analysis**

**Analysis Background**

In August 2019, the Wildfire Safety Division (WSD) of the California Public Utilities Commission (CPUC) released a set of geographic information system (GIS) Data Reporting Requirements for the investor-owned utilities (IOUs) to include as part of their regular Wildfire Mitigation Plan (WMP) submissions and quarterly reports. As an IOU, Bear Valley Electric Service (BVES) is required to comply with these requirements. The requirements consist of several components including tables, GIS shapefiles and geodatabases, and supporting documentation explaining the data provided. The data must adhere to specific standards and formats and encompasses five general areas: (1) assets, (2) Public Safety Power Shutoff (PSPS) events, (3) risk events, (4) initiative events, and (5) other data. Additionally, BVES must compute a number of metrics for Tables 1-12 and develop risk assessment maps for the quarterly filing updates.

**Analysis Findings & Recommendations**

BVES contracted Guidehouse to analyze its GIS program and capabilities in relation to the new WSD requirements. The analysis included an assessment of the current state, identification of gaps in the current state and the future state (as defined by the WSD requirements), and recommendations for closing stated gaps. Table 1 below lays out key findings and recommendations related to general GIS / data management best practices, each of the five data areas, required metrics, and required risk assessment maps. The table also notes how often BVES will be required to update the data moving forward.

**Table 1. GIS Gap Analysis Findings & Recommendations**

Finding	Recommendations
<b>General Best Practices            Based on Guidehouse Expertise            Ongoing Considerations</b>	
<b>1. Technology Upgrades:</b> BVES currently operates on ArcMap 10.4, which meets the WSD software requirements.  <b>2. Training:</b> Recent staff departures have led to key gaps in GIS capabilities.	1. No action required. 2. Send 1-2 staff members to GIS training or certificate programs. 3. Define processes for inputting and updating GIS data. Document data input and processing

<p><b>3. Knowledge Management:</b> BVES does not have well defined processes for inputting and updating GIS data. Additionally, it does not currently document its data input/processing processes.</p> <p><b>4. Data Storage:</b> BVES currently backs up its data onsite only. This may cause issues in an emergency or natural disaster that affects that site.</p>	<p>processes for future reference and onboarding of new staff.</p> <p>4. Evaluate opportunities for technology / data storage upgrades, which include offsite backup capabilities.</p>
<p><b>Assets</b></p> <p><b>WSD Requirements 3.1 and 3.2</b></p> <p><b>Annual Updates Required</b></p>	
<p><b>Asset data falls into two subcategories: (a) Partially Complete Data and (b) Incomplete / Unavailable Data. The file types are organized according to these categories.</b></p> <p><b>(a) Partially Complete Data</b></p> <ol style="list-style-type: none"> <li>1. <b>Camera:</b> BVES does not currently have operational cameras in its service territory, although it plans to install them. It already has camera coordinates / locations, however, this data is not in GIS.</li> <li>2. <b>Customer Meters:</b> BVES has its customer meter data in GIS via Milsoft's WindMilMap.</li> <li>3. <b>Fuse:</b> BVES has fuse data in GIS via Milsoft's WindMilMap, however the data does not appear in the correct location in GIS; the data also needs to be updated to adhere to the WSD requirements.</li> <li>4. <b>Substation:</b> BVES has its substation data in GIS via Milsoft's WindMilMap.</li> <li>5. <b>Switchgear:</b> BVES has switchgear data in GIS via Milsoft's WindMilMap, however the data does not appear in the correct location in GIS; the data also needs to be updated to adhere to the WSD requirements.</li> <li>6. <b>Transformer:</b> BVES has transformer data in GIS via Milsoft's WindMilMap, however the data does not appear in the correct location in GIS; the data also needs to be updated to adhere to the WSD requirements.</li> <li>7. <b>Weather Station:</b> BVES currently has its weather station locations in GIS; it will add additional weather stations in the near future.</li> </ol>	<p><b>(a) Partially Complete Data</b></p> <ul style="list-style-type: none"> <li>• BVES needs to update all its templates in Milsoft to adhere to the WSD requirements.</li> <li>• BVES needs to fix Milsoft datasets that are showing up incorrectly in GIS, including fuses, switchgears, and transformer data.</li> <li>• Fill gaps in data, as needed.</li> </ul> <p><b>(b) Incomplete / Unavailable Data</b></p> <ul style="list-style-type: none"> <li>• BVES needs to obtain this data via field surveys or other methods and input this data into its GIS system.</li> </ul>

<p><b>8. Transmission Lines:</b> BVES does not operate any transmission lines.</p> <p><b>9. Primary Distribution Lines:</b> BVES currently has some distribution line data in WindMilMap, however the data needs to be updated to adhere to the WSD requirements.</p> <p><b>10. Secondary Distribution Lines:</b> BVES currently has some distribution line data in WindMilMap, however the data also needs to be updated to adhere to the WSD requirements.</p> <p><b>(b) Incomplete / Unavailable Data</b></p> <p>1. <b>Connection Device:</b> BVES does not currently have connection device data, although it has connection devices installed.</p> <p>2. <b>Lightning Arrestor:</b> BVES does not currently have lightning arrestor data, although it has connection devices installed.</p> <p>3. <b>Support Structures:</b> BVES does not currently have support structure data, although it has support structures installed.</p>	
<p><b>PSPS Events</b></p> <p><b>WSD Requirement 3.3</b></p> <p><b>Quarterly Update Required</b></p>	
<p>1. <b>PSPS Events:</b> To date, BVES has not had any PSPS.</p>	<p>1. Develop a process and plan for documenting PSPS events in GIS in alignment with WSD requirements in preparation for future events.</p>
<p><b>Risk Events</b></p> <p><b>WSD Requirement 3.4</b></p> <p><b>Quarterly Update Required</b></p>	
<p><b>Risk events data falls into two categories: (a) Partially Complete Data Not in GIS, (b) Incomplete / Unavailable Data, and (c) Not Applicable Data.</b></p> <p><b>(a) Partially Complete Data Not in GIS</b></p> <p>1. <b>Wire Down Events:</b> BVES has some wire down events recorded in its outage management log, however this data is not currently in GIS.</p> <p>2. <b>Ignition:</b> BVES has not had any WMP-reported ignition events to date.</p> <p>3. <b>Distribution Outages:</b> BVES has some distribution outage events recorded in its</p>	<p><b>(a) Partially Complete Data Not in GIS</b></p> <ul style="list-style-type: none"> <li>• Update outage data input templates to adhere to WSD requirements.</li> <li>• Fill gaps in data, as needed.</li> </ul> <p><b>(b) Incomplete / Unavailable Data</b></p> <ul style="list-style-type: none"> <li>• Develop process for obtaining data and inputting it in GIS.</li> </ul> <p><b>(c) Not Applicable Data</b></p> <ul style="list-style-type: none"> <li>• No action required.</li> </ul>

<p>outage management log, however this data is not currently in GIS.</p> <p><b>4. Distribution Vegetation Management (VM) Outage:</b> BVES has some distribution vegetation management events recorded in its outage management log, however this data is not currently in GIS.</p> <p><b>5. Risk Event Asset Log:</b> BVES has some distribution vegetation management events recorded in its outage management log, however, this data is not currently in GIS and not at the level of granularity required by the WSD.</p> <p><b>(b) Incomplete / Unavailable Data</b></p> <p><b>6. Risk Event Photo Log:</b> BVES does not currently have this data.</p> <p><b>(c) Not Applicable Data</b></p> <p><b>7. Transmission Outages:</b> BVES does not operate any transmission lines.</p>	
<p><b>Initiative Events</b></p> <p><b>WSD Requirement 3.5</b></p> <p><b>Quarterly Updates Required</b></p>	
<p><b>1. Vegetation Management:</b> Mowbrays only documents completed tree trimming / clearing and does not currently document planned, in-progress, or complete tree inspections in Partners; the current template in Partners does not conform to WSD formatting; there is currently no vegetation management data in GIS.</p> <p><b>2. Asset Management Inspections:</b> Overhead / underground line completed inspection data included in Partners; asset management inspection data is not currently in GIS.</p> <p><b>3. Grid Hardening Initiatives:</b> Only one planned initiative is currently in GIS in the WSD format; no other planned, in-progress, or complete grid hardening initiatives (e.g., covered conductor) are in GIS.</p> <p><b>4. Initiative Photo Log:</b> BVES currently takes photos of some inspection initiatives, however the data does not conform to the WSD requirements.</p>	<p>1. Work with Mowbrays to update Partners data and exported spreadsheet to align with WSD requirements; digitize planned and in-progress inspection data; upload Partners data to GIS. This may require additional funding to adjust Partners data templates and add in documentation for additional data into Partners.</p> <p>2. Work with internal staff to update Partners data and exported spreadsheet to align with WSD requirements; begin documenting planned, in-progress, and complete inspections; upload inspection data to GIS. This may require additional funding to adjust Partners data templates into Partners.</p> <p>3. Input other planned, in-progress, and complete grid hardening initiatives in GIS.</p> <p>4. Develop a photo log that conforms to the WSD requirements. The log should relate to the vegetation management and asset management data.</p>

<b>Other Data</b>	
<b>WSD Requirement 3.6</b>	
<b>Annual Updates Required for All Data Except Red Flag Warning Days</b>	
<p><b>1. Electrical Corporation Power Line Connection Location:</b> BVES knows the location of its connection points to other Southern California Edison (SCE), however, it does not have this data in GIS.</p> <p><b>2. Critical Facilities:</b> BVES currently tracks critical facility information and has updated this information in GIS.</p> <p><b>3. Red Flag Warning Days:</b> BVES currently receives Red Flag Warning data from its meteorologist in Excel format, however the data is not regularly input into GIS.</p> <p><b>4. Administrative Areas:</b> BVES currently has its service territory (operational) boundaries in GIS, however, it does not have other boundaries (e.g., circuits) in GIS.</p>	<p>1. Input SCE connection point data into GIS, conforming to WSD requirements.</p> <p>2. No near-term action required. Continue to update facility data as needed.</p> <p>3. Develop process for uploading red flag warning data into GIS as needed.</p> <p>4. Input other administrative boundaries (e.g., circuit boundaries) in GIS.</p>
<b>Performance Metrics and Underlying Data for Quarterly Reports</b>	
<b>WSD Requirement Section 6 (Tables 1 – 11)</b>	
<b>Quarterly Updates Required for All Metrics and Underlying Data</b>	

<p>BVES has most of the data required to calculate the underlying metrics by the WSD's desired locational breakdown (high fire threat designation zones, urban/ rural /highly rural, and Wildlife Urban Interface (WUI)). in GIS, however many of the metrics have not been previously calculated. Additionally, BVES does not have a formal process for calculating and reporting the metrics regularly. All metrics must align with the asset, initiative, risk and other data listed above. Metrics that need to be calculated in GIS include:</p> <ol style="list-style-type: none"><li><b>1. Table 6 -- Red Flag Warning Circuit Mile Days:</b> Metrics broken down by High Fire Threat Designation (HFTD) Zone, as requested by the WSD.</li><li><b>2. Table 8 – State of Service Territory:</b> Metrics broken down by urban, rural, highly rural, and Wildlife Urban Interface (WUI).</li><li><b>3. Table 9 – Location of Actual and Planned Utility Equipment Additions and Removal Year Over Year:</b> Metrics broken down by urban, rural, highly rural, and Wildlife Urban Interface (WUI).</li><li><b>4. Table 10 – Location of Actual and Planned Utility Infrastructure Upgrades Year Over Year:</b> Metrics broken down by urban, rural, highly rural, and Wildlife Urban Interface (WUI).</li></ol>	<p>For all metrics, BVES should calculate the metrics to the extent possible for the next quarterly filing. The utility should also develop a process for calculating these metrics regularly as it updates its risk, initiative, asset, and other data.</p>
<p><b>Performance Metrics and Underlying Data for Quarterly Reports</b> <b>WSD Requirement Section 6 Risk Assessment &amp; Mapping (Table 12)</b> <b>Quarterly Updates Required for All Metrics and Underlying Data</b></p>	

<p>In addition to metrics, the WSD has requested utilities undertake specific initiatives related to Risk Assessment and Mapping. These initiatives should be completed in GIS. These initiatives include:</p> <ol style="list-style-type: none"><li><b>1. Summarized Risk Map (Initiative 5.3.1.1):</b> BVES currently quantifies wildfire risk in Excel format, but the utility does not have a summarized risk map, showing ignition probability and estimated wildfire consequence.</li><li><b>2. Climate-Driven Risk Map (Initiative 5.3.1.2):</b> BVES has retained a meteorologist to provide weather forecasts and has installed weather stations to gather weather data, however the utility does not have a climate-driven risk map and modelling, showing various weather scenarios.</li><li><b>3. Ignition Probability Mapping (Initiative 5.3.1.3):</b> BVES currently quantifies wildfire risk in Excel format, but the utility does not have a map illustrating ignition probability along electric lines and equipment.</li><li><b>4. Initiative Mapping and Estimation of Wildfire and PSPS Risk-Reduction Impact (Initiative 5.3.1.4):</b> BVES currently analyzes wildfire risks and initiative risk reduction impacts in Excel format, but the utility does not have these risks and risk reduction impacts in a map.</li><li><b>5. Match Drop Simulations (Initiative 5.3.1.5):</b> BVES currently analyzes wildfire risks in Excel, however the utility has not conducted match drop simulations in GIS to understand the consequence of ignitions that occur along the electric lines and equipment.</li></ol>	<p>For all maps, BVES should hire a consultant to complete each of these assessments, given current staff knowledge and skillset in GIS. All assessments require deep technical knowledge about GIS and modelling in GIS.</p>
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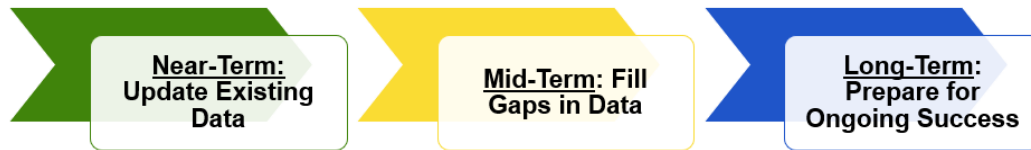
### Funding Considerations

All recommendations above require additional funding if BVES chooses to engage external contractors for support. Given the scope of the updates and staffing constraints, Guidehouse recommends that BVES uses external contractors on an as-needed basis to fill in key capabilities, such as technical support for GIS and GIS-related analysis, field surveying for missing data, documenting data update processes and training staff.

### Findings & Recommendations Roadmap

Guidehouse has developed a roadmap to prioritize next steps in the near-term (3 – 5 months), mid-term (6 – 9 months), and longer-term (9 months+). Near-term steps represent quick wins, such as converting existing data into the proper format to align with the WSD requirements. Mid-term steps represent critical steps that require more effort and therefore, require additional time to complete. Finally, longer-term steps represent steps that will ensure BVES is prepared to meet the ongoing needs of the WSD requirements. Figure 1 provides a high-level overview for how BVES should implement the recommendations.

**Figure 1. Roadmap for Implementing Recommendations**



**Near-term Actions (3 – 5 months): Focus on updating existing data**

- Begin updates to existing Risk, Initiative, and Weather Data (Red Flag Warning Days) for the next **Second Quarterly Filing due December 9, 2020, covering Q3 updates**. BVES previously stated it would provide an update on these filings. Guidehouse recommends showing progress towards fulfilling the WSD requirements. Specifically, BVES should:
  - **Risk Data** – convert existing data to the WSD format in Excel. Input the converted format into GIS. Utilize the new format for Q4
  - **Weather Data** – request updated data from Ben Brissley following the WSD format. Input the updated data into GIS, using the converted format.
  - **Initiative Data** –
    - **Vegetation Management**: begin updating current Partners data to conform to WSD requirements in GIS. Digitize planned and in-progress inspections in GIS.
    - **Grid Hardening**: Identify grid hardening projects that could easily be recorded in GIS. Digitize and add to GIS, accordingly.
    - **Asset Management Inspections**: begin updating existing data to conform with WSD requirements in GIS.
  - **Metrics** – calculate metrics according to WSD designations (urban, rural, highly rural, WUI) for all existing initiative and asset data.
- Prepare **PSPS Data** templates for future use and report preparation activities. Specifically, BVES should:
  - Develop templates for documenting PSPS data according to the WSD format. Train staff on the templates for future use.
  - Correct existing **asset data**, including switchgears, fuses, distribution lines and transformers, which have incorrect coordinates / location data in GIS.
- Begin **Risk Assessment & Mapping** analyses, including Summarized Risk Map, Climate Driven Risk Map, and Ignition Probability Map in collaboration with an external contractor. Leverage existing data for these analyses.
- As BVES updates its software and hardware enterprise-wide, consider opportunities for different **data storage options**, especially for offsite backup.

**Mid-term Actions (6 months – 9 months): Fill remaining gaps in data**

- Fill gaps in **asset data**, including lightning arrestors, connection devices, and support structures. Specifically, BVES should:
  - Identify internal or external resources to survey equipment and gather data on missing assets.
  - Gather data on missing assets.
  - Input data into GIS and develop a plan and process for updating the data as needed.
- Fill gaps in **initiative data**, including documenting planned and in-progress asset management, vegetation management, and grid hardening initiatives on an ongoing basis.
- Fill gaps in **all remaining data** sets. The WSD requested a significant amount of data for each dataset. BVES should identify reasonable methods for filling remaining gaps in the data on an on-going basis.



- Finalize other **Risk Assessment & Mapping** analyses, including Initiative Mapping and Estimation of Wildfire and PSPS Risk Reduction Impact and Match Drop Simulations. Guidehouse recommends using an external contractor to fulfill these requirements.

**Long-term Actions (8 months+): Prepare for long-term success**

- **Training** -- As new staff is on-boarded, provide training opportunities to learn and hone GIS skills through specialized workshops, conferences, or certificate programs.
- **Knowledge Management** – Define process for updating data in relevant databases (OMS, Milsoft, and GIS) and for updating metrics and risk-related maps over time. The processes should define key steps, data handoffs, and QC processes. All information should be documented in a guide for employees.
- **All Data** – Continue to update data on an ongoing basis in alignment with WSD requirements.