**PROBLEM STATEMENT**

A rise in population and activity within the West Point Training Reservation prompted the need for an analysis of the current well infrastructure to assess its capacity and demand. This analysis is a crucial aid for the engineering team in determining what design features are necessary based on projected future demand and current system constraints.

**STUDY APPROACH**

**METHODS AND DESIGN**

- **Phase 1)** Research: Hydrogeologic analysis, site recon, and water demand calculations provided system constraints and design parameters necessary to formulate potential COAs.
- **Phase 2)** Initial COAs: Created COAs based on future water demand, potential environmental impacts, and projected recreational activity within the areas of interest and compared their benefits.
- **Phase 3)** Final COA/Recommendation: Based on the needs of the customer and previously identified constraints, a final recommendation combined the most beneficial aspects of each COA created.

**DESIGN OBJECTIVES POST COA DECISION**

1. Design a storage system at Lake Frederick.
2. Locate prospective well drilling locations at Round Pond.
3. Create a specific well design for prospective wells.

**ECONOMIC ANALYSIS**

**Table 1:** Final analysis of the net present value (NPV) and the cost of drilling a new well and installing new well storage at Lake Frederick.

<table>
<thead>
<tr>
<th></th>
<th>New Well (NPV)</th>
<th>Well Storage (Cost)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV</td>
<td>$7,042</td>
<td>$195,414</td>
</tr>
<tr>
<td>Cost</td>
<td>$136,182</td>
<td>$9,000</td>
</tr>
</tbody>
</table>

**DEMAND CALCULATIONS**

**Table 2:** Current and Future demand (gallons/month) calculations based off the rated capacity of the current wells and the projected infrastructure changes at each location.

<table>
<thead>
<tr>
<th></th>
<th>Round Pond</th>
<th>Lake Frederick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Demand</td>
<td>262,800</td>
<td>137,000</td>
</tr>
<tr>
<td>Future Demand</td>
<td>285,400</td>
<td>227,000</td>
</tr>
</tbody>
</table>

**RESULTS AND RECOMMENDATION**

- Well locations at Round Pond can be expected to yield between 5-10 gallons per minute (GPM) due to characteristics of the fractured bedrock dominant at the site.
- Lake Frederick wells have significantly higher yield from the more porose glacial till formations.
- It is possible to drill wells at both sites, however, simply increasing storage at Lake Frederick is more than sufficient due to the higher yields.

**ACKNOWLEDGEMENT & REFERENCES**