August 27th BCC Staff Report

Possible Direction to Staff:

- Continue to fund flood response activities
- Design and competitively bid projects to create volume in lake
- Obtain Board approval on required agreements for use of property, easements, licenses
Swan Lake Closed Hydrobasin Update

WASHOE COUNTY COMMISSION DIRECTIVES

• Manage Swan Lake within current boundaries
• Prevent water from entering homes and businesses
• Maintain open roadways for emergency responders

➢ Flood response funding; general fund contingency, stabilization and water rights sale proceeds (June 27, 2017 and Sept 12, 2017)

• Total Washoe County flood response
  • $11.45M
• Lemmon Valley flood response
  • $8.83M
• Average monthly operation and maintenance - $230K
## Swan Lake Closed Hydrobasin Update

### FEMA Reimbursements

<table>
<thead>
<tr>
<th></th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Requested</td>
<td>$3,043,952</td>
</tr>
<tr>
<td>Total Received to Date</td>
<td>$849,229</td>
</tr>
</tbody>
</table>

### Project Completion Deadlines

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Deadline Date</th>
<th>4303 January Flood</th>
<th>4307 February Flood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debris clearance - category A</td>
<td>6 months</td>
<td>08/17/17</td>
<td>09/27/17</td>
</tr>
<tr>
<td>Emergency work - category B</td>
<td>6 months</td>
<td>08/17/17</td>
<td>09/27/17</td>
</tr>
<tr>
<td>Permanent work - category C-G</td>
<td>18 months</td>
<td>08/17/18</td>
<td>09/27/18</td>
</tr>
</tbody>
</table>
HESCO Barrier

- In place since March 2017
- Concerns raised by various groups from time to time
- Hired third-party professional for evaluation
- Fit for purpose, well-constructed, performing very well, recommendations made

Response

- Have completed consultant recommendations
- Continue to inspect/maintain

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Dear Washoe County,

This is a report that summarizes my review of the HESCO Bastion flood defense around Swan Lake in Washoe County, NV.

**Initial Introduction:**

Flood Defense Group specializes in the supply, installation, and/or support of temporary flood defense measures throughout North America. As an organization, we represent a vast variety of products and solutions within this region and cover the majority of designs regularly deployed within this market space. Our unique expertise lies in the ability to provide objective feedback on a broad variety of products and solutions unique to the needs of the end user or flood event in question. One of our options include the HESCO Bastion line of flood barriers.

Flood Defense Group has not been involved in any aspect of the HESCO Bastion built in Washoe County and have been called to review the current material in place based on experience and understanding of the product. I have had significant experience with building HESCO Bastion since 2003 and am currently listed as a technical support dispatcher for flood defense deployments by the USACE with this product which has remained their primary tool for flood defense since around 2014.

**Initial Summary:**

After reviewing the HESCO Bastion flood barriers installed within Washoe County, it is my belief that these barriers are fit for purpose and can be expected to perform as designed under floodwaters rise. These barriers appeared to be in good condition and built correctly except for some footprint issues along Lemmon Drive. Discussion on reinforcing this section and general repairs are detailed below but none of these issues cause concern for a catastrophic failure.

Below is a detailed review of the HESCO Bastion flood defense built within Washoe County. This includes aspects from product selection, product design, product construction, product performance, existing problems, corrective actions, general maintenance, and what to expect with regard to the usage of this product and how to extend it as required.
Swan Lake Water Quality

- WC Health District tested Swan Lake water in 2017 and 2018
- Community Services Department collects monthly samples
- Swan Lake continues to meet and exceed Federal guidelines for recreational water quality standards (WC Health District Aug 12, 2019)

On August 8, 2019, the Washoe County Health District (WCHD) was sent and requested to review analytical sample results from various sampling events of Swan Lake in the late spring/early summer of 2019. The review was requested by the Washoe County Community Services Division and as part of the review, these samples were compared with sample results taken in 2018. Samples were reviewed and evaluated based on guidance documents developed by the United States Environmental Protection Agency (EPA) for recreational bodies of water and surface water standards for bodies of water not used as potable water supplies. Samples taken on 4/17/2019, 5/23/2019 and 6/25/2019 were tested for Total Coliform, E. Coli, water quality parameters, anions, flow injection analysis, trace metals and Mercury. Additionally, samples were collected on 05/06/2019 which were only tested for Total Coliform and E. Coli. Review of the submitted results show proper chain of custody and associated Quality Control Reports with the results.

Review of the ten samples taken over the four sampling events show a range of Total Coliforms from 8.4 to greater than 2,419.6 MPN/100ml. These results only demonstrate the presence of potential bacteria in the water. The sample results for E. Coli had a range of non-detect (ND) to 71.7 MPN/100ml (ND, ND, ND, 2.0, 3.1, 4.0, 5.2, 9.7, 24.3 and 71.7). Therefore, the results are well below the limits for bacterial contamination for a recreational water body. The highest test result for E. Coli reviewed by the WCHD in 2018 was 18.9 colony forming units per 100ml (cfu/100mL) whereas the Environmental Protection Agency’s (EPA) recommended guidance for the geometric mean (GM) and statistical threshold value (STV) should not exceed 126 and 410 cfu/100mL respectively. For clarity, CFU refers to “colony forming units” which is the actual count of the test plate whereas MPN refers to “most probable number” and is the statistical probability of the number of organisms on the plate.

A review of the non-microbiological sample results demonstrate no analytes of concern for which WCHD would recommend people or pets stay out of the water. Recently the public has been concerned with arsenic levels in Swan Lake. The submitted analytical results for Arsenic in Swan Lake ranged from 0.019-0.040 mg/L, whereas the maximum contaminant level of arsenic allowed in drinking water is 0.010 mg/L and in surface bodies of water the EPA guidance is for less than or equal to 0.050 mg/L total arsenic.

As in the past, WCHD continues to recommend and support CSD continuing a proactive routine sampling schedule for Swan Lake to continue to demonstrate the water is not detrimental to public health or the environment. If you have any questions regarding the interpretation of this analytical data, please contact me at jenglish@washoeCounty.us.
Projects that create volume in lake
- Land application
- Flood pool management

Projects that maintain protections
- Barrier/Berm
  - Pompe Way, east side
  - Lemmon Valley Elementary School (if triggering event occurs)
  - Patrician, Lemmon Drive (if triggering event occurs)

Operations and Maintenance
- Lemmon Valley Water Reclamation Facility
  - Mechanical spray aeration of Class C
  - Enhanced evaporative pond management
<table>
<thead>
<tr>
<th>Action Item</th>
<th>Benefit</th>
<th>Status</th>
<th>Estimated Construction Cost*</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Application</td>
<td>Additional storage volume in lake</td>
<td>Installation pending property access, base-line testing</td>
<td>$60K - $200K, BCC approval needed</td>
<td>Winter 2019/Spring 2020</td>
</tr>
<tr>
<td>Flood Pool Management</td>
<td>Additional storage volume in lake</td>
<td>Equipment in place, requires agreement with property owner</td>
<td>Easement required, BCC approval needed</td>
<td>Continue this action</td>
</tr>
<tr>
<td>Barrier/Berm –Pompe Way, East Side</td>
<td>Enhanced protection</td>
<td>Waiting for lowest lake level, will require working in water, requires property owner(s) approval</td>
<td>$300K - $450K, WC self-perform</td>
<td>Begin construction mid October 2019</td>
</tr>
<tr>
<td>Barrier Additions</td>
<td>Enhanced protection</td>
<td>Materials on hand, requires property owner approval</td>
<td>$40K - $80K</td>
<td>Will implement if/when trigger event occurs</td>
</tr>
<tr>
<td>LVWRF - Effluent Spray Project</td>
<td>Reduce discharge of treated effluent</td>
<td>Engineering study in progress</td>
<td>$75K - $150K</td>
<td>Spring 2020</td>
</tr>
</tbody>
</table>
Swan Lake Closed Hydrobasin Update

Noticeable On-Going Activities
• Field response to precipitation and flooding events
• Roadside ditch cleaning
• Bentonite application on Pompe Way
• Maintenance of pumps and piping
• Weed abatement
• Mosquito abatement

Near-Term Activities (6-12 months)
• Install pumping and piping – land application
• Lemmon Valley Water Reclamation Facility – Berm Modifications
• Removal of inflatable dams - Pompe Way and Jean Way area
• Construction of berm behind residential properties (east side) - Pompe Way
LONG-TERM MITIGATION PLANNING

Regional Hazard Mitigation Plan (RHMP)

- A comprehensive and inclusive planning process
  - Required by FEMA every 5-years

- Development of mitigation strategies
  - Required as a condition of grant funding application

- Collaborative information sharing
  - Covering all 13 regional hazards, while focusing upon hazards that occurred over the last 5-years

Washoe County
Regional Hazard Mitigation Plan Update

- Community engagement and participation

Take our community survey today!
https://www.surveymonkey.com/r/KBTQXMF
LONG-TERM MITIGATION PLANNING

CLOSED BASIN MITIGATION PLAN

- FEMA Process
- Regional Stakeholders
- Feasibility studies
- Cost and funding strategies

STATUS

- Engineering studies underway
- DRI Predictive Model
- Lemmon Drive enhancements
- WRWC Support and Partial Funding
August 27th BCC Staff Report

Possible Direction to Staff:

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QUESTIONS?
East Lemmon Valley Hydrographic Basin

SWAN LAKE HISTORIC LAKE LEVELS

INFORMATION PROVIDED BY DESERT RESEARCH INSTITUTE - DEC. 2017

Estimated Stage (Feet)

Calendar Year


2.5 5.5 1.5