Section 1

Introduction

Pima County RWRD owns and operates the Mt. Lemmon WRF. The Mt. Lemmon WRF was constructed in the early 1980s, has a design capacity of 15,000 gallons per day (gpd), and serves the community of Summerhaven, Arizona. The current average daily flow rate is approximately 2,300 gpd, but can range from approximately 500 gpd to 5,000 gpd under normal conditions. Peak flows of up to approximately 21,000 gpd were the result of a fixture being left on at a public restroom. Since the Mt. Lemmon WRF went into service back in the early 1980s, the WRF has operated continuously and has never been taken off-line for inspection of the tankage and other equipment. Brown and Caldwell (BC) was contracted to evaluate the feasibility of using a vault and haul operation to allow the WRF to be inspected and possibly rehabilitated or replaced.

1.1 Scope of Work

The scope of work for this feasibility study includes an analysis of required improvements to the Mt. Lemmon WRF in order to allow for vault and haul operations for the following three scenarios:

- Short term vault and haul (2 weeks to 2 months)
- Long term vault and haul (2 months or 2 years)
- Permanent vault and haul (greater than 2 years).

As part of the feasibility of implementing a vault and haul operation, the following items were included in this feasibility study:

- Verify the capacity and evaluate the condition of the existing tankage available for receiving and storing effluent.
- Determine if additional holding capacity is required.
- Evaluate the current influent system (pumps, pipes, valves, etc.) and how they can be modified to support a vault and haul operation.
- Evaluate the existing electrical and instrumentation capabilities and limitations.
- Determine how the current permits are affected by going to a vault and haul operation.
- Develop budgetary costs estimate for the various alternatives and improvements.

The feasibility study included analyzing and providing recommendations for:

- Tankage capacity needs, including level indication
- Influent flow measurement
- Additional influent loading operation needs (load stand, tanker access drive area, pumps, additional or larger tankage, etc.)
- Spill prevention
- Odor control
- Freeze protection
- Electrical upgrades
- Emergency power
- Operation and maintenance (O&M) costs
Section 2
Existing Facilities and Conditions

The Mt. Lemmon WRF is located near the small community of Summerhaven on Mt. Lemmon and is owned and operated by Pima County RWRD. Sewerage service is limited to 77 connections, provided the daily average flows do not exceed 12,500 gpd average flow and 17,000 gpd daily maximum flow. The service area is primarily residential, with a few commercial customers such as restaurants, general store, and gift shops. Effluent from the WRF is pumped to spray irrigation fields on United States Forest Service (USFS) property on the San Pedro River watershed side of Mt. Lemmon.

Photograph 2-1. Mt. Lemmon WRF

Photograph 2-2. 10-Acre Spray Irrigation Fields

The Mt. Lemmon WRF treatment building is shown in Photograph 2-1 and the 10-acre spray irrigation fields on USFS property is shown in Photograph 2-2.

2.1 Climate Conditions

The general climate at the Mt. Lemmon WRF is cooler than nearby Tucson, Arizona. Summertime weather is above freezing and is relatively mild; however, precipitation from summertime monsoons can be significant. In the winter, annual snowfall of approximately 65 inches and temperatures often below freezing at night can be expected. Table 2-1 summarizes monthly climate data for the Mt. Lemmon WRF.

<table>
<thead>
<tr>
<th>Table 2-1. Climate Data for Summerhaven, AZ from 1958 to 2011</th>
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</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Average Max. Temperature (F)</td>
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<tr>
<td>Average Min. Temperature (F)</td>
</tr>
<tr>
<td>Average Total Precipitation (in.)</td>
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<tr>
<td>Average Total Snowfall (in.)</td>
</tr>
<tr>
<td>Source: Western Regional Climate Center, Station 025732</td>
</tr>
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</table>

Brown and Caldwell
Section 5

Treatment Plant Alternatives

In addition to the vault and haul feasibility summarized in this Study, various treatment plant alternatives were considered including:

- Installation of private septic and holding tanks and decommission WRF
- Perform repairs to existing WRF and remain under General Permit 1.09
- Replace WRF with package plant to meet BADCT requirements.

5.1 Installation of Private Septic or Holding Tanks

This treatment plant alternative considered decommissioning the WRF permanently without upgrading or replacing the WRF. The alternative would mandate that current connections to the wastewater collection system be abandoned, and currently connected wastewater customers install private septic or holding tanks. The Summerhaven community currently has many residents that either have septic systems or holding tanks and are not connected to the Pima County RWRD-owned wastewater collection system. Appendix C includes a figure of current connections to the WRF. Permitting and other considerations for the installation of private septic and holding tanks are discussed in the following sections.

5.1.1 Permitting Requirements for Installation of Private Septic or Holding Tanks

BC contacted PDEQ regarding the possibility of installing private septic or holding tanks and the initial response from PDEQ was that it is possible as long as the permitting requirements are met. The following requirements are for a septic only permit and have to be submitted to PDEQ for approval:

- Signed Notice of Intent (NOI) to Discharge
- Signed Site Suitability Checklist
- Soils Report – Percolation test results and/or soil characterization data prepared by an Arizona Registrant (Civil or Geotechnical Engineer)
- Site Plan:
  - Location of proposed septic tank and leach field
  - Existing and proposed buildings and structures, driveways, parking
  - Distances from property lines, buildings and structures
  - Location of utilities and wells
  - Existing and proposed topography.
- Materials List
- Design calculations/trench profile
- If applicable:
  - Signed Alternative Feature Request (A31.2G) with supporting documentation
  - Signed Request for Waiver with supporting documentation.
Requirements for permitting septic tanks are defined in AAC R18-9-E302 (Type 4.02 General Aquifer Protection Permit). NOI application, site suitability determination guidelines, percolation test data sheet, and request for approval of alternative feature forms are included in Appendix C. There are setback requirements, site requirements, and design requirements that must be met in order to obtain a permit. Due to the close proximity to Sabino Creek and small parcel sizes, it is anticipated that several properties will not meet setback requirements. Setback requirements include:

- Five feet or more from a driveway or easement.
- Ten feet (water main), 5 feet (domestic line).
- Ten feet or more to structures including decks, porches, etc.
- Five feet or more to a swimming pool.
- Fifty feet to a wash that drains more than 20 acres.
- One hundred feet or more to a well.
- Five feet or more from property lines.
- Fifty feet from property line if no central water source.
- One hundred feet to live or intermittent stream.
- Two hundred feet to surface water drinking source.
- One hundred feet to lake, reservoir, or canal.
- One hundred feet to an earth fissure.
- Downslopes or cut banks >15 percent, culverts, and ditches from: septic tank – 10 feet, disposal field if no limiting condition within 12 feet of land surface – 20 feet (50 feet if limiting condition exists).

Due to the close proximity to Sabino Creek, a significant number of residences will not meet the 100-foot setback requirement from a live or intermittent stream and will not be able to install a septic tank. In addition, many of the property parcels are relatively small and may not meet other setback requirements or have the room for a septic tank with a leach field. In cases where setback requirements are not able to be met for septic tank installations, a NOI for an Alternative On-Site Wastewater Treatment Facility can be applied for in order to install a holding tank (sewage vault). There are still setback requirements for holding tanks that may require a waiver if setback requirements are unable to be met. Also, properties that do not pass the percolation test or do not have suitable site requirements will also have to apply for a NOI for an Alternative On-Site Wastewater Treatment Facility to install a holding tank.

Due to regulations that state there will be no disposal of wastewater to the Sabino Creek/Sabino Canyon basin, all holding tanks on Mt. Lemmon require the following additional design requirements to prevent releases:

- Double containment tanks with leak detectors placed between containment walls.
- Install solenoid valve on water service line to residence.
- Flood Control Permit to allow holding tank if within the floodplain.

If the holding tank leak detector or high level signal is activated, the water service solenoid valve will automatically close preventing the residence from contributing any additional wastewater flows to the holding tank. The tank will then need to be serviced prior to the water service being restored.
5.1.2 Other Factors for Installation of Private Septic or Holding Tanks

There are other factors that should be considered and evaluated if this alternative is to be pursued including:

- Public Relations – Private vault and haul will be expensive and inconvenient. Future growth of Summerhaven may be decreased due to inability to meet septic or holding tank requirements.
- Permitting Issues – There may be some properties that are too close to the creek or have no room to install a holding tank, leaving no wastewater disposal option.
- Water Rights – Treated wastewater that was once disposed of on Mt. Lemmon will now be hauled down off of Mt. Lemmon.
- Abandon WRF and Collection System – Once the WRF and Collection System are abandoned, it would be very difficult to reinstate this infrastructure in the future if ever required.

The current properties connected to the collection system are shown in a figure in Appendix C. In order for this alternative to be successful, there has to be 100 percent transition to septic and holding tanks. If it is determined that one or more of the properties are not able to be converted over to septic or holding tanks, the existing WRF will have to remain in service. By only converting some of the existing connections over to this alternative, it will be more difficult to operate the WRF due to the decrease in flows and the cost to operate the WRF per connection will increase due to fewer connection fees.

There are a few existing connections that will need to be carefully examined if the decision is made to further investigate this alternative:

- United States Post Office – Coordination with federal government.
- Restaurants – Sized to handle larger flows during peak tourist season.
- Community Center – Sized to handle larger flows during peak tourist season.

There were no site visits to investigate the feasibility of installing septic and holding tanks on currently connected properties and, therefore, this alternative analysis should be considered a desktop review only. It is recommended that if this alternative is considered, an additional site study is performed to determine the feasibility of this alternative.

5.2 Perform Repairs to Existing WRF

Repairs to the structure and process equipment of the existing WRF is possible under the existing General Permit 1.09 without resulting in a change in process technology and more stringent BADCT requirements. The existing WRF can be taken out of service and the facility inspected to determine the extent of repairs required. Existing structure repairs can be completed to extend the life of the facility. The existing equipment can be replaced with the same equipment or a similar technology such that the existing treatment process remains the same.

In order to perform repairs to the existing WRF, condition assessment of the WRF equipment, tanks, and infrastructure needs to be performed. Initiating the short term vault and haul option will allow the WRF tanks to be drained, cleaned and assessed. It is recommended that the following inspections are conducted as part of the condition assessment of the WRF:

- Inspect steel tankage using ultrasonic testing to determine wall thickness.
- Inspect aeration equipment.
- Inspect blowers/compressors.
- Inspect pumps and piping.
- Inspect mixing systems.
4.3 Hauling Contractors

Several licensed hauling companies were evaluated to perform daily trips to remove wastewater from the Mt Lemmon WRF storage tanks. The table below summarizes information collected on these companies:

<table>
<thead>
<tr>
<th>Hauler Business Name</th>
<th>Maximum Volume Capacity (Gallons)</th>
<th>Costs</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Busy D Pumping</td>
<td>4,000</td>
<td>$1,080 weekdays or $1,275 weekends/holidays</td>
<td>Number of trucks: 1 truck at 4,000 gallons, 1 truck at 3,500 gallons, 4 trucks at low capacity volumes.</td>
</tr>
<tr>
<td>Curtis Plumbing Services</td>
<td>3,300</td>
<td>$495</td>
<td>Number of trucks: 1 truck at 3,300 gallons, 1 truck at 2,500 gallons, 1 truck at 1,500 gallons.</td>
</tr>
<tr>
<td>AZ RoadRunner</td>
<td>2,500</td>
<td>-</td>
<td>Back-up for Busy D Pumping.</td>
</tr>
</tbody>
</table>

1 Cost based on Manhole Number MH-8716-03 disposal.

All hauling companies listed are licensed and have multiple trucks available for hauling. Busy D Pumping has a 4,000-gallon hauling truck and also use AZ Roadrunner as a backup. Curtis Plumbing Services also has multiple trucks available for hauling.

Haulers have stated that additional charges may be added to the costs listed in the table above, including additional waiting times related to traffic on the mountain and standby times in excess of 10 minutes. It was estimated that these additional costs would be approximately $20 for every 15 minutes, but these costs may vary from hauler to hauler.

A contingency plan should be in place in the event a hauler will not be able to meet the requirements of the vault and haul program. The haulers have agreed verbally that they would be willing to haul off the mountain during inclement weather and other conditions such as periods of high traffic volumes, cyclists, etc. However, these statements should be further discussed during the contracting with these companies. In addition, a contingency plan should be in place in the event a hauler is unable or unwilling to service the facility. This plan may include having multiple companies under contract to service the facility, or Pima County RWRD may have a Pima County RWRD vehicle that can service the facility.

4.4 Risks

There are several inherent risks associated with a vault and haul system based on the set-up and the location of the WRF.

4.4.1 Hauling Risks

Daily travel on the Mt. Lemmon Highway, described as a two-lane, steep, winding road with narrow shoulders, is a potential risk for the hauler. The distance from the WRF to the designated disposal Manhole is approximately 31 miles as shown in Figure 4-3. Associated risks include the potential hazard of cyclists that ride the mountain road, wildlife crossing, pedestrians crossing the road in Summerhaven and Windy Point, daily travel to the site up a steep driveway, and limited turning radiiuses for the haul truck. In addition, the highway is subject to closures during forest fires, landslides, flooding, and inclement weather. If a highway closure occurs, the septic haul truck cannot conduct the daily trip, leading to possible tank volume capacity exceedance, which could lead to a permit violation and possible fines. In addition to risk during travel, the haul truck also has the