

# Boyce Park AMD System Sampling

## 1. Water Chemistry Parameters/Procedure

- a. Parameters—Samples will be collected and sent to an Independent lab 1 per year for the following:
  - i. pH
  - ii. Alkalinity
  - iii. Hot Acidity
  - iv. Total Manganese
  - v. Total Iron
  - vi. Total Aluminum
  - vii. Dissolved Iron
  - viii. Dissolved Aluminum
- b. Parameters—Samples will be field analyzed with meter and field kits at each visit for the following:
  - i. pH
  - ii. Conductivity
  - iii. Alkalinity
  - iv. Acidity
  - v. Manganese
  - vi. Iron
  - vii. Aluminum
  - viii. Sulfate

## 2. Flow Procedure

- a. Using bucket w/ stopwatch
- b. Place bucket under flow for as long as possible without overflowing the bucket.
- c. Record #of Gallons on bucket and Time from the stopwatch
- d. Complete 2 replicates
- e. Covert to Gallons/Minute and Average the 2 replicates

## 3. Sample Points (every 6 months minimum)

- a. BP2RAW-Outlet of Collapsed Pipe Structure into BP@ Limestone Pond—Water Chemistry Only
- b. BP3RAW-Surface Discharge into Inlet Box w/ Grate #1—Water Chemistry Only
- c. BP3-VFW Outfall-Outlet of Inline Structure #1 into BP2/BP3-Pond—Flow Only
- d. BP2/BP3 Pond Outfall-Outlet of Inlet Structure #1—Flow & Water Chemistry
- e. BP4 Pond #2 Outfall-Outlet of Inlet Structure #3—Flow & Water Chemistry
- f. Constructed Wetland/Final Outfall-Outlet of Inlet Structure #4—Flow & Water Chemistry
- g. BP4-Pond #1 Outfall-Outlet of Inlet Structure #2—Flow & Water Chemistry
- h. BP4RAW-Outlet of Pipe into Inlet Box w/ Grate #1—Flow & Water Chemistry

# Boyce Park AMD System Maintenance

## BP4 VFW #1-At Least Once Every Month

1. Remove 1 stoplog from inlet structure #2 in BP4 Pond #1
2. Allow water level in BP4 Pond #1 to go down. (In the meantime remove stoplogs at BP4 Pond #2 and BP2/BP3 Pond)
3. Replace stoplogs in BP4 Pond #1
4. Remove all stoplogs from Inline Structure #2 and open Manual Flush Valve #2
5. After 15 Minutes close Manual Flush Valve #2 and replace all of the stoplogs in Inline Structure #2, making sure to provide a 2-foot water column over the compost layer in the VFW.

## BP4 VFW #2 (At Least Once Every 2 Months)

1. Follow procedure from BP4 VFW #1

## BP3 VFW Flushing-Periodically (At Least Once Per Quarter)

1. Remove 1 stoplog from inlet structure #1 (check for and remove any accumulated debris prior to removing stoplog) in BP2/BP3 Pond (2 stoplogs if flushing BP2 Limestone Pond)
2. Allow water level in BP2/BP3 Pond to go down. (In the meantime remove stoplogs at BP4 Ponds)
3. Replace stoplogs in BP2/BP3 Pond.
4. Remove all stoplogs from Inline Structure #1.
5. After 15 Minutes replace all of the removed stoplogs, making sure to provide a 2-foot water column over the compost layer in the VFW.

## BP2 Limestone Pond-Periodically (At Least Once Per Quarter)

1. Remove 1 stoplog from inlet structure #1 in BP2/BP3 Pond (2 stoplogs if flushing BP3VFW)
2. Allow water level in BP2/BP3 Pond to go down. (In the meantime remove stoplogs at BP4 Ponds)
3. Replace stoplogs in BP2/BP3 Pond.
4. Open the Manual Flush Valve #1 for 10 Minutes
5. Close Manual Flush Valve #1

IF after Manual Flushing, BP4 VFW #1, BP4 VFW #2, BP3 VFW and BP2 Limestone Pond are still not treating the AMD adequately or if visual observations of the limestone bed indicate short-circuiting of water across the top of the limestone or compost due to iron precipitates armouring the surface, the arrangements should be made to stir up the top few feet of limestone or compost with a piece of equipment making sure not to damage the perforated piping network at the bottom of the pond.

Settling Ponds: Every 2 years, the sludge levels on the bottom of the pond should be measured. Once sludge levels accumulate to more than 1.5 feet, steps should be taken to perform a sludge clean-out event. Methods include use of a vacuum truck, pumping and dewatering into geomembrane bag or dig out with heavy equipment, dry and haul offsite

Constructed Wetland: Sludge accumulation within the constructed wetland is dependent on the treatment efficiency of the upstream ponds and flow rates entering the wetland. Every 2 years, sludge levels in the bottom of the wetland should be measured. Once sludge accumulates more than 1 foot in any location, steps should be taken to perform sludge cleanout. Depending on the method used, dewatering all or most of the water will be necessary. Care should be taken during sludge removal to minimize impacts to wetland vegetation and maintain the deep pockets in the wetland for additional sludge volume accumulation.