

MEMORANDUM

DATE: February 6, 2015
TO: File 63-33843 (permit)
FROM: Ashley Newbry
Engineer Associate
RE: North Alkali Drain Project Presentation

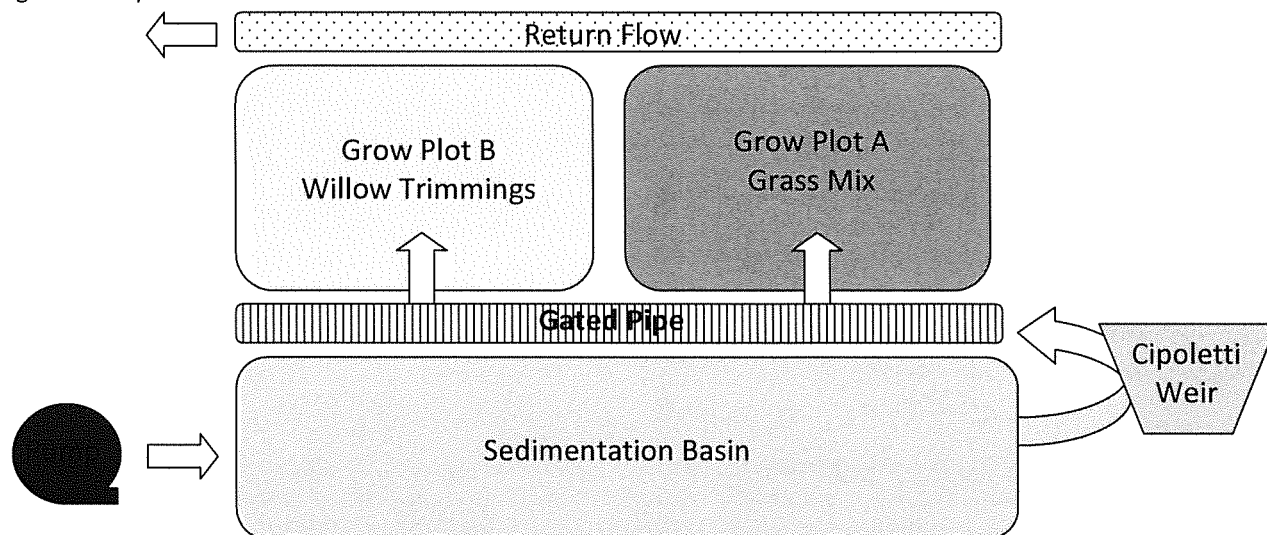
On February 4, 2015, I attended an hour-long presentation about this project. This lecture was a part of the 2015 Idaho DEQ Water Quality Monitoring workshop, held annually at Boise State University. The presentation was facilitated by Hal N. Anderson and Robert B. Tiedemann of Integrated Watershed Solutions, Inc. The purpose of this memo is to summarize the main points of the presentation and possibly assist the field examiner in the future (proof due May 1, 2015).

North Alkali Water Quality Improvement Pilot Demonstration Project

This project began as a proposal to the Lower Boise Watershed Council, requesting State 319 funds for a pilot demonstration project. The project location is near Parma, Idaho. The North Alkali Drain discharges into the South Boise Drain. The South Boise Drain dumps into the Snake River approximately 2 miles upstream of the confluence of the Boise and Snake Rivers.

The main goal of the project was to determine whether a sedimentation basin can be a scientifically effective means of phosphorus removal. Other important factors played into project success: minimization of construction costs and O&M costs, use of common construction methods and materials, production of a marketable product (such as mulch additive or grass for feed).

Some of the project design elements included the following: (1) a check structure which could control from ½ cfs up to 10 cfs at the Alkali Drain, which is an agricultural return drain, (2) a pump which would be able to divert 1 cfs to a sedimentation basin. The idea is that water would be processed via the sedimentation basin, allowing particulates to fall out. Project leaders theorized that a 4 hour retention time would allow for the removal of 60-80% of incoming sediment. (3) Gated pipe would be used to transport flow to the ridges and furrows of the two grow plots. Again, the desire is for plants in the grow plots to take up remaining phosphorus in the water supply. (4) It was important to select plants which grow well in alkali conditions; these plants also needed to be agriculturally marketable.



A key precursor to construction was to obtain a water right for the following beneficial uses from the Department of Water Resources: water quality improvement, diversion to storage, and diversion from storage. An automated flow measurement device was installed to control flow to the grow plots. In 2014, the project diverted

approximately 184 AF in total. (The following values were estimated from a chart in the presentation. They are approximate.)

2014 Month	Approximate Volume Diverted to Project (AF)
May	8
June	15
July	45
August	58
September	46
October	12

In addition, the project managers filed a Water Quality Assurance Plan to EPA and Idaho Department of Environmental Quality. As the project began, the project managers were not sure if they would need an NPDES permit to discharge their effluent, or return flows. Ultimately, the regulating authorities determined that the project was exempt from 401-certification because it was an agricultural project. It took approximately 6 additional weeks to obtain the exemption due to questions regarding the recent changes to the definition of “Waters of the United States” in the Clean Water Act.

The project cost about \$110,000 in total. Construction of the system took place from April 9 to May 2, 2014. From the construction activities, the presenter gave a few takeaways:

1. Be sure all permits and a Storm Water Pollution Prevention Plan (SWPPP) are in place. Don’t underestimate the time required for these items.
2. Spend time doing a detailed ground survey, including required earthwork.
3. Reduce O & M costs by installing an automatic pump. This reduces pump run time.
4. Have a robust water quality sampling protocol.
5. Conduct lab studies to properly size the system, especially the retention pond.

Preliminary Results from the North Alkali Drain Water Quality Improvement Pilot Project

Take a look at the dirty plumes where Fifteen Mile Creek, Mason Creek, and Indian Creek meet the Boise River. All of these plumes are full of nutrients, including significant phosphorus. Too much phosphorus causes algal blooms, and reduced oxygen in water bodies. There is plenty of phosphorus to go around, so the goal of this project was to attempt to remove phosphorus from North Alkali Creek.

Through research the project managers determined that a retention time of 4 hours and a 1 CFS flow rate would work best to allow for sediments to fall out of the flow, but also to prevent erosion of the unlined sedimentation basin. In addition, the project pieces had to be named in a fashion which would prevent unnecessary government regulation. For example, the grow plots needed to be entitled “grow plots” (agricultural). If they had been titled “discharge fields,” the project would have required an NPDES permit.

The grow plots themselves were of interest. Grow plot A was hydro seeded with 6 species (alkali bulrush, alkali sacaton, garrison creeping foxtail, tall fescue, blue joint wheatgrass, and one more that I didn’t catch) of alkali-tolerant grasses, atop the ridges and furrows. A nutritious mulch and bio-stimulant were added to encourage growth. Grow plot B was willow cuttings. The team cut, stored, and removed the calloused bottoms of the willow cuttings. Then, the crew painted the top of each willow branch to reduce transpiration, and they all but the top 6 inches of each stem. This methodology proved to be unsuccessful because the willows did not take hold in the grow plot.

Results:

- Suspended solids concentration was reduced.
- Total phosphorus and dissolved phosphorus results were ambiguous. Some samples revealed reduction, some no change, and some resulted in an increase.
- Grow plot A grew an abundance of vegetation.
- Green algae growth was seen in the sedimentation basin.
- The willows were not tolerant to the alkali soils.
- The project requires more sampling for more data.