

## *Memorandum*

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Date: 3/24/2017  
To: YJWCD Board  
From: Craig Ullmann, P.E.  
Subject: **Tom Little Inlet Canal**

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AG Job No.: 10-118

### **Inlet Canal**

As requested Applegate Group has investigated the conceptual feasibility of constructing a gravity inlet for the Tom Little Reservoir and the results are presented in this memo. For this analysis we evaluated both an open canal and a low pressure pipeline assuming a flowrate of 100 cfs. This would provide roughly 200 acre-feet per day to the site which could completely fill the reservoir in 82 days.

### *Open Canal*

Assuming a canal slope of 0.0015 ft/ft or approximately 8 feet per mile the canal would need to be 17.3 miles long. The intake on the White River would be near the west side of Powell Park. A cursory evaluation of the topography between the intake and the reservoir reveals that constructing an earthen canal would be very difficult to impossible along much of the length due to steep slopes and cross drainages. Inverted siphons would be needed at multiple locations in order to eliminate large detours required for an open canal.

### *Low Pressure Pipeline*

A more feasible option would be to construction a low pressure pipeline from an intake to the reservoir. For purposes of this analysis we assumed that the pipe could be placed adjacent to Highway 64. Due to the topography in the area the pipeline would need to lie within the highway right-of-way for at least part of the length. This would require CDOT approval, however, no contact with their staff was initiated as part of this analysis. A pipe sized to carry 100 cfs with a velocity of 5 ft/s would need to be approximately 5 feet in diameter. The slope required to produce the assumed velocity is approximately 0.0009 ft/ft or 4.75 ft/mi. The resulting pipeline length would be 9.8 miles long. Assuming that the pipeline was constructed using fusion welded HDPE pipe the cost of this pipeline would range from \$250-\$325 per foot or \$1.3-\$1.7 million per mile. The total cost would be between \$12.7 to \$16.6 million.



### **Note on Pumping Costs**

In the 2016 report Applegate prepared for the District it was estimated that the annual pumping costs to fill Tom Little reservoir could be \$230,000. As stated in the report, this estimate assumes that the reservoir is filling from empty which is unlikely except possibly in drought years. Furthermore, this estimate assumes that no hydropower is generated when water is released from the structure. Incorporating a hydropower unit in the dam outlet may allow much of the energy costs from pumping to be recovered as water is released through the outlet. The additional capital costs of the hydropower plant would only include the turbine, controls, and building. The outlet pipe would already be installed as part of the dam project and power lines would be constructed for the pump station. This option could never recover all of the pumping costs since some energy would be consumed by system losses resulting from pipeline friction and pump/turbine efficiencies. White River Electric Association will need to be consulted to determine if they are willing to work with a net metering scenario on this scale. Net metering is commonly done for small residential loads but not always an option for larger services such as a pump station. WREA has reportedly discussed a similar plan with the Rio Blanco Water Conservancy District in regards to the proposed Wolf Creek Reservoir. If the Tom Little site is pursued the next step would be to meet with WREA and see what options would be available.



**Legend**

**Proposed Tom Little Canal**

-  Gravity Pipe
-  Siphon
-  Proposed Tom Little Pipeline
-  Proposed Tom Little Reservoir
-  White River
-  Roadways
-  Highways

**Proposed Tom Little Canal Headgate**  
Approx. Elevation = 6000 ft

**Proposed Tom Little Canal**  
Approx. Length = 17.3 Miles  
Approx. Slope = .0015 ft/ft

**Proposed Tom Little Pipeline Headgate**  
Approx. Elevation = 5860 ft

**Proposed Tom Little Pipeline**  
Approx. Length = 9.8 Miles  
Approx. Slope = .0009 ft/ft

**Proposed Tom Little Reservoir**  
Approx. WSE Elevation = 5808 ft



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**Yellow Jacket 2016 Study**  
Potential Reservoir Sites  
**Tom Little Canal and Reservoir**

Date: 9 Feb 2017  
Job #: 10-118  
Drawn By: TJD

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