MB 12.48 Automated Reservoir Control
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Control Option 4

Adjustment to the Mabton Canal flow to make it match the desired flow rate at the ramp flume will be made by pumping water from the reservoir and discharging it into the canal or with drawing water from the canal by gravity to feed into the reservoir. The flow rate in the Mabton canal will be measured by a ramp flume installed downstream of the pump discharge pipes and reservoir inlet structure.

The Mabton 12.48 reservoir can be run on downstream level control by a level sensor located at the Mabton spill (Like the 59.29 reservoir). The controls for this type of operational control of the Mabton canal will have to have a delay of at least one hour between auto adjustments from the level sensor at the Mabton spill to the ramp flume at the Mabton 12.48 reservoir. This is due to the distance of about One mile between the Mabton Spill and the Mabton 12.48 reservoir and water in the canal having an approximate water velocity of one mile per hour.

The control loop between the Mabton spill level sensor and the Mabton 12.48 ramp flume can be disconnected and the reservoir can be run on just flow control based on the set point on the ramp flume (like the 23.70 reservoir) the controls for the pumps and the auto inlet gate on the Mabton 12.48 reservoir will stay the same for maintaining the flow over the MB 12.48 ramp flume.

The inflow water to the Mabton 12.48 reservoir will be measured by a 3 ft^2 orifice (a #300 orifice). Two level sensors will measure the head differential across the orifice. This orifice will not be used to control the reservoir or the canal. The 24" automatic canal gate will be used to control the level of the canal along with the two lift pumps. Each lift pump will have a flowmeter on it to measure the amount of water being pumped from the Mabton 12.48 reservoir to the Mabton Canal.

Golden Gate's water will come through the 24" automatic canal gate along with the excess water that is being removed from the Mabton canal. A 12" flowmeter will be used to measure Golden Gate's water use from the reservoir.

If the level of the water at the Mabton spill is too high it will send a signal to the ramp flume located at the reservoir to cut the flow back. The ramp flume will call on the auto inlet gate to the reservoir to open and remove excess water from the canal.

If the level of the water at the Mabton spill is too low it will send a signal to the ramp flume located at the reservoir to increase the flow in the canal. The ramp flume will call on the pumps to start pumping water into the canal and add water to the canal.

The following flow scenarios describe what will happen based on the controls being set on auto and downstream level control at the Mabton spill.

Scenario 1
No Spill, No Change in reservoir level. For this to happen the ramp flume will have to say there is too much water in the canal and amount of excess water being removed from the canal as measured by the orifice flowing through the reservoir inlet gate will need to match the flow of Golden Gates flowmeter.

Scenario 2
No spill, reservoir level is dropping. For this to happen the ramp flume will have to say there is too much water in the canal and amount of excess water being removed from the canal as measured by the orifice flowing through the reservoir inlet gate will need to be less than the flow of Golden Gates flowmeter.

Scenario 3
No spill, reservoir level is dropping reservoir inlet gate is closed. For this scenario the amount of water in the canal matches the set point of the ramp flume. Golden gate only has access to the water left in the reservoir.

Scenario 4
No Spill, reservoir level is dropping auto gate is closed SVID pumps are on. For this to happen the ramp flume will have to say there is too little water in the canal, (reservoir inlet gate will have to be closed completely before the reservoir lift pump can start up). SVID pumps are making up the difference. Golden gate only has access to the water left in the reservoir.

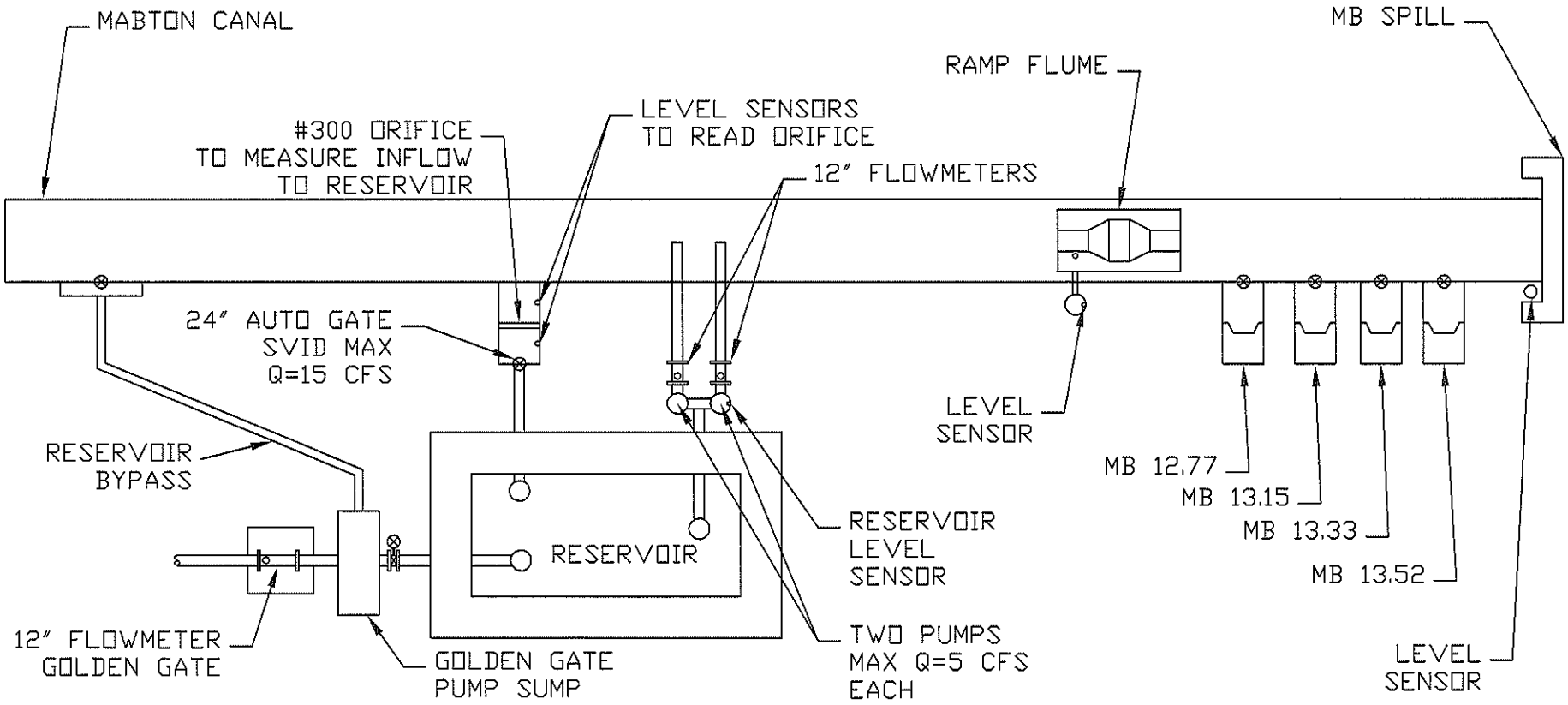
Scenario 5
Lower end shorted, reservoir level is dropping, for this scenario to happen the reservoir inlet gate is closed, SVID pumps are off, reservoir level is at invert of intake pipe for SVID lift pumps, at this reservoir level there is 0.5 ac-ft left in the reservoir. When the water level is this low in the reservoir the SVID pumps will automatically be shut off by a low water level over ride on the pumps controlled by the water level sensor for the reservoir and the tail end will get shorted.

Scenario 6
Lower end shorted, Reservoir is empty, reservoir inlet gate is closed, SVID lift pumps are off, and Golden Gate has no water to pump. For this scenario the SVID pumps will be off due to being shut off by the low water level over ride on the reservoir water level sensor. The only way for Golden gate will be able to get water is through the manual bypass if the reservoir is left in auto level control at the Mabton spill.

Scenario 7
No spill, reservoir level is increasing. For this to happen the ramp flume will have to say there is too much water in the canal and amount of excess water being removed from the canal as measured by the orifice flowing through the reservoir inlet gate will needed to be more than the flow of Golden Gates flowmeter.

Scenario 8
Spilling, reservoir level is increasing; reservoir inlet gate is full open. For this to happen the ramp flume will have to say there is too much water in the canal and amount of excess water being removed from the canal as measured by the orifice flowing through the reservoir inlet gate will needed to be more than the flow of Golden Gates flowmeter and the high level of water in the reservoir will restrict the flow through the inlet structure caused by small head difference. All excess water will flow over the ramp flume and be spilled.

Scenario 9
Spilling, reservoir is full. All excess water is flowing over ramp flume and spills at tail end. For this to happen the ramp flume will have to say there is too much water in the canal and the reservoir inlet gate is fully open and reservoir has just reached max water surface, and the level sensor for the reservoir will then automatically shut the reservoir inlet gate when the water reaches the max water surface for the reservoir. All excess water will flow over the ramp flume and then be spilled.



NOTES:
1. USE ORIFICE TO MEASURE INFLOW TO RESERVOIR.
2. USE FLOWMETER TO MEASURE GOLDEN GATE FARMS WATER USE.
3. USE DOWN STEAM LEVEL CONTROL ON MB SPILL FOR POND OPERATIONS
4. USE RAMP FLUME UNDER FLOW CONTROL LOOPED TO DOWN STREAM LEVEL SENSOR AT MABTON SPILL.
5. AUTO GATE AND PUMPS UNDER LEVEL CONTROL OF THE RAMP FLUME.

MABTON 12.48 RESERVIOR CONTROL OPTION 4

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