**PLN-11694CUP Rainwater Irrigation and Storage Calculations**

Overview:
Water for cannabis irrigation and the operations building/residence will be supplied entirely by an off-stream rainwater catchment system. The pond is located at 40.05518877º, -123.5881117 º and measures 120feet in length and 120 feet in width, which is approximately 8,600.80 square feet. The pond is approximately 15 feet deep at peak rainfall season.

There is 89,450 gallons of water stored within HDPE water tanks which consists of one (1) 250 gallon tank, two (2) 500 gallon tank, one (1) 1,200 gallon tank, one (1) 1,500 gallon tank, seventeen 2,500 gallon tanks, one (1) 3,000 gallon tank, and two (2) 20,000 gallon tanks. Additionally, the applicant plans to install two (2) 2,500-gallon tanks for fire suppression. The combination of rainwater sources will provide over 735,000 gallons of water, plenty to meet the 590,000-gallon projected irrigation need, including consideration for evaporation from the pond. The breakdown of water catchment, water use, and water storage numbers are provided below.

Note: although the 60yr average for annual rainfall is 42.26", the rainfall volumes below are
calculated using the mean precipitation value in severe drought years (30.51"). See the scatter plot graph for details (Figure 1) and Table 1 for values used.

Calculations:

Rainwater capture volumes by source:

Pond: 14,400ft2 = 525,000 gallons

Operations building: 14,400 $ft^2$ = 39,665 gallons

Water storage tanks: gallons

Total rainwater volume: **?** gallons

Annual water need: (590,000 use) + (79,000 evap-loss -see below) = **669,000** gallons

Storage: (575,000 pond) + (160,000 tanks) = **735,000** gallons

Sources: https://www.omnicalculator.com/other/rainfall-volume
https://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x675e/x6705e02.htm
https://concalculator.com/pond-volume-calculator/

Evaporation Loss:

*multiply by 0.75 correction factor to offset heat exchange
Source: https://wrcc.dri.edu/Climate/comp_table_show.php?stype=pan_evap_avg

Pond surface area (median): **14,400 ft2**

Class A Pan seasonal evaporation rate- 37 yr. average: **38.69”**
Annual pond surface evaporation loss:

Corrected Pan evaporation: 38.69 x 0.75 = 29.0175”/12 = 2.418ft
median surface area x corrected total evaporation
(4,352 ft2) x (2.418’) = **10,523.136 ft3**
(x 7.48052 gallon conversion)
= **78,718 gallons**

**Table 1. 60 Years of rainfall in inches**

| PRISM Time Series Data: PRISM_ppt_tmean_stable_4km_1968_2023_45.0000_-123.0000 | |
|---|---|
| Location: Lat: 45.0000 Lon: -123.0000 Elev: 157ft | |
| Climate variables: ppt,tmean | |
| Spatial resolution: 4km | |
| Period: 1968 - 2023 | |
| Dataset: AN91m | |
| PRISM day definition: 24 hours ending at 1200 UTC on the day shown | |
| Grid Cell Interpolation: Off | |
| Time series generated: 2024-Nov-04 | |
| Details: http://www.prism.oregonstate.edu/documents/PRISM_datasets.pdf | |
| **Date** | **ppt (inches)** |
| 1968 | 54.4 |
| 1969 | 41.21 |
| 1970 | 45.84 |
| 1971 | 49.74 |
| 1972 | 42.94 |
| 1973 | 47.11 |
| 1974 | 45.69 |
| 1975 | 40.99 |
| 1976 | 28.74 |
| 1977 | 37.89 |
| 1978 | 35.32 |
| 1979 | 38.86 |
| 1980 | 42.92 |
| 1981 | 43.52 |
| 1982 | 48.04 |
| 1983 | 56.65 |
| 1984 | 49.08 |
| 1985 | 26.54 |
| 1986 | 41.9 |
| 1987 | 38.76 |
| 1988 | 38.19 |
| 1989 | 31.96 |
| 1990 | 41 |
| 1991 | 38.3 |

| | |
|---|---|
| 1992 | 35.76 |
| 1993 | 36.77 |
| 1994 | 40.35 |
| 1995 | 52 |
| 1996 | 76.13 |
| 1997 | 49.92 |
| 1998 | 54.85 |
| 1999 | 48.71 |
| 2000 | 33.71 |
| 2001 | 34.43 |
| 2002 | 40.35 |
| 2003 | 45.04 |
| 2004 | 34.72 |
| 2005 | 41.19 |
| 2006 | 53.1 |
| 2007 | 41.61 |
| 2008 | 31.82 |
| 2009 | 34.72 |
| 2010 | 52.5 |
| 2011 | 38.32 |
| 2012 | 58.5 |
| 2013 | 27.65 |
| 2014 | 42.97 |
| 2015 | 41.92 |
| 2016 | 47.82 |
| 2017 | 50.29 |
| 2018 | 30.87 |
| 2019 | 32.82 |
| 2020 | 35.86 |
| 2021 | 41 |
| 2022 | 39.13 |
| 2023 | 36.37 |
| **Annual Average** | **42.26410714** |

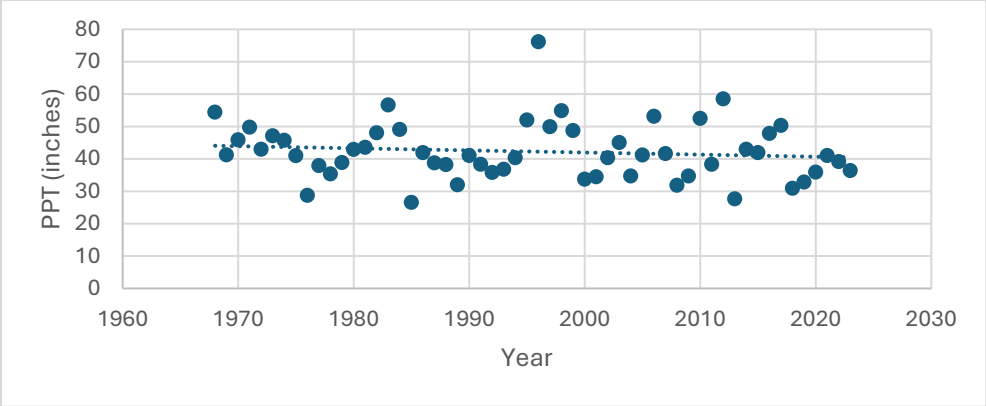



**Figure 1. inches of rain per year**

| | |
|---|---|
| Average Annual Rain Fall 60 year: | 42.26" |
| Low: | 26.54" |
| High: | 76.13" |
| Mean for outlier years: | 30.51375 |

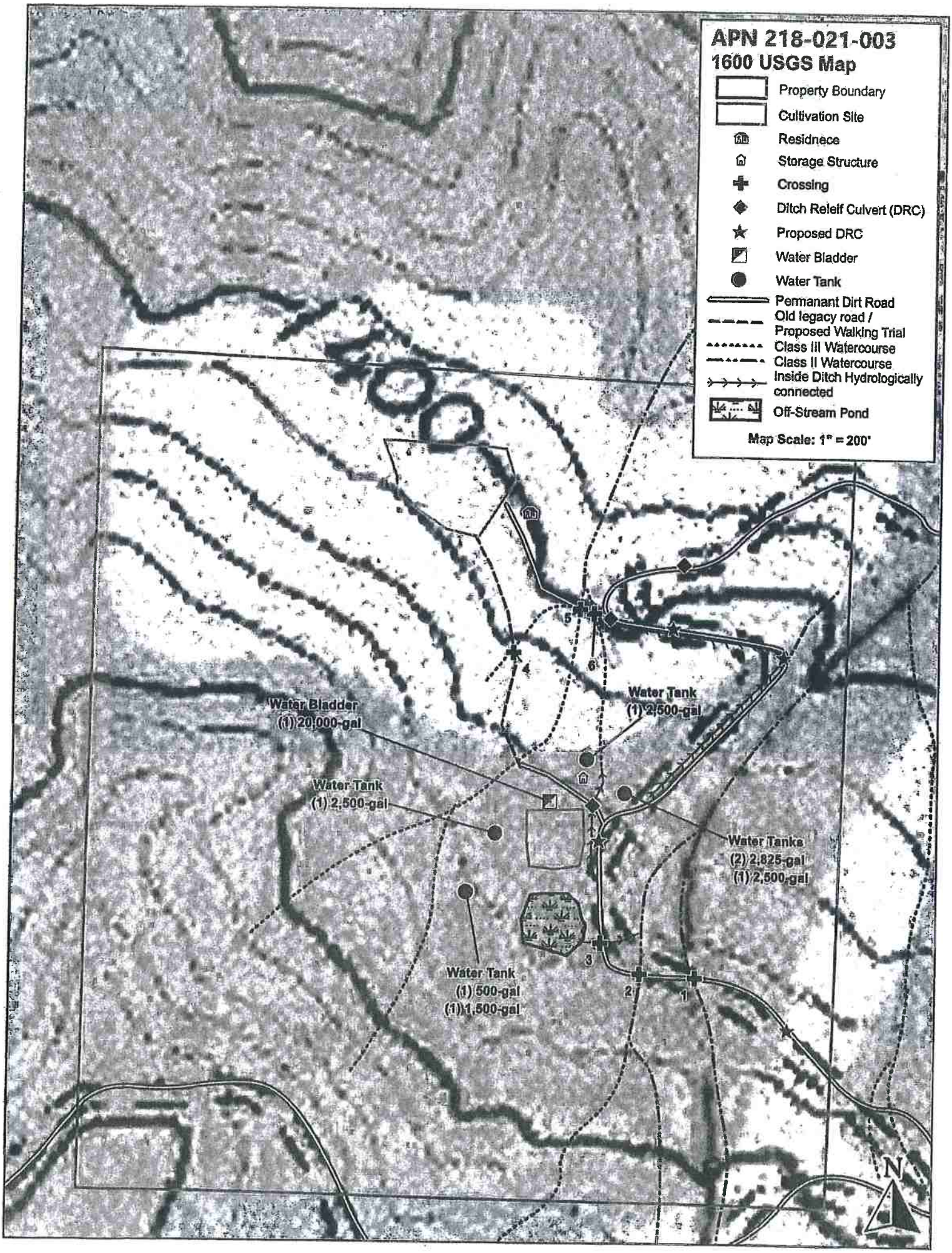
11694



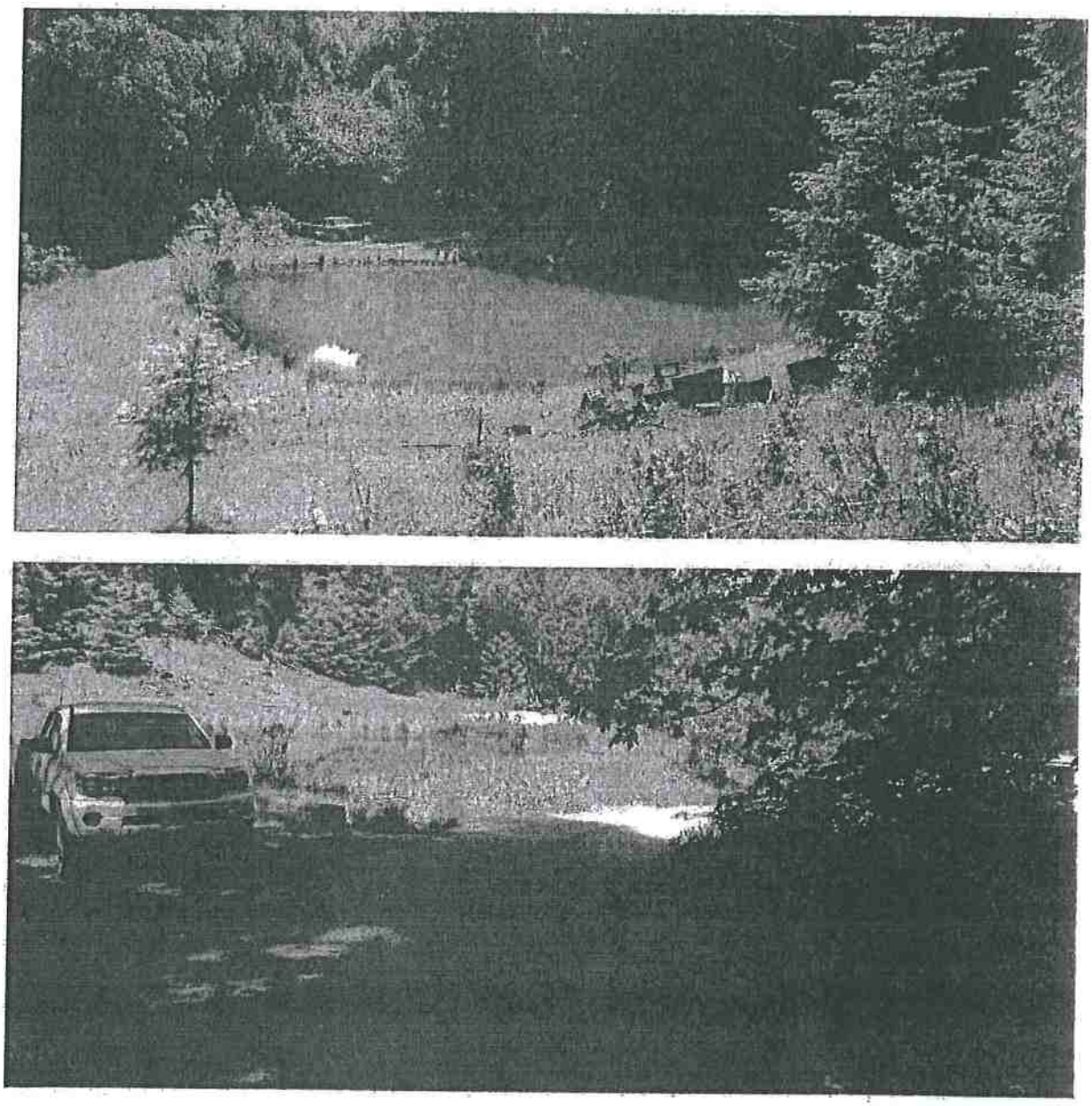
**Tierra Verde Holdings LLC – Water Source**

**(APN 218-021-003)**

The rainwater catchment system being used is an "Off-Steam Pond" aka Rain Catchment Pond. The location of the Rain Catchment Pond is: 123.5881117°;40.05518877°. The Rain Catchment Pond is 104 feet in length by 82.7 feet in width, which equates to approximately 8,600.80 square-feet of Rain Catchment Pond. The Rain Catchment Pond is approximately 13 feet deep at peak season. There are 9,825-gallons of water storage tanks plummed to the Rain Catchment Pond. A 20,000 gallon water bladder also lies on site. The Rain Catchment Pond supplies the agricultural water and the domestic water for the project. Photographs of the Rain Catchment Pond are included herewith.

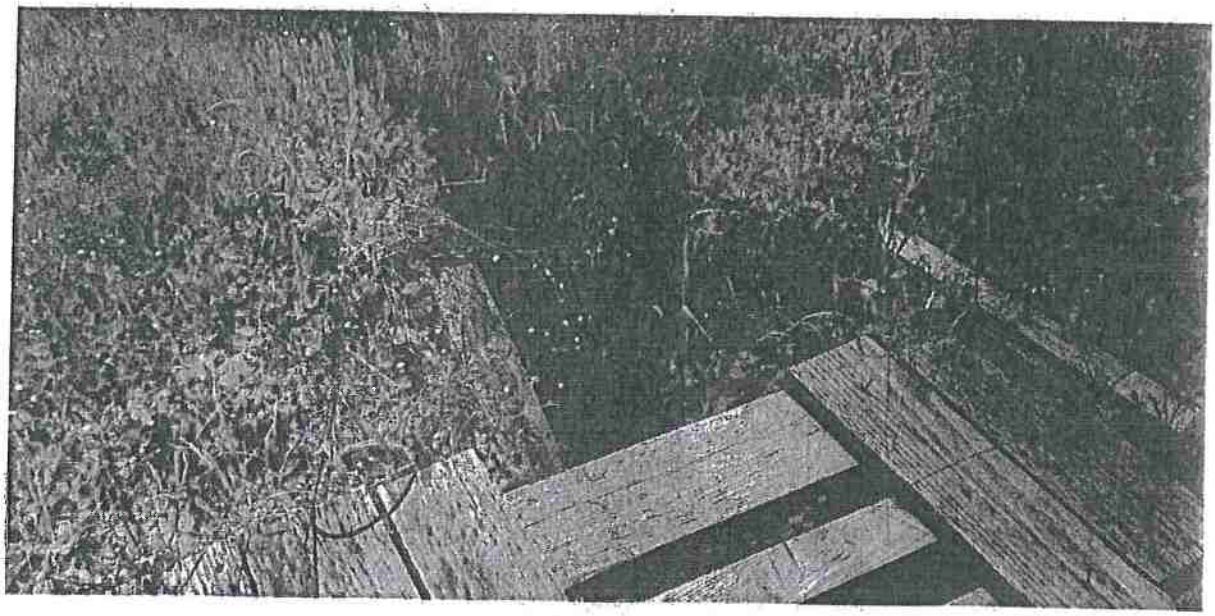

APN 218-021-003
1600 USGS Map
Property Boundary
Cultivation Site
Residnece
Storage Structure
Crossing
Ditch Relelf Culvert (DRC)
Proposed DRC
Water Bladder
Water Tank
Permanant Dirt Road
Old legacy road / Proposed Walking Trial
Class III Watercourse
Class II Watercourse
Inside Ditch Hydrologically connected
Off-Stream Pond
Map Scale: 1" = 200'
Water Bladder (1) 20,000-gal
Water Tank (1) 2,500-gal
Water Tank (1) 2,500-gal
Water Tanks (2) 2,825-gal (1) 2,500-gal
Water Tank (1) 500-gal (1) 1,500-gal
1
2
3
4
5
6
N

## Addendum 10 – Pictures



**Picture 4 & 5:** On Stream Pond (top) and looking upstream at the overflow spillway (bottom). Photos date 5-08-2019.

## Addendum 10 – Pictures



**Picture 10:** The inlet and outlet to the Off-Stream Pond overflow spillway Crossing #3. Photos date 5-08-2019.