The Woodlands Township
Drought Management Plan- Lake and Pond Fill

January 25, 2023

Presentation Outline

- Background Information
- Weather Information
- Water Levels
- Bleyl Engineering Option
- Additional Options

Background Information

Why water conservation?

- Push enhanced in 2009-2012
- Conservation/best practice
- Limits on pumping
- Subsidence concerns
- Set example for the community
- Per person per day use dropped to 91 gallons per day, a 43% decline over 10 years.

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Background Information

- Drought Management Plan-2011- updated as needed
- Use limitations- WJPA/MUD 386/permitting
- Examined uses of water, tiered use, *best practices*
- Encompasses park/streetscape irrigation, pond fountains, pond fill, spray grounds, pressure washing, etc.

Watering Restriction Stage		Pond Fills
1	[redacted]	Fill at 50%, if needed to support aquatic health or ensure amenity (pier) structural integrity
2		Fill at 50%, if needed to support aquatic health or ensure amenity (pier) structural integrity
3		Fill at 50%, if needed to support aquatic health or ensure amenity (pier) structural integrity
4		Only to support aquatic life.
Watering Restriction Stage		**Spraygrounds**
1	[redacted]	Regular Operation
2		Regular Operation
3		Hours reduced (8 am to 1 pm, 5pm to 8 pm)
4		Off

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Background Information

- Reviewed residents' concerns- multiple times during 2022
- Confirmed 50% capacity/depth, if needed to support aquatic health or ensure pier integrity
- Obtained an engineering report on Kayak Ridge

Kayak Ridge- 1-24-2023

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Weather Information

NORMALS (based on the 30 year period 1991-2020)...

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rain Totals (in)	3.76	2.97	3.47	3.95	5.01	6.00	3.77	4.84	4.71	5.46	3.87	4.03	51.84
Mean Temp (°F)	53.8	57.7	63.8	70.0	77.4	82.0	85.1	85.2	80.5	71.8	62.0	55.1	70.5
Avg High (°F)	63.8	67.8	74.0	80.1	86.9	92.3	94.5	94.9	90.4	82.8	72.6	65.3	80.5
Avg Low (°F)	43.7	47.6	53.6	59.8	67.8	73.7	75.7	75.4	70.6	60.9	51.5	45.6	60.5

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rain Totals (in)	9.42	1.23	2.87	1.99	4.31	0.13	1.35	8.58	0.75	1.83	4.97	3.88	41.30
(departure from normal)	(+5.66)	(-1.74)	(-0.60)	(-1.96)	(-0.71)	(-5.87)	(-2.42)	(+3.74)	(-3.96)	(-3.63)	(+1.10)	(-0.15)	(-10.54)
Mean Temp (°F)	52.8	51.9	62.0	72.8	80.9	86.7	88.0	85.1	80.7	70.0	60.4	57.1	70.7
(departure from normal)	(-1.0)	(-5.8)	(-1.8)	(+2.8)	(+3.5)	(+3.7)	(+2.9)	(-0.1)	(+0.2)	(-1.8)	(-1.7)	(+1.7)	(+0.2)
Avg High (°F)	64.5	63.6	74.6	82.6	90.1	96.9	98.5	94.4	91.8	82.6	69.6	66.7	81.3
(departure from normal)	(+0.7)	(-4.2)	(+0.6)	(+2.5)	(+3.2)	(+4.6)	(+4.0)	(-0.5)	(+1.4)	(-0.2)	(-3.0)	(+1.4)	(+0.9)
Avg Low (°F)	41.1	40.1	49.5	63.0	71.7	76.5	77.6	75.7	69.7	57.5	51.2	47.4	60.1
(departure from normal)	(-2.6)	(-7.5)	(-4.1)	(+3.2)	(+3.9)	(+2.8)	(+1.9)	(+0.3)	(-0.9)	(-3.4)	(-0.3)	(+1.8)	(-0.4)
Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual

https://www.weather.gov/hgx/climate_iah_normals_summary

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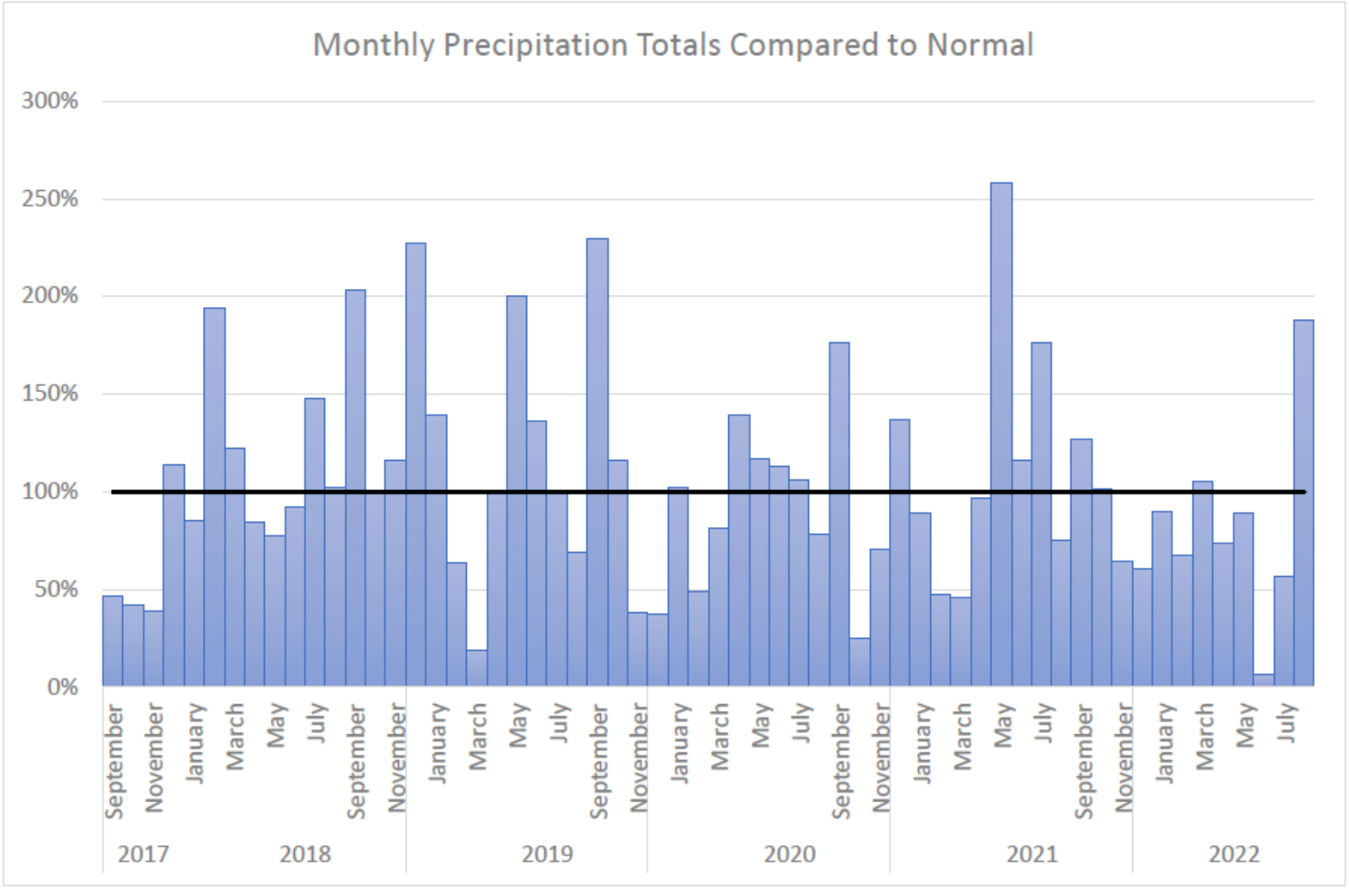
Figure 3.2: Precipitation Values Compared to Monthly Normal



Current Pond Levels

Active monitoring (Jan 24/25, 2023)

- Hamlin-63, 70%
- Twin Pond-64, 71%
- Hullwood-83, 96%
- N. Kayak-65, 79.25%
- S. Kayak-75, 81.25%

Routine monitoring (1/24/2023)

- Cokeberry-100%
- Mystic Forest-98%
- Long Lake-85%

Long Lake- 1-25-2023

All ponds fill at a different rate, due to size, depth, slope, draw area, access to storm water

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Kayak Ridge Pond- Bleyl Engineering

- Bleyl Engineering reviewed:
  - Weather/rainfall
  - Infiltration
  - Evaporation
  - Storm sewer elevations
  - Topography
- *"If the pond was at a static level and there were normal amounts of rain, the current surface area and surrounding run-off area would support a higher pond level"*

Kayak Ridge- October 2022

Kayak Ridge- 1-24-2023

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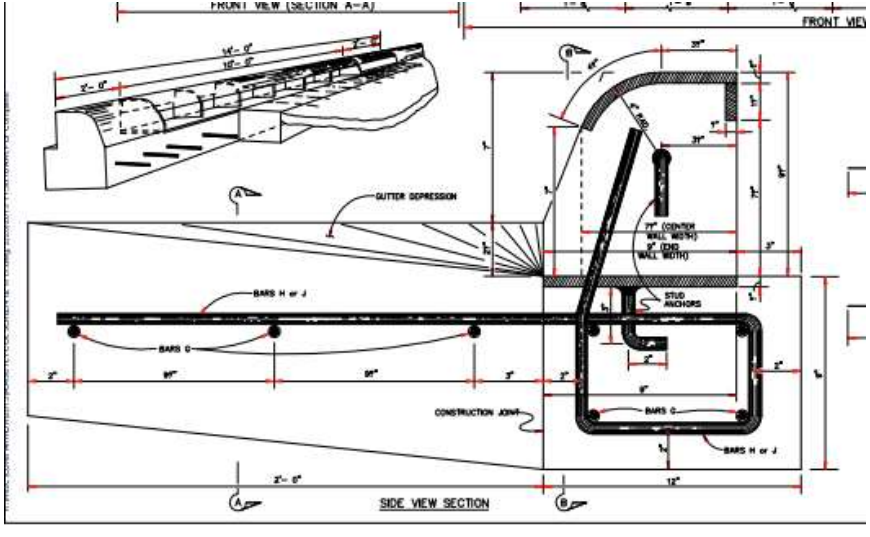
Kayak Ridge Pond- Engineers Report

- Install six inlets (three at North Pond, three at South Pond) to capture additional stormwater
- Over a 5-year period (September 2017 and September 2022) based on recorded data:
  - Improvements would result in a water level increase of 0.79 feet (North) and 1.25 feet (South)
  - With the additional storm water, the ponds would be 1.73 feet below normal pool elevation –North Pond, and 2.27 feet below normal-South Pond

Kayak Ridge Pond- Engineers Report

Board directed staff to further review Option 1 - *"Remove and replace the existing curb inlets located immediately adjacent to the two ponds to direct more drainage to the ponds."*

- Harris County/MUD 386 do not object- need to follow permitting requirements
- Harris County Flood Control- No Impact Certification Letter- $1,000
- Total cost-$100,000



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Additional Options

Chicot Aquifer Wells

- 3 wells for Kayak Ridge- 200”
- $30,000 per well
- $20,000 per well electrical service
- $150,000 total
- Limited impact on Hullwood Pond

Due to cost, concerns about subsidence, and the current Drought Management Policy not identified as feasible.

Twin Ponds - 1-24-2023

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Additional Options

Lake Paloma- Re-Use

- Install 2” lines to Kayak Ridge and Hullwood Ponds
- 150 gpm/216,000 gpd/.66 acre feet per day
- 9.95 acres (both ponds)/.75 inch per day
- $40,000 total cost
- Use parameters
- No Impact Certification Letter is not required-not expanding the maximum volume of pond

Hullwood - 1-24-2023

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Recommendation

Board to determine course of action

Hamlin Pond - 1-24-2023

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