Project Fresh Water Impacts Analysis

A Whitewater Processing Development

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Agenda

1. Goals & Objectives of Analysis
2. Overview of Project Fresh
3. Potential Impacts of Proposed Water Use on the Resource
4. Waste Water Discharge Impacts
5. Results and Conclusions

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Project Objectives

- Assess the potential impacts of Project Fresh aquifer withdrawals on the resource and existing water users
- Evaluate the potential water-quality impacts to the river from the proposed wastewater facilities

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Location of Project Fresh

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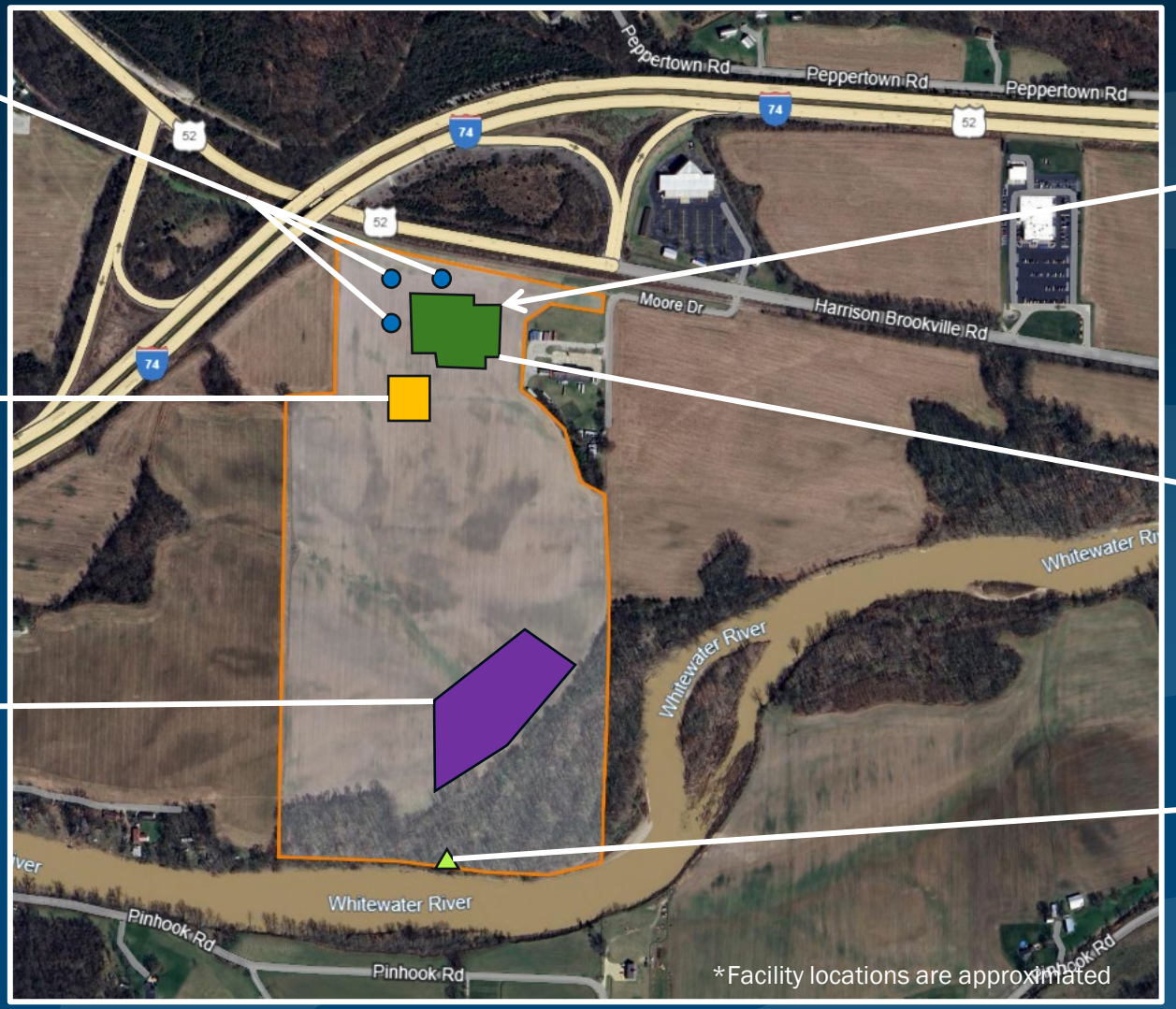
Overview of Project Fresh

Three Production Wells

Wastewater Treatment Plant

Cooling Water Lagoon

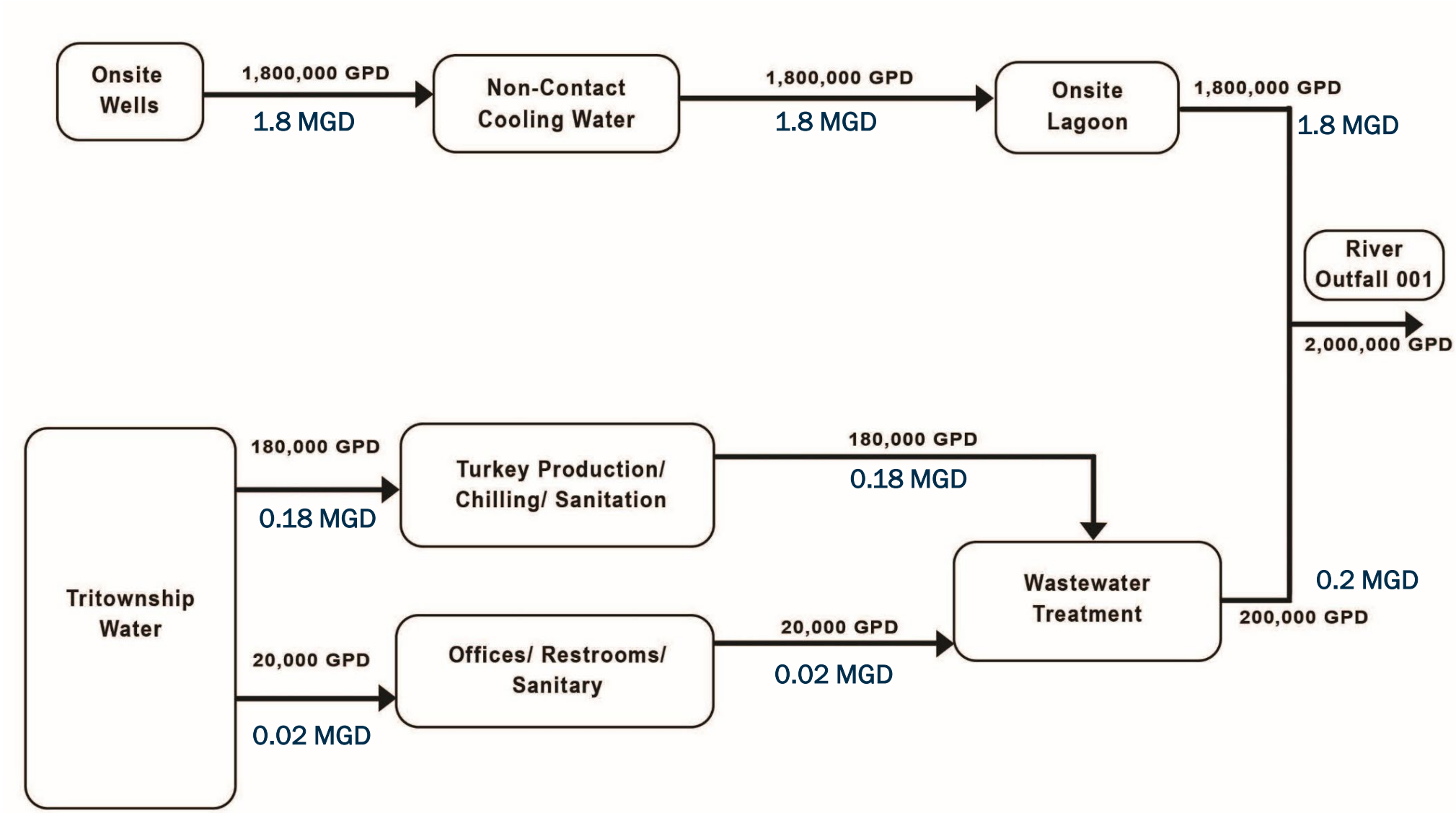


Tri-Township Water Supply

Turkey Processing Facility

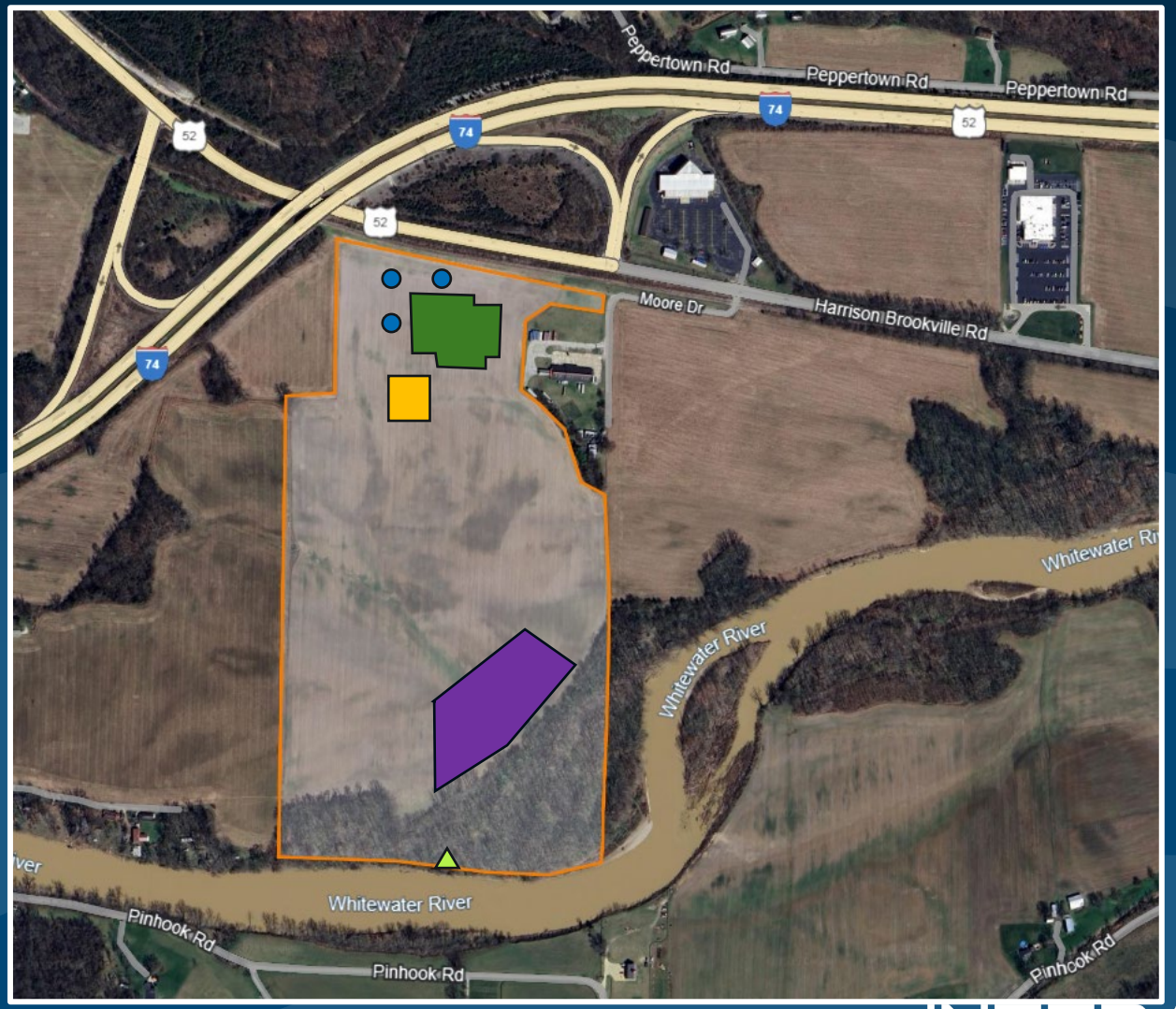
Combined Waste and Cooling Water to River Outfall 001

Water Process Flow Chart



Cooling Water Supply

- Three production well to pump groundwater onsite
- Expected to produce total 1.8 Million Gallons per Day (MGD)
- All water used for cooling
- Discharged to lagoon to decrease temperature
- Outfall to 001



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River Flows and Aquifer Water Levels

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Question: What is the impact of the water withdrawals to the river?

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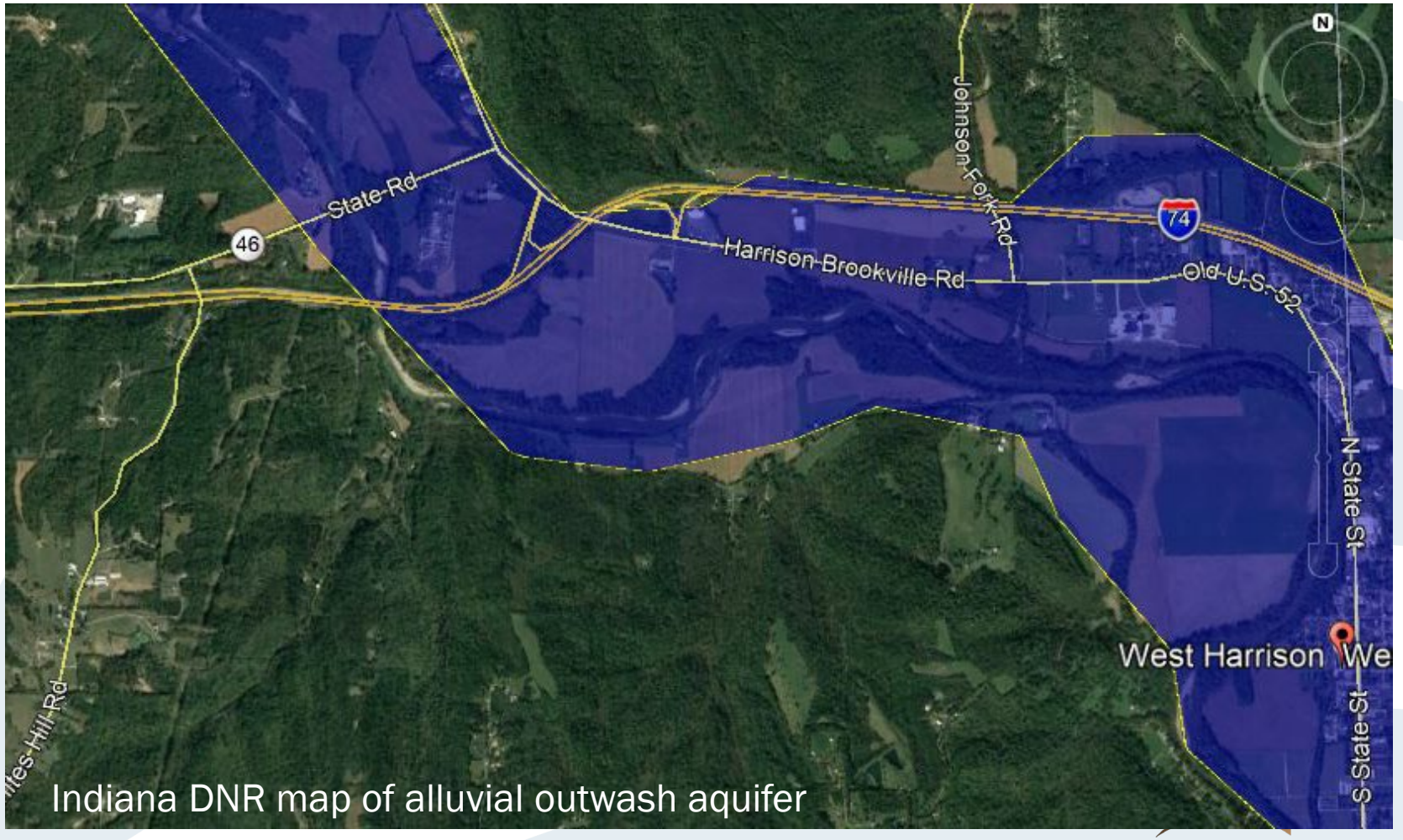
Whitewater Valley Aquifer System

- Entire project site underlain by alluvial outwash aquifer
- The Whitewater Valley Aquifer System (WVAS) is the most productive aquifer in the county
- Sand and gravel deposits approx. 20-75 feet deep in the project area
- Good aquifer material for water withdrawals



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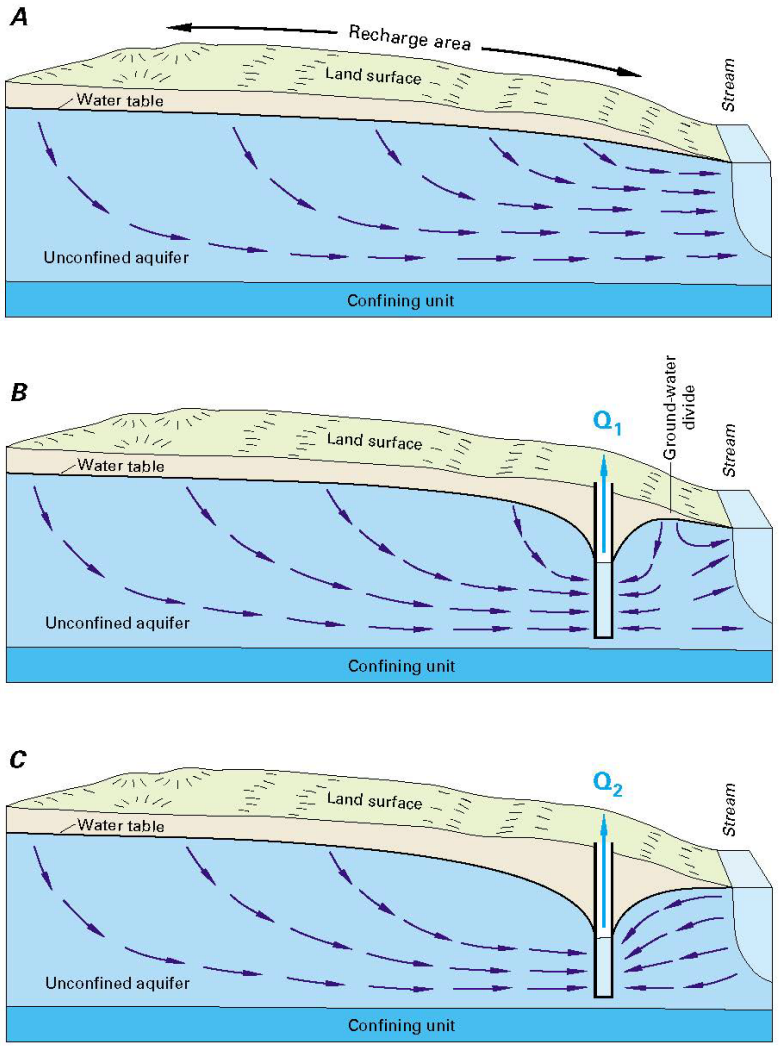
The River/Aquifer Connection



[Source: USGS Circular 1137]

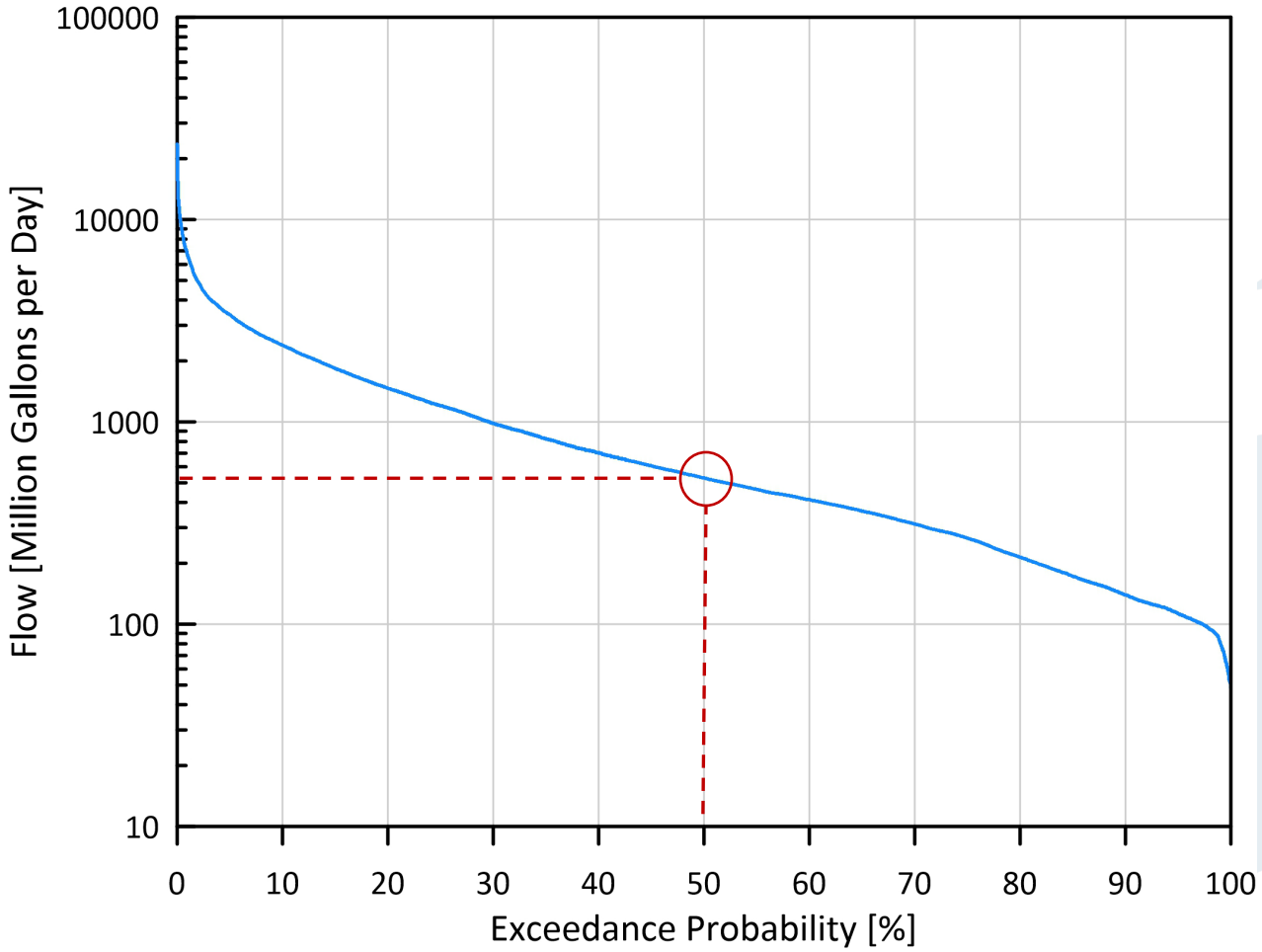
The Whitewater River interacts with the aquifer and production wells within the valley.

Under natural conditions, the river gains water from inflow of groundwater

A high capacity well placed along the river will intercept groundwater that would have naturally discharged to the river

If the well is pumped at a higher rate, it can additionally pull water from the river to the well (Induced Recharge)

Flow in the Whitewater River



Flow-duration curve for Whitewater River at Brookeville (1975-2025)

- Daily flow measured by USGS stream gage in Brookeville since the dam was put into operation.
- A flow duration curve was constructed with the daily flows since 1975 shows the cumulative frequency of flows.
- Functionally, it shows the percentage of days the river flow equals or exceeds a certain value.
- For example, 50% of time flows in the river exceed 500 MGD

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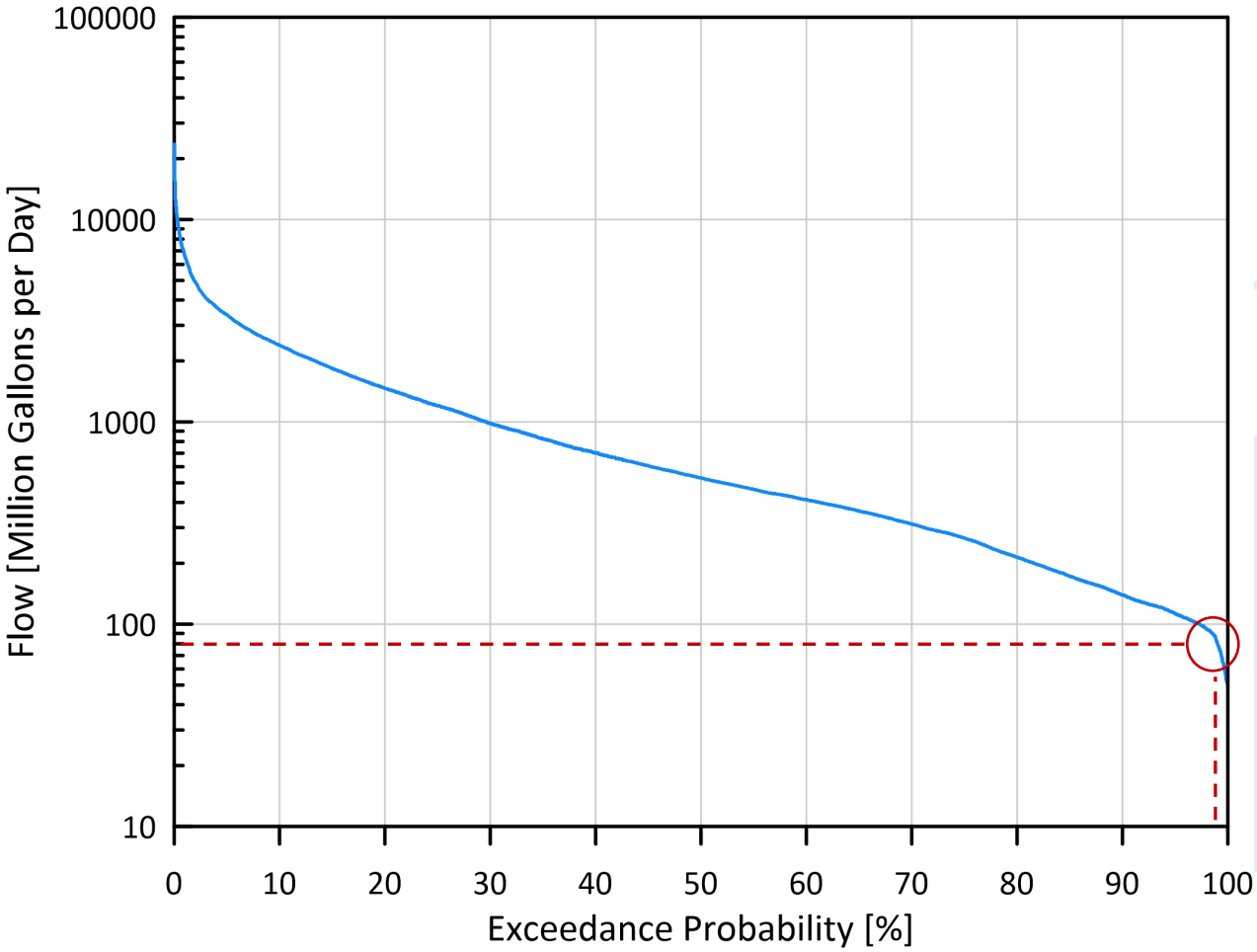
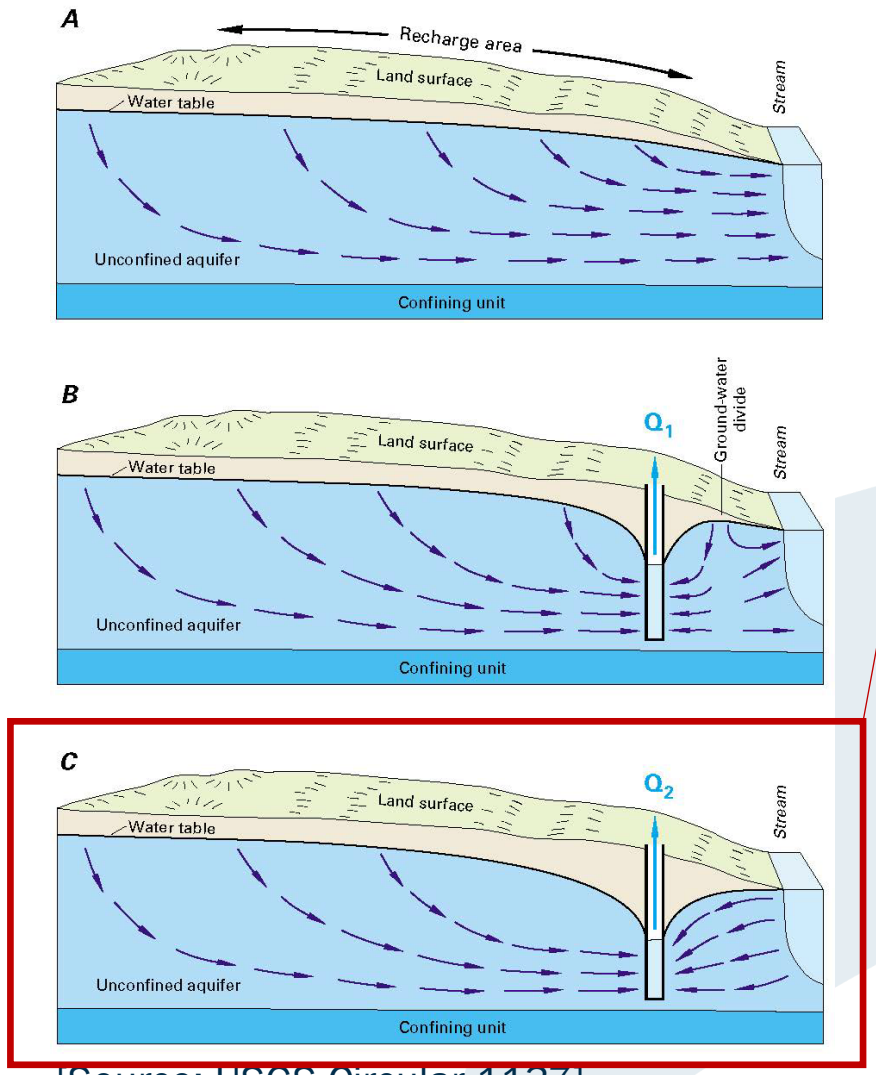
Flow in the Whitewater River



Flow-duration curve for Whitewater River at Brookeville (1975-2025)

- The lowest flows are of interest to project – 99% of time, the flow has exceeded 80 MGD.
- Low flows downstream at the project site are expected to be higher due to contribution from tributaries, groundwater inflow, and upstream NPDES discharges.
- Planned withdrawals represent <2.5% of lowest flows in the river

Proposed Pumping and River Flows



[Source: USGS Circular 1137]

- The proposed wells would intercept groundwater that would have naturally discharged to the river and induce recharge from the river.
- The operation will affect timing of flows in the river but will not affect the overall water balance.
- All the water used will eventually be discharged to the river through the outfall. The only exception is what will be lost through evaporation from the lagoon (consumptive use).
- Given that the lowest flows observed in the river are in excess of 80 MGD, the consumptive use would be a very small portion of the total river flow.

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Question: What is the impact of the water withdrawals to groundwater levels and existing users?

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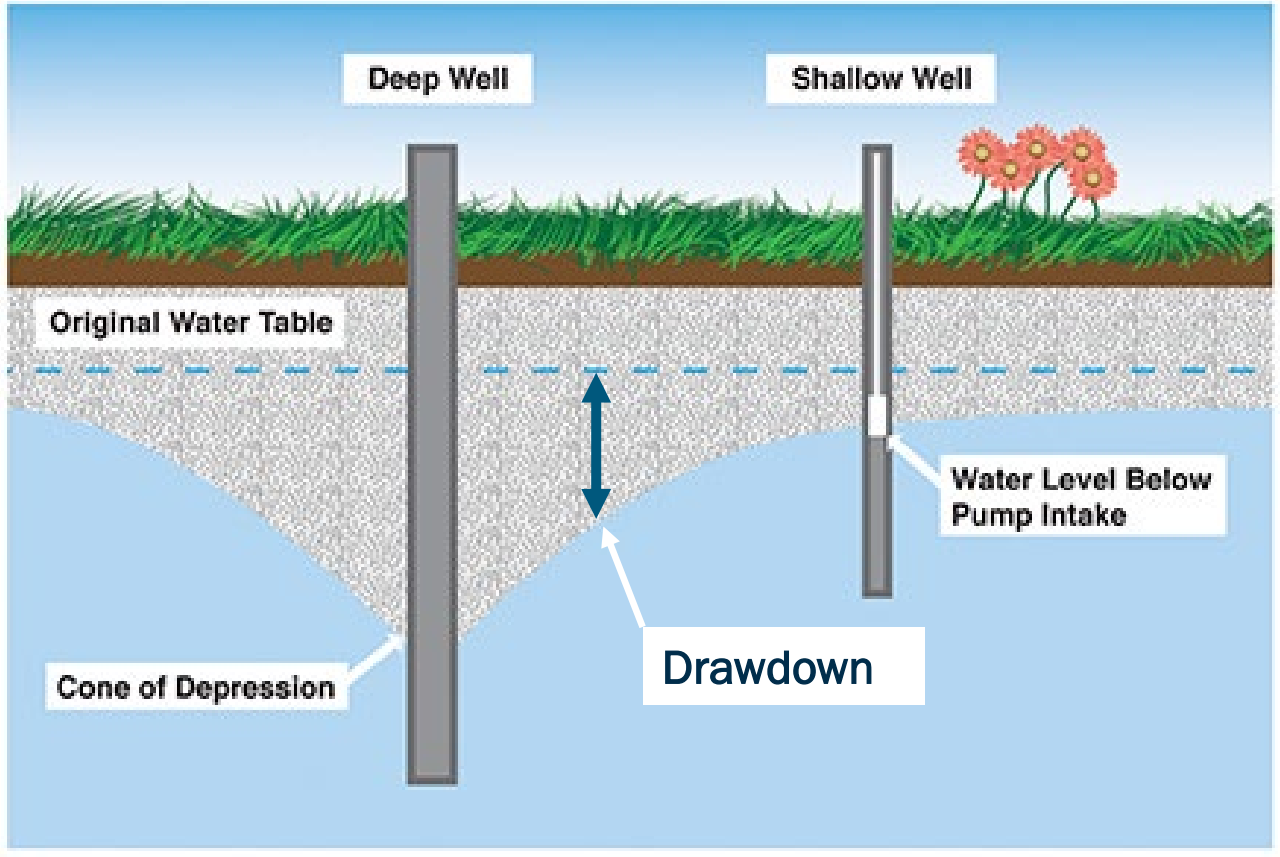
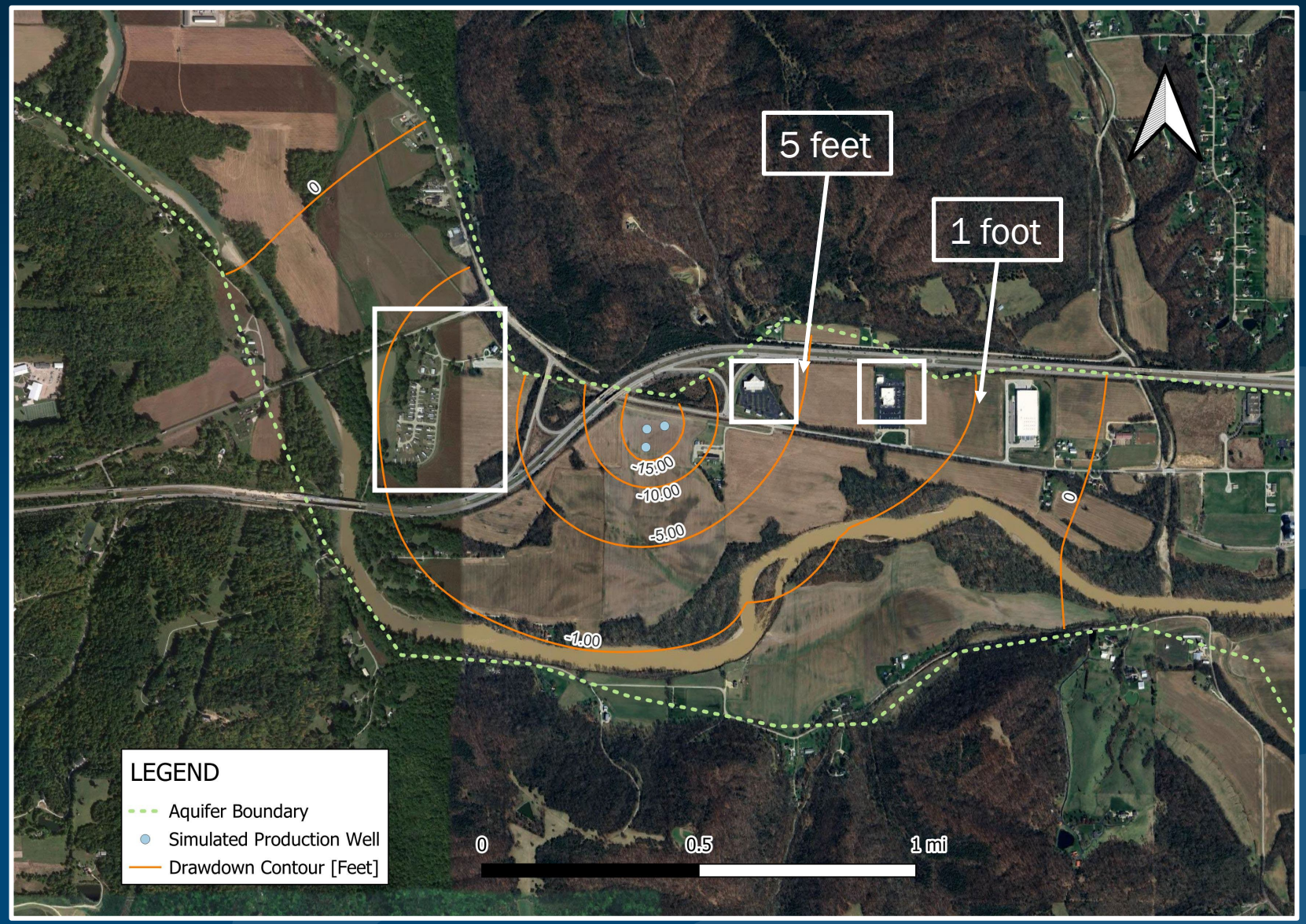
Analysis Method

- Construct a computer model to evaluate potential drawdown
- Drawdown describes the drop in the aquifer water level due to a pumping well
- Drawdowns are highest near the well and spread out radially
- Drawdown can affect nearby wells depending on depth and pump setting



Drawdown Modeling Results



Wastewater Discharge Impacts

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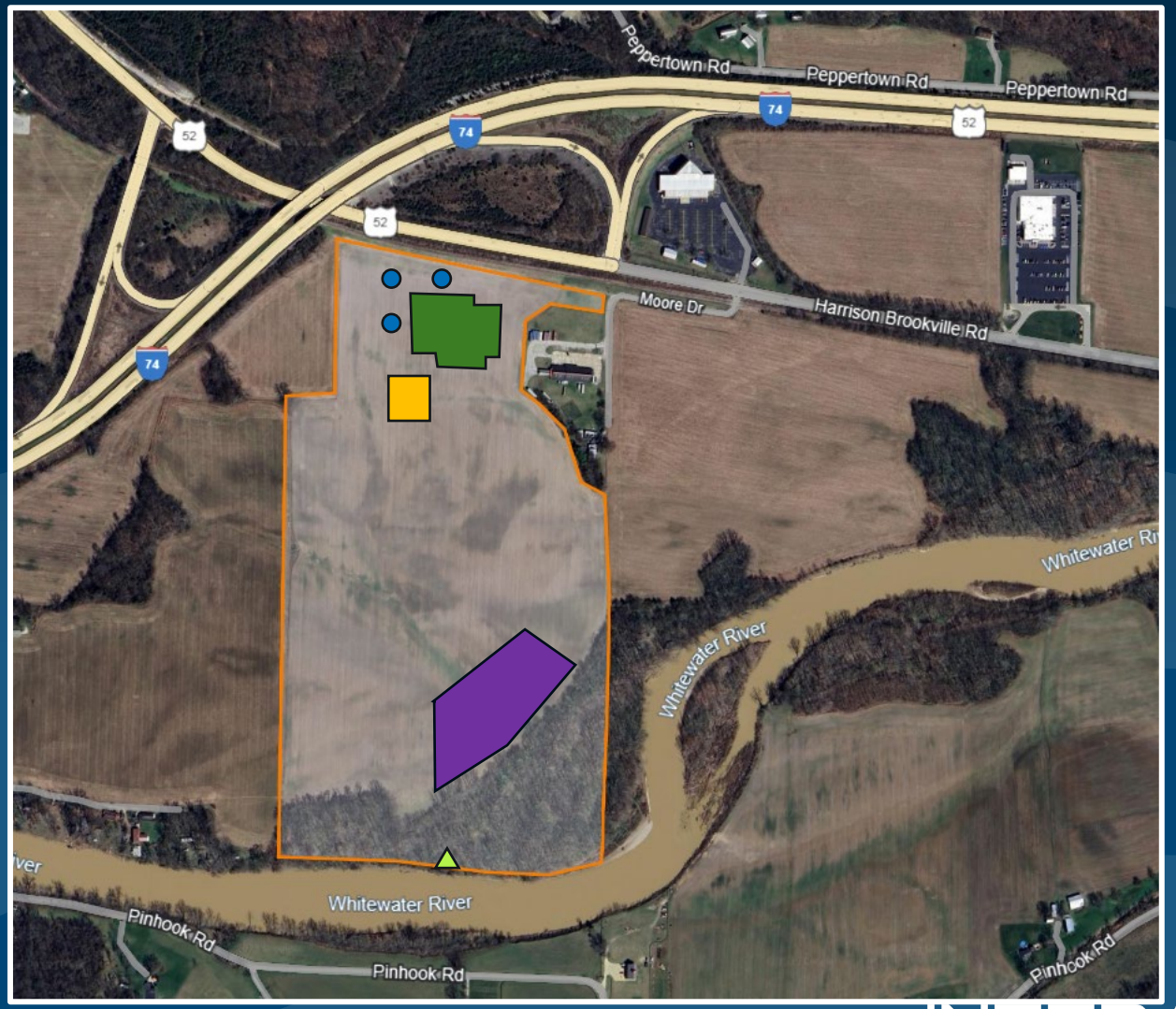
Wastewater Treatment Plant

- Designed to treat 180,000 GPD of turkey processing waste plus 20,000 GPD of office wastewater
- Total of 200,000 GPD will be discharge to the River via Outfall 001
- Water quality of water discharged to Rivers is regulated by the IDEM NPDES permit.



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Wastewater Quality of Turkey Processing Waste

- Wastewater has high levels of organic matter
  - Fats, oils, grease
  - Dissolved and particulate proteins and carbohydrates
  - Measured as biological oxygen demand (BOD)
- BOD levels are typically 600 – 800 mg/L before treatment
- Other important regulated components of the waste stream are
  - Total suspended solids
  - Ammonia,
  - *E coli*

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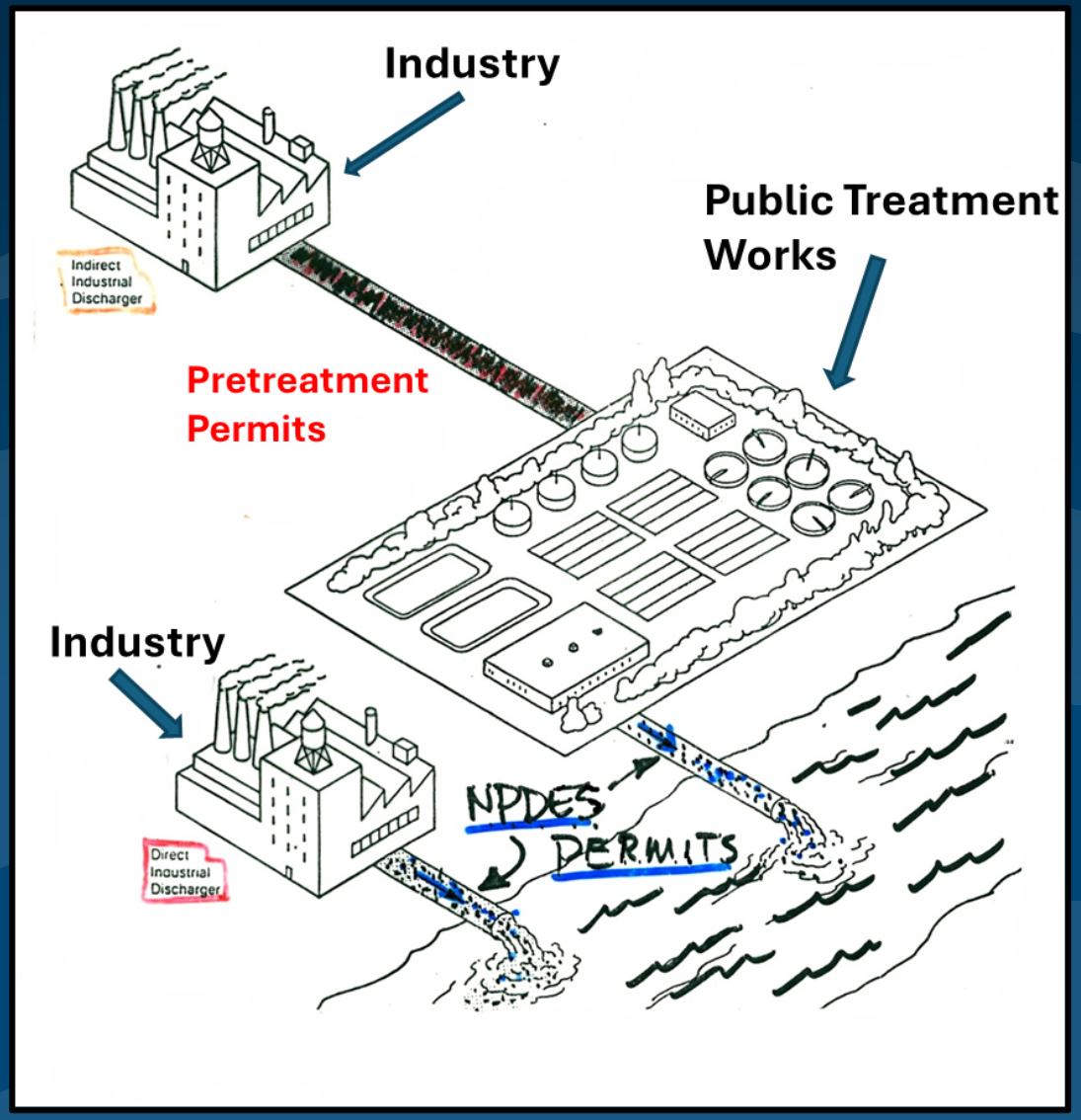
NDPES Permit

- National Pollution Discharge Elimination System (NDPES)
- Clean Water Act
- Unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained.
- Indiana Department of Environmental Quality (IDEM)



NPDES Effluent Limits for Facility in Harrison, OH

		Summer		Winter				
Parameter	Units	Monthly Avg	Weekly Max	Monthly Avg	Weekly Max	Daily Minimum	Monthly Avg	Daily Maximum
CBOD	mg/l	10	15	10	15			
TSS	mg/l	12	18	12	18			
Ammonia-Nitrogen	mg/l	1.0	1.5	3	4.5			
Oil and Grease	mg/l						8	10
pH						6.5		9.0
Dissolved Oxygen	mg/l					6.0		
E. Coli	Count/100 mls	126	284	126	284			
Phosphorus	mg/l						Monitor	Monitor
Flow	MGD						Monitor	Monitor
TDS	mg/l						Monitor	Monitor
Temperature	C						Monitor	Monitor
Total Kjeldahl Nitrogen	Mg/l						Monitor	Monitor

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Wastewater Treatment Process

- Bar screen to remove large solids
- Dissolved air flotation (DAF) system to remove suspended solids, organic matter, fats, oil and grease
- Moving Bed Biofilm Reactor (MBBR) to remove suspended and dissolved organic matter
- Secondary Filter (possible depending on NPDES TSS limits), remove suspended solids
- Disinfection with either UV or peroxide to kill pathogens and meet E-coli requirements

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Impacts to Whitewater River

- IDEM uses the low flow in the Whitewater River to determine the concentrations of the discharge constituents that will protect the River
- Whitewater Processing has submitted the permit application and is awaiting the discharge requirements
- The WWTP will be specifically designed to treat the water to the concentrations required in permit

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Results and Conclusions

- Water withdrawals from groundwater wells will result in 1 to 5 feet of drawdown on surrounding parcels.
- Similar to seasonal groundwater level shifts, 1 to 5 feet of drawdown is unlikely to impact residential wells nearby (if there are any)
- Almost all the water withdrawn from the groundwater wells for cooling water will be returned to the river, therefore flows will be minimally impacted
- The WWTP will be designed to treat the discharge water to the water quality required by their IDEM NPDES permit, therefore the water-quality of the river will be protected

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Questions?

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