Ketchum / Sun Valley, Idaho
Wastewater Reuse Implementation
The Long Road to Class A Reuse

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Slow process

- Begin planning now, you might be done in seven years!
- Ketchum/SVWSD first started considering reuse in 2003.
- Reuse will begin in 2010.

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Brief history

- Reuse first introduced in 2003 Facility Plan
  - First step; determined Ketchum and SV have consumptive groundwater right . Do not need to return to Big Wood River.

Reuse ideas in 2003 Plan

  - WW plant grounds/bike path
  - Nearby Idaho Lands pasture
  - Elkhorn golf course (Sun Valley)
  - And “snow” fluent – snow making for Dollar Mt.
- Major plant upgrades keep us busy in 2004 – 2007 (UV disinfection, SCADA, aeration basins, filters)

Brief history (continued)

- By late 2006 we began planning for a reuse demonstration project
- First logical choice plant grounds and nearby property along highway & bike path
- Permit application completed in early 2007
- Nearby subdivision also became interested after the application was submitted. Addendum submitted in early 2008 to add Weyyakin subdivision.
- Permit received March 2009

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Why consider reuse ?
Community based on recreation and commitment to environment.

- Large influx of 2nd home residents and tourists during summer and holidays
- Key recreational activities include:
  - skiing
  - biking
  - golf
  - and fishing

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Big Wood River (near outfall)

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Big Wood River

- The river is an important part of Ketchum / Sun Valley
- Wastewater plant discharges to the Big Wood River
- Big Wood River watershed identified as water quality limited - §303 (d) listed
- TMDL submitted to EPA in 2002 (temperature portion in 2007)
- TSS, TP, temperature, bacteria

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NPDES permit limits

- Applied for permit renewal in 2006
- Currently operating under June 2001 permit limits
  - BOD 505 lbs/day monthly avg. (30 mg/L)
  - TSS 505 lbs/day monthly avg. (30 mg/L)
  - TP 1 mg/L
  - E. coli 126 org/100 ml
- Expect permit re-issuance in 2010

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TMDL proposed limits

Water Quality issues: TSS, TP, e. coli and temperature

- TSS = 26 tons/yr (142 lb/d), will mean:
  - 11 mg/L (current avg. monthly flow)
  - 4 mg/L (future avg. monthly flow)
- TP = 9.9 lbs/day, will mean:
  - 0.8 mg/L (current avg. monthly flow)
  - 0.3 mg/L (future avg. monthly flow)

TMDL proposed limits (cont.)

- E. coli = 2.7 cfu^9, will mean:
  - 18 cfu/100 ml (future avg. mo. flow)
- Temperature = 0.3° C rise,
  - 19° C cold water aquatic life
  - 9° C salmonid spawning (impossible to meet, background 14° C.). Background temperature influenced by hot water springs.
  - Critical months Spring and Fall

Additional wastewater plant background

- Treatment plant shared between Ketchum and Sun Valley (~ 50/50)
- Original plant constructed in 1968
- Based on TMDL results, major tertiary upgrades were completed between 2004 and 2007

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Wastewater plant background

- Current flow rate
  - 1.5 mgd (average)
  - 2.5 mgd (peak month)
- Future flow rate at build-out
  - 4.0 mgd (average)
  - 5.0 mgd (peak month)
  - 7.5 mgd (peak hour)

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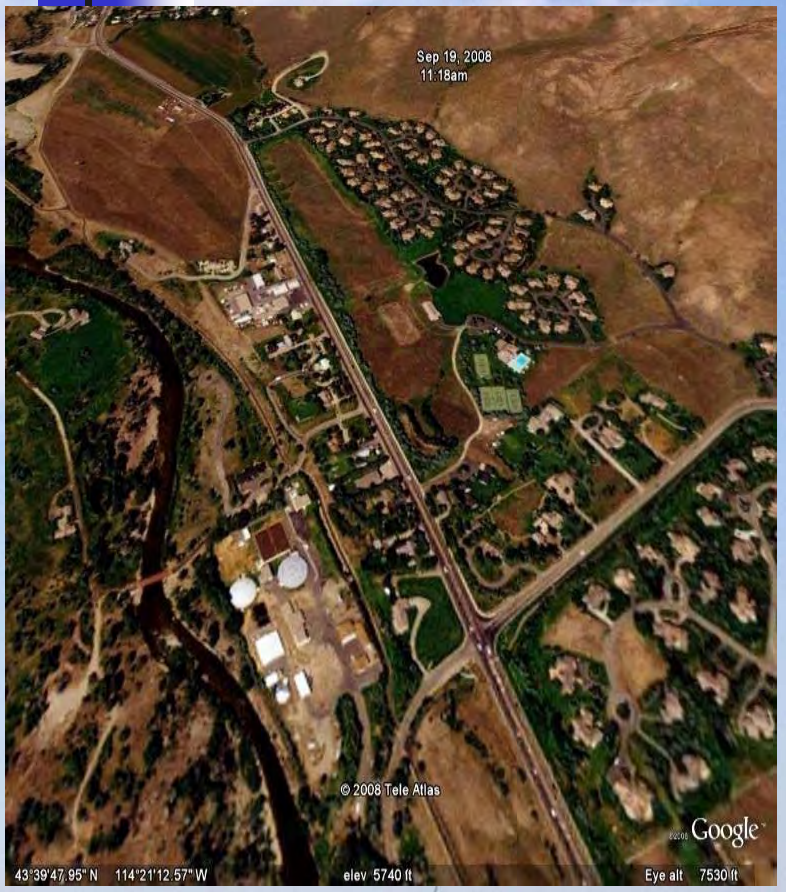
Treatment Plant



- Screening/grit removal
- Activated sludge
- Cloth media disk filtration
- UV Disinfection

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Activated Sludge

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Cloth Media Filtration

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UV Disinfection

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Current Effluent Quality

- BOD_5 = < 5 mg/L
- TSS = < 5 mg/L
- TP = < 0.5 mg/L
- TN = < 15 mg/L
- E. coli = < 2 org/100 ml
- NTU = < 1 unit (0.3 – 0.7)
- UV Transmittance = 99.6%

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High quality water available - Why Not Reuse?

- High quality effluent was available due to anticipation of TMDL limits
- Reuse assists in meeting some TMDL limits
- Minimizing impact on Big Wood River is important to the environmentally sensitive community
- Water is recognized as a valuable commodity
- Reuse could help balance potable water demand with availability

Based on these positive factors:

- Ketchum/Sun Valley decide to permit a demonstration reuse project. The irrigation of plant grounds and nearby bike path.

First decision – Class A or B

- Class B: (also) requires filtration / disinfection (2.2 / 100 ml)
  - Irrigation of edible or non-edible crops
  - Irrigate golf courses, parks, road ways
- Class A: (also) requires nutrient reduction.
  - Limited restrictions on reuse (residential irrigation)

City selected Class A due to broader use and public perception (highest quality class)

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Class A

- Allows conversion of existing irrigation lines if physically disconnected from potable system
- Residential irrigation during non-use periods
- 100 feet from drinking water wells
- Signs to identify reclaimed water
- Nitrate < 30 mg/L
- Turbidity < 2 NTU
- Disinfection with CT 450 mg-min/L or 5-log virus inactivation

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Class A issues at Ketchum

- Redundancy
  - Plant can provide up to 2.5 mgd of Class A reuse water
- Disinfection
  - CT 450
    - Limits reuse to 350 gpm if using the existing chlorine contact tank
    - Increased capacity available using contact time credit for pipeline and holding pond
  - Or 5-log virus inactivation
    - Use existing UV system (de-rated), or
    - Add separate UV disinfection to reuse line

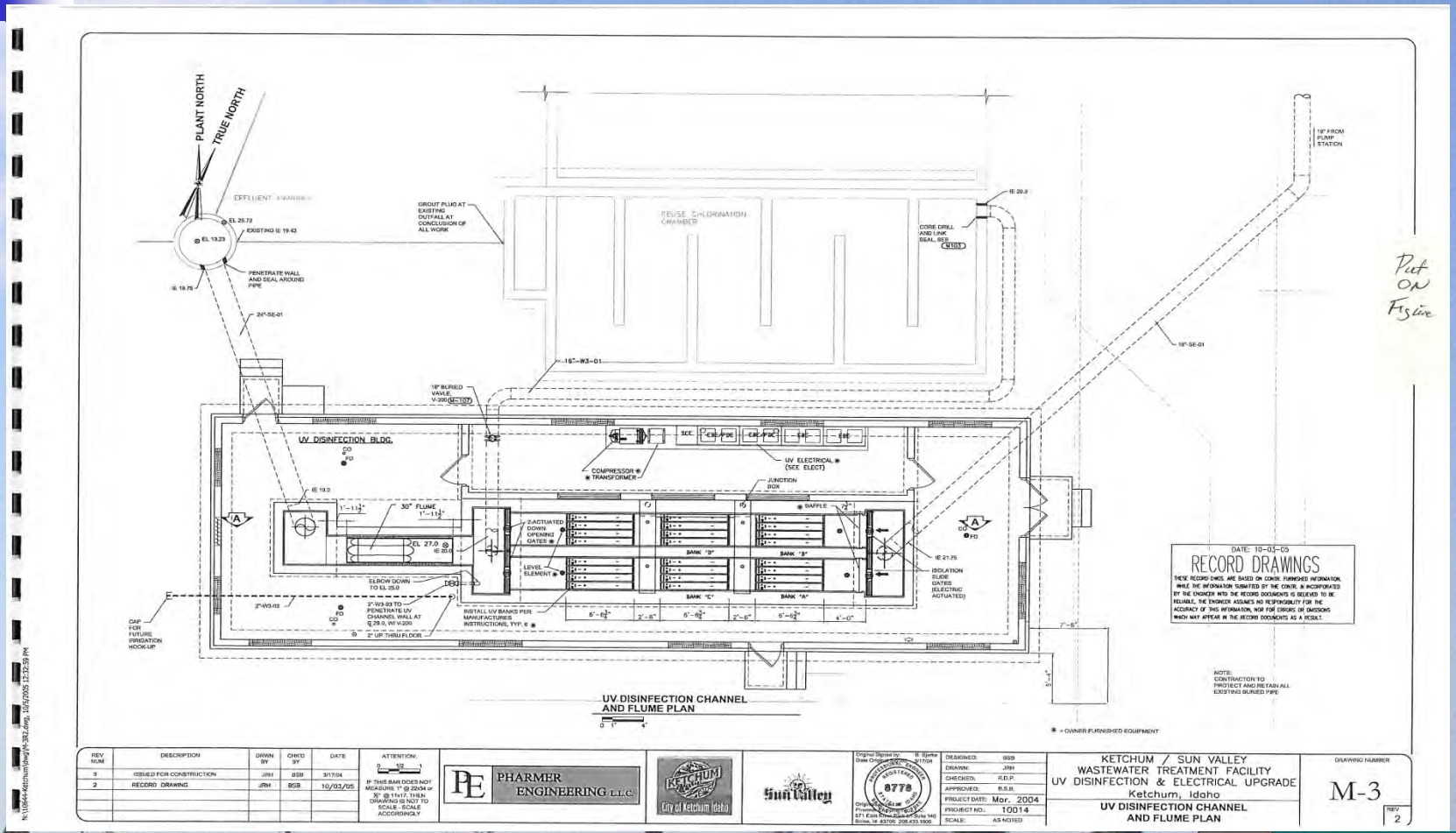
Ketchum disinfection

- UV system designed in 2003 and constructed in 2004 (Idaho reuse guidelines not yet thoroughly defined). Wedeco TAK55 installed.
- TAK55 system was accepted under 2000 NWRI/AWWFR guidelines but not 2003. New Wedeco model TAK55HP was tested and approved under 2003 (difference is 150 watt vs. 125 watt lamps).

Ketchum disinfection (cont.)

- Wedeco TAK55, two channels, three banks per channel (8 lamps/module, 4 modules/bank, 96 lamps per channel). Only one bank (32 lamps) needed to meet current bacteria limits. Two banks can provide UV dose of 100 mJ/cm^2 at 75% UVT and 1250 gpm (1.8 mgd).
- Ketchum/SV to propose in the Plan of Operation using the existing UV (de-rated) with a follow-up safety factor Cl_2 dose of 0.5 – 1.0 mg/L.
- Layout diverts portion of treated water after UV disinfection to chlorine contact tank/reuse pump station.

UV and Reuse Cl_2 tank layout



Reuse permit application

Plant Site

- Site Characteristics
  - Climate
  - Soils
  - Hydrology
- Perform loading analysis
- Site Management

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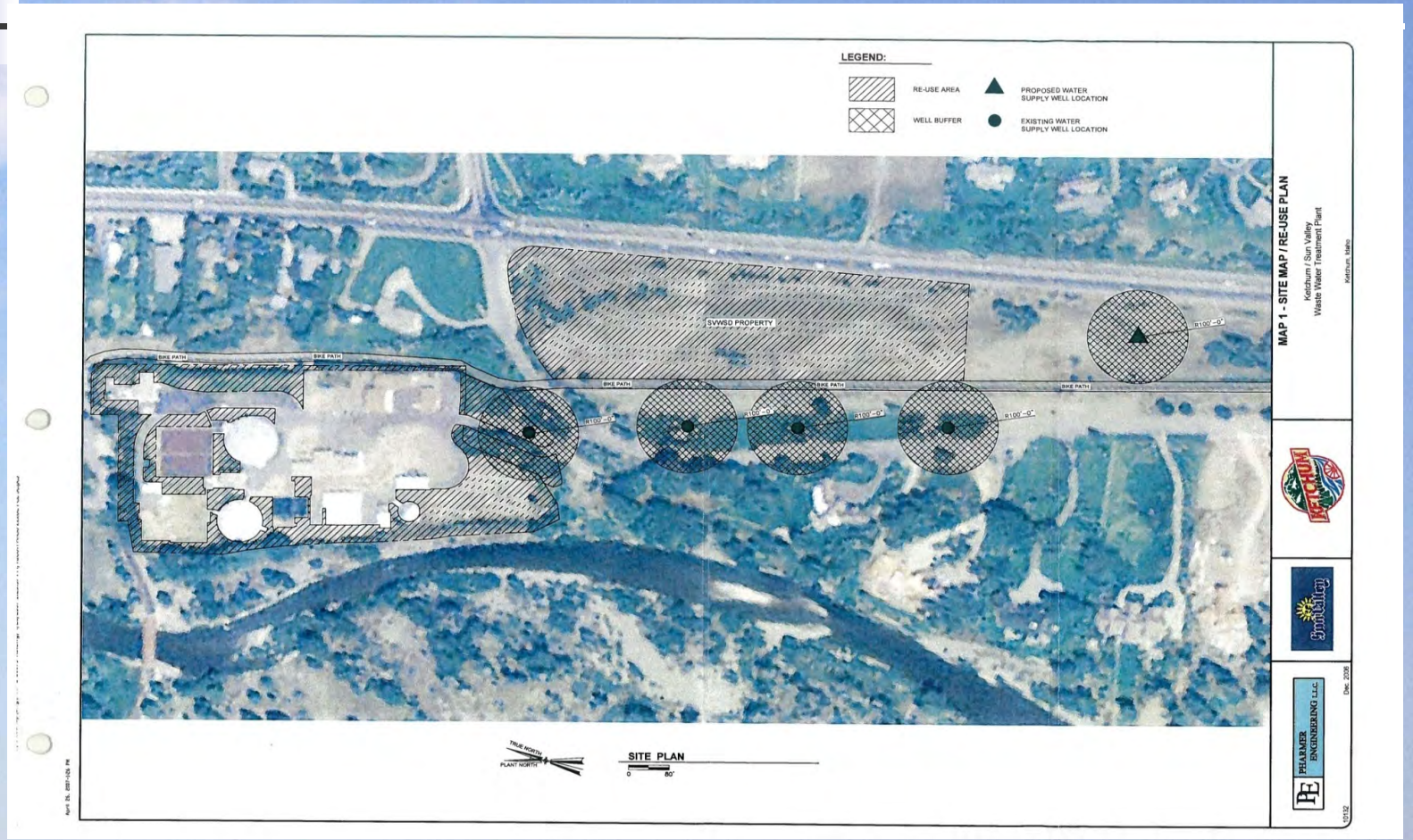
Plant Site



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Water demand for plant site

- Plant grounds ~ 2 acres
- Sun Valley property adjacent to the bike path ~ 6 acres
- Landscape irrigation requirement, 28 inches/season or ~ 6,000,000 gallons/season, Peak day 54,600 gpd (July)

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Reuse – plant grounds

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Reuse – bike path

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Then came Weyyakin...

- An opportunity presented itself in a nearby development needing a reliable irrigation supply
- Weyyakin irrigation needs
  - 44 ac lawn and common areas,
  - plus 22 ac horse pasture

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“Selling” Weyyakin Home Owners Association

- Toured WTF – association impressed!
- HOA compared water quality of Trail Creek water to WTF water.

	Trail Creek Diversion	Entering Weyyakin	WTF Effluent
TC	105	613	4
E. coli	21	110	<1

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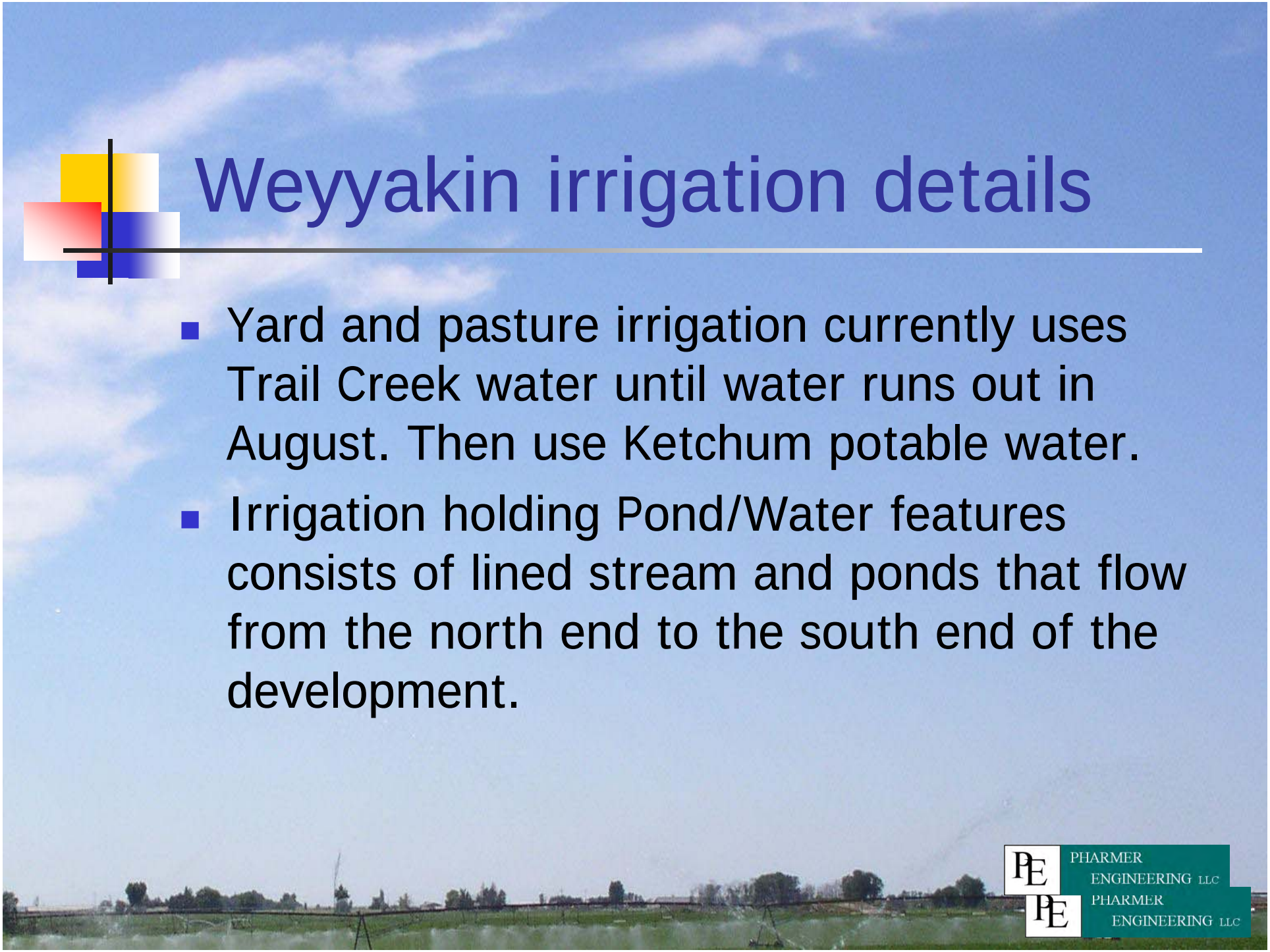
Weyyakin irrigation details

- Yard and pasture irrigation currently uses Trail Creek water until water runs out in August. Then use Ketchum potable water.
- Irrigation holding Pond/Water features consists of lined stream and ponds that flow from the north end to the south end of the development.



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Weyyakin current irrigation water situation

- Irrigates with surface water with a priority date of 1883
- Historically supply through August
- Good water years last through September
- Poor water years last into July

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Weyyakin Reuse Site

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Weyyakin Development

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Weyyakin lined pond – Supplies irrigation water to lawns and pastures

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Weyakkin lined water features

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Weyyakin – 20 small lined ponds

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When the ditch runs dry…What happens?

- Weyyakin switches to city water to finish out irrigation season
- Weyyakin water cost up to $18,000 per season
- Weyyakin irrigation stresses the capability of Ketchum potable water supply

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Weyyakin on Reuse

- Advantage to Weyyakin –
  - Reliable irrigation supply through full growing season
- Advantage to Ketchum –
  - Irrigation not on potable system in August/September
  - Water right transferred to City

Water demand for Weyyakin

- Pasture ground ~ 22 acres
- Landscape irrigation ~ 44 acres
- Pasture irrigation ~ 33.4 inches/ac, ~ 20,000,000 gallons/season
- Landscape irrigation 28 inches/ac, ~ 33,000,000 gallons/season
- Peak day demand 0.48 mgd (July)

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Implementation Schedule

- Prepare Plan of Operation in 2009
- Construct portions of pipeline to Weyyakin in 2009
- Construct plant systems to supply reuse water (chlorine tank and pumping station) in 2009 -2010
- Reuse water available in 2010
- Reuse will occur seven years after concept was original presented to the City in 2003

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Reuse a Win-Win opportunity and worth the long wait

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Questions ??

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