Water Reuse
Past, Present, Future

City of Cheyenne Board of Public Utilities

Matt Buelow

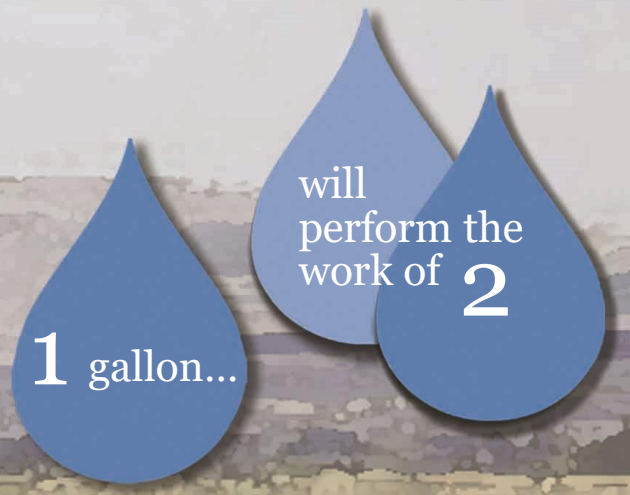
Bryce Dorr

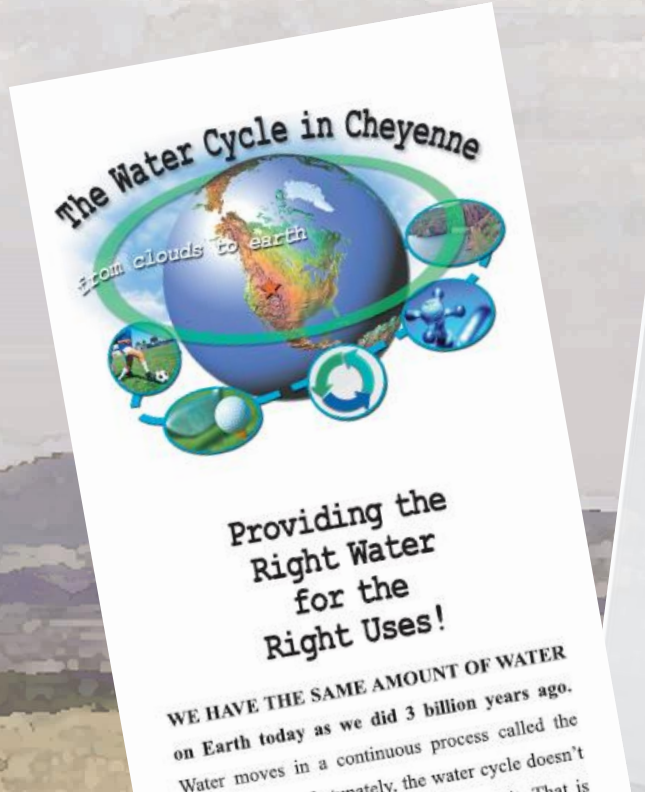
“THE STORY OF THE LONG STRUGGLE FOR WATER IN CHEYENNE is typical of the general situation in the arid West and leads to the general conclusion that in order to meet the demands of the future, the existing sources of water must be conserved, and that the residents of this area must learn to use water so that one gallon of the supply provided by nature will perform the duty of two gallons as it is now used.”

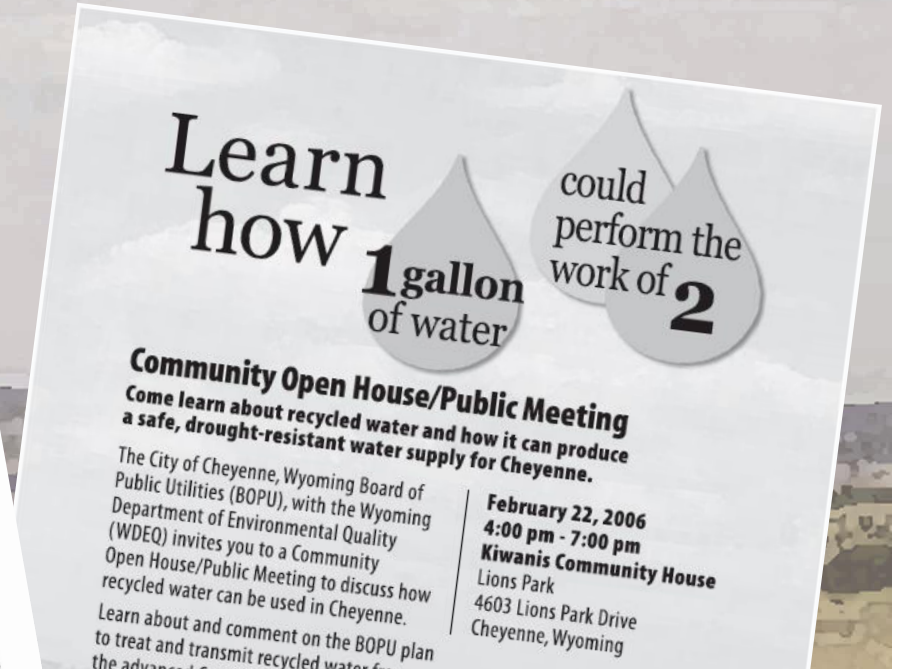
W. J. Dinneen, Board President (circa 1951)

Embracing Recycled Water

- Public outreach
  - Advocates developed before public outreach.
  - Messages embraced history and promoted future.

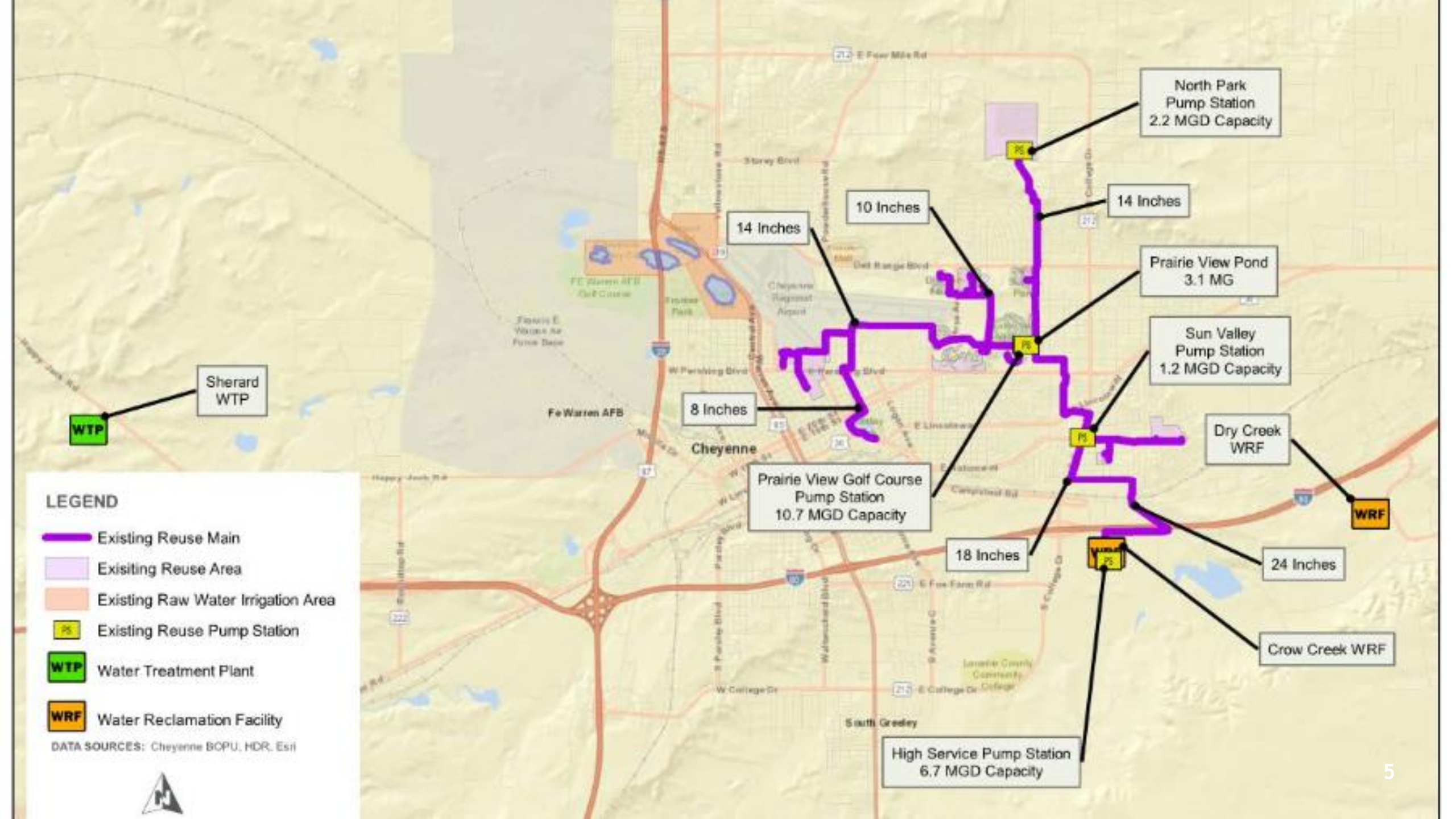


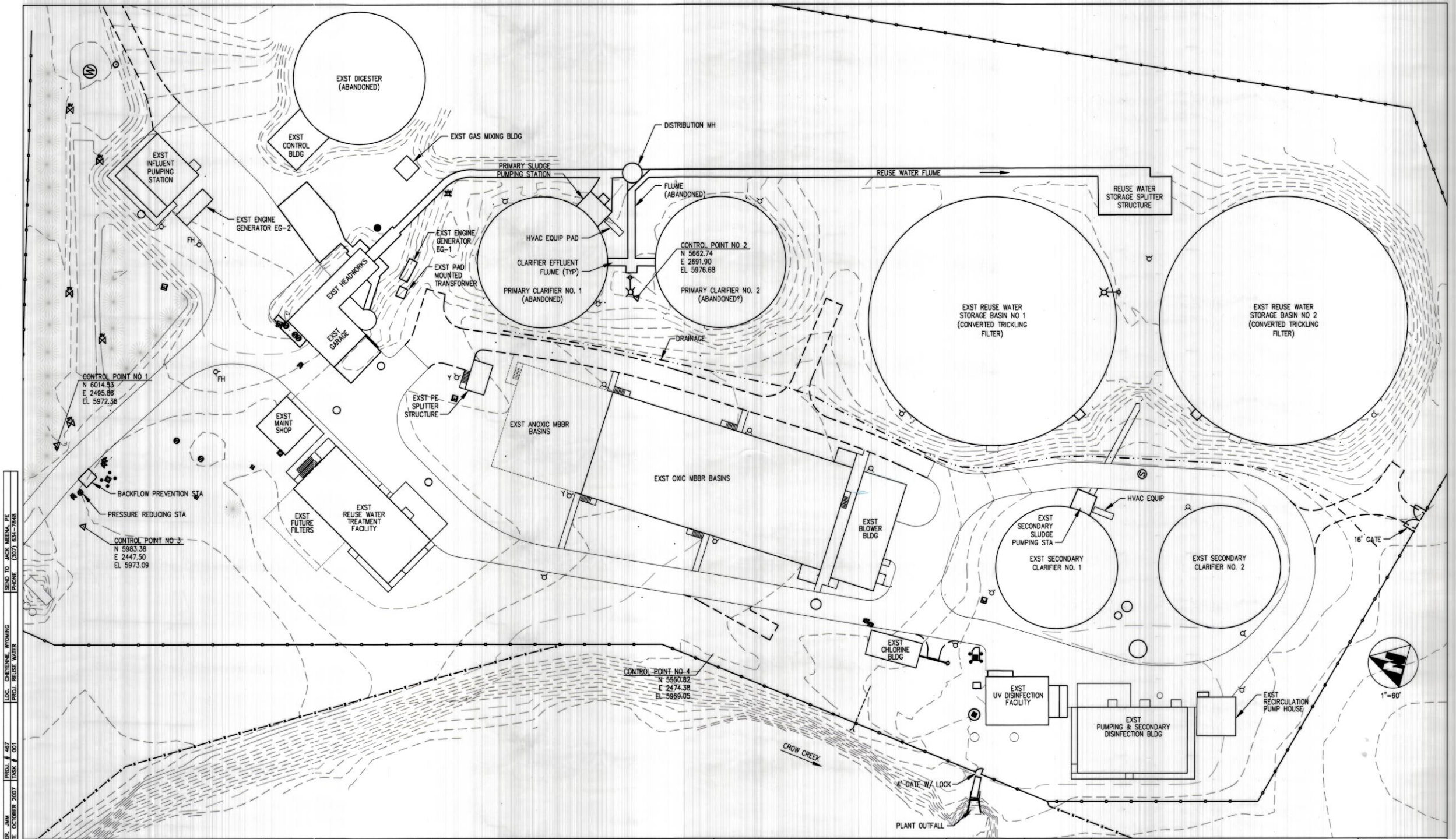




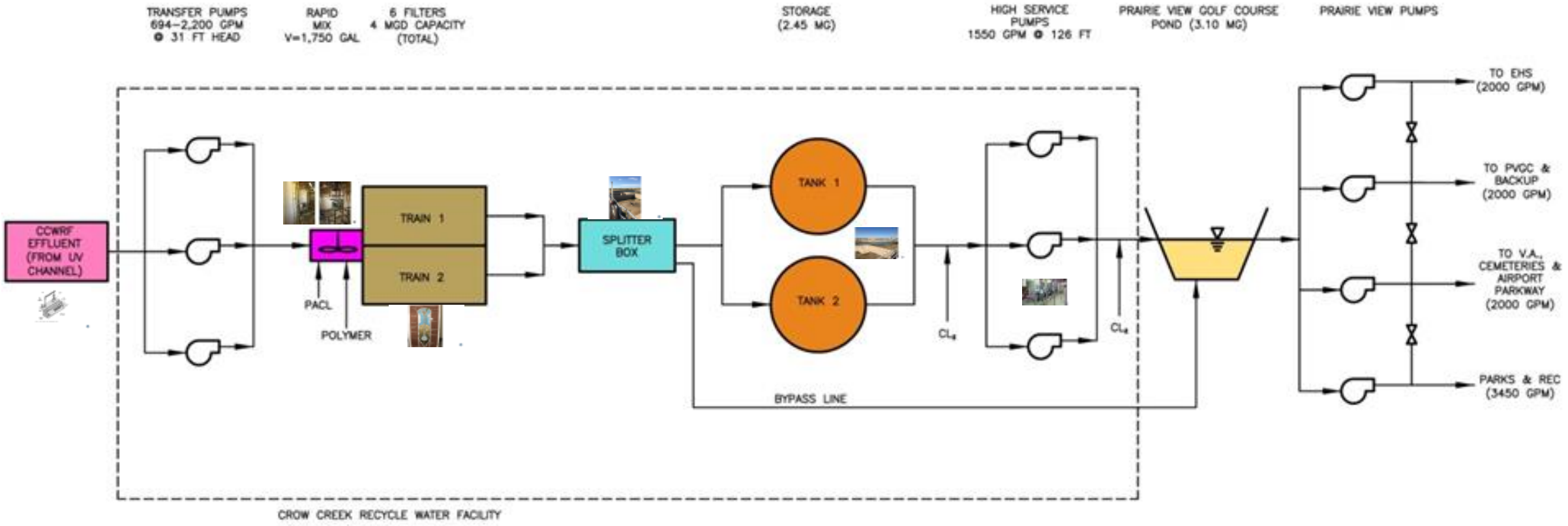
Reuse water in Cheyenne

- Started 2007
- Offset 500 acre-ft/year
- “Class A” meets 2.2 CFU/1000mL limit
- Currently used on:
  - Irrigated parks
  - Athletic Fields
  - Cemeteries
  - Schools
  - Green areas


North Park
Pump Station
2.2 MGD Capacity
14 Inches
10 Inches
14 Inches
Prairie View Pond
3.1 MG
Sun Valley
Pump Station
1.2 MGD Capacity
Sherard
WTP
WTP
8 Inches
Fe Warren AFB
Cheyenne
Dry Creek
WRF
Prairie View Golf Course
Pump Station
10.7 MGD Capacity
WRF
18 Inches
24 Inches
Crow Creek WRF
High Service Pump Station
6.7 MGD Capacity
LEGEND
Existing Reuse Main
Exisiting Reuse Area
Existing Raw Water Irrigation Area
Existing Reuse Pump Station
Water Treatment Plant
Water Reclamation Facility
DATA SOURCES: Cheyenne BOPU, HDR, Esri



ER. JMM	PROJ. # 467	LOC. CHEYENNE, WYOMING	SEND TO JACK MEENA, PE
E OCTOBER 2007	TASK # 001	PROJ. REUSE WATER	PHONE (307) 634-7948


TRANSFER PUMPS
694–2,200 GPM
@ 31 FT HEAD
RAPID
MIX
V=1,750 GAL
6 FILTERS
4 MGD CAPACITY
(TOTAL)
STORAGE
(2.45 MG)
HIGH SERVICE
PUMPS
1550 GPM @ 126 FT
PRAIRIE VIEW GOLF COURSE
POND (3.10 MG)
PRAIRIE VIEW PUMPS
CCWRF
EFFLUENT
(FROM UV
CHANNEL)
TRAIN 1
TRAIN 2
PACL
POLYMER
SPLITTER
BOX
TANK 1
TANK 2
CL_2
CL_2
BYPASS LINE
TO EHS
(2000 GPM)
TO PVGC &
BACKUP
(2000 GPM)
TO V.A.,
CEMETERIES &
AIRPORT
PARKWAY
(2000 GPM)
PARKS & REC
(3450 GPM)
CROW CREEK RECYCLE WATER FACILITY

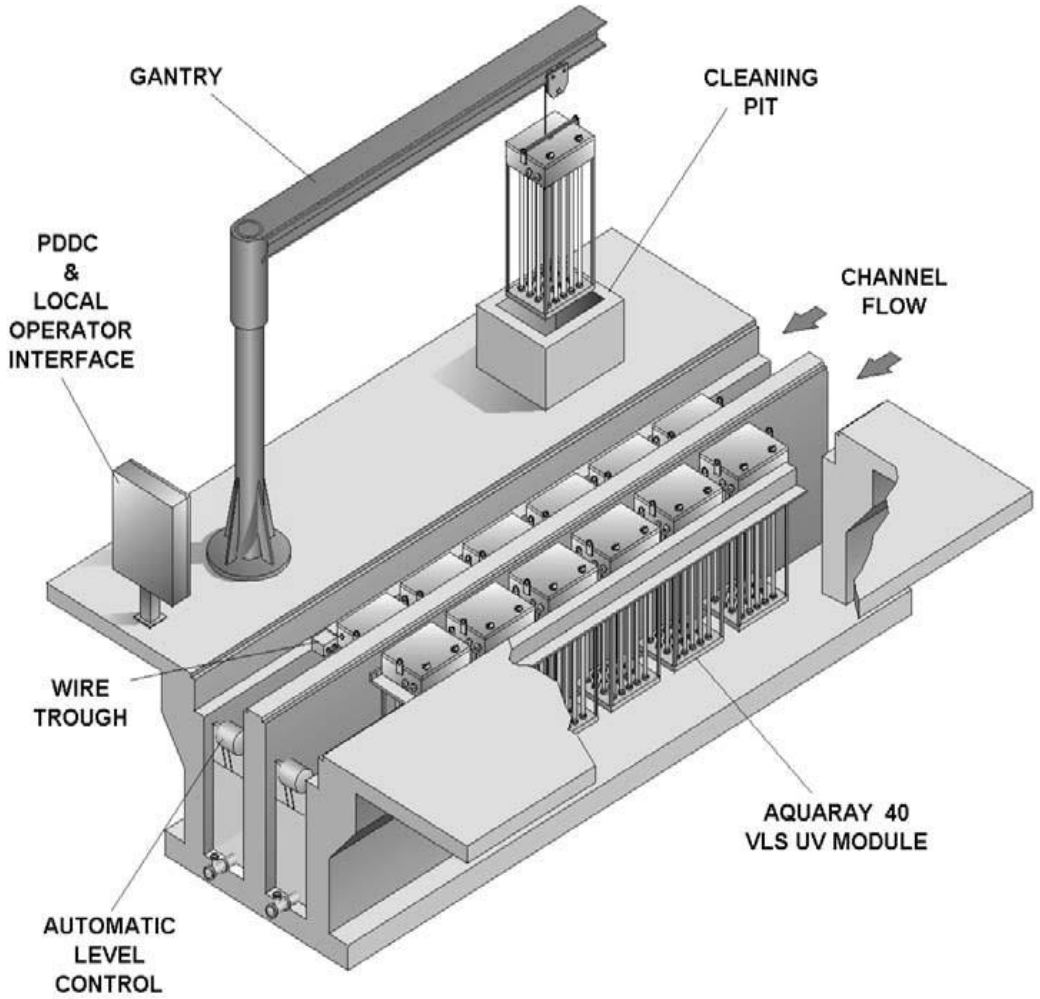
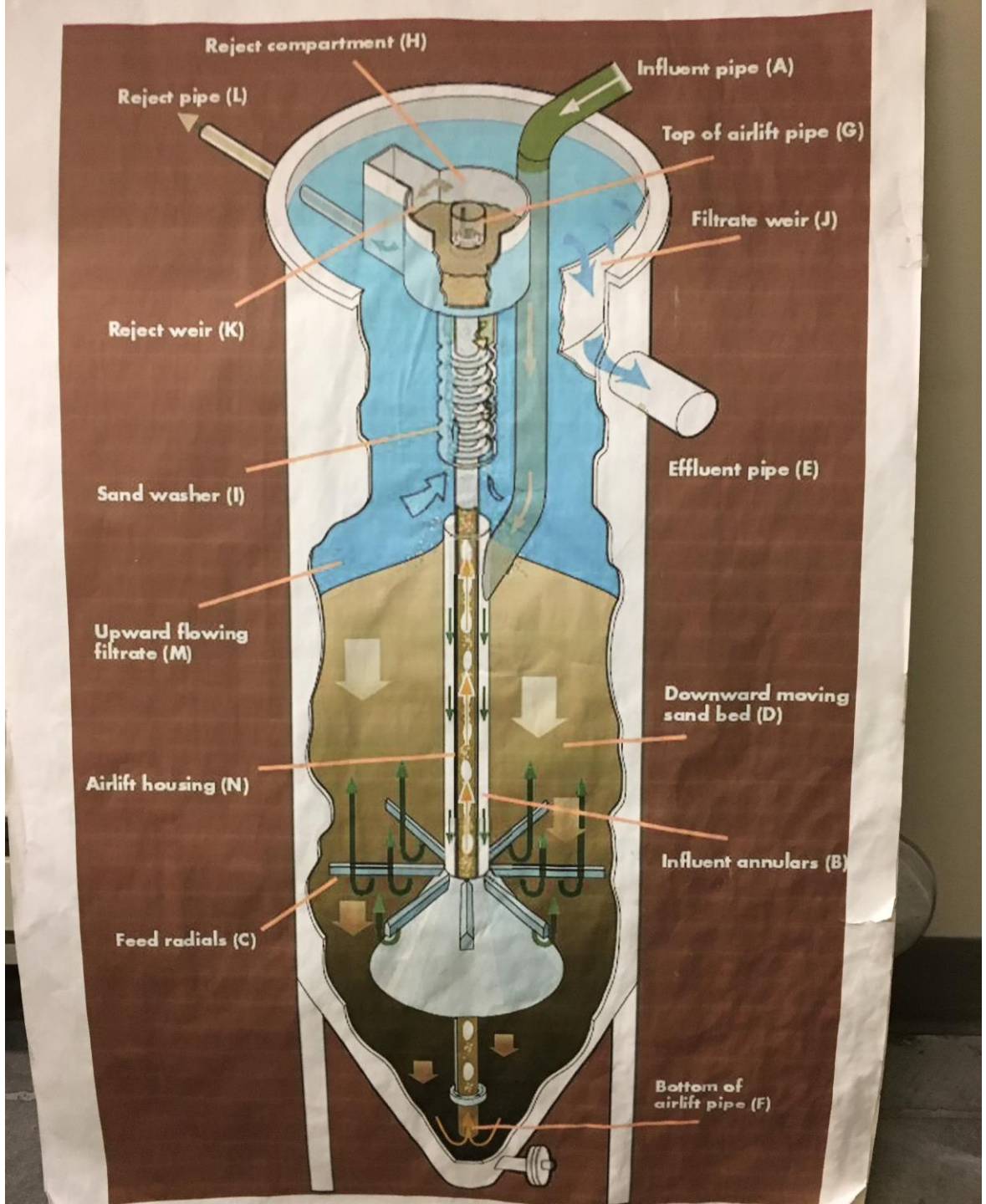


Figure 1 – Typical Aquaray® 40 VLS UV Disinfection System Layout


EDWARDS FIBERGLASS, INC.


2
0
OXY
0


Reject compartment (H)
Influent pipe (A)
Reject pipe (L)
Top of airlift pipe (G)
Filtrate weir (J)
Reject weir (K)
Effluent pipe (E)
Sand washer (I)
Upward flowing filtrate (M)
Downward moving sand bed (D)
Airlift housing (N)
Influent annulars (B)
Feed radials (C)
Bottom of airlift pipe (F)

Reuse Water Quality

Parameter	Units	Degree of Restriction on Use			Class A Pre-Blend (2009 – 2017)	Prairie View Pond Post Blend (2017)
		None	Slight to Moderate	Severe		
EC	dS/m	<0.7	0.7 - 3.0	>3.0	1.18	0.84
TDS	mg/L	<450	450 - 2000	>2000	629	537
pH	-	6.5 - 8	8 - 8.4	>8.4	8.0	no data
Na	mg/L	<69	>69	-	97	85
B	mg/L	<0.7	0.7 - 3.0	>3.0	no data	no data
Cl^-	mg/L	<106	>106	-	110	94
HCO_3	mg/L	<92	92 - 518	>518	176	156
NO_3	mg/L -N	<5	5 - 30	>30	9.7	5.9

Sources:(WateReuse Foundation, 2007), Food and Agriculture Organization (FAO, 1985)

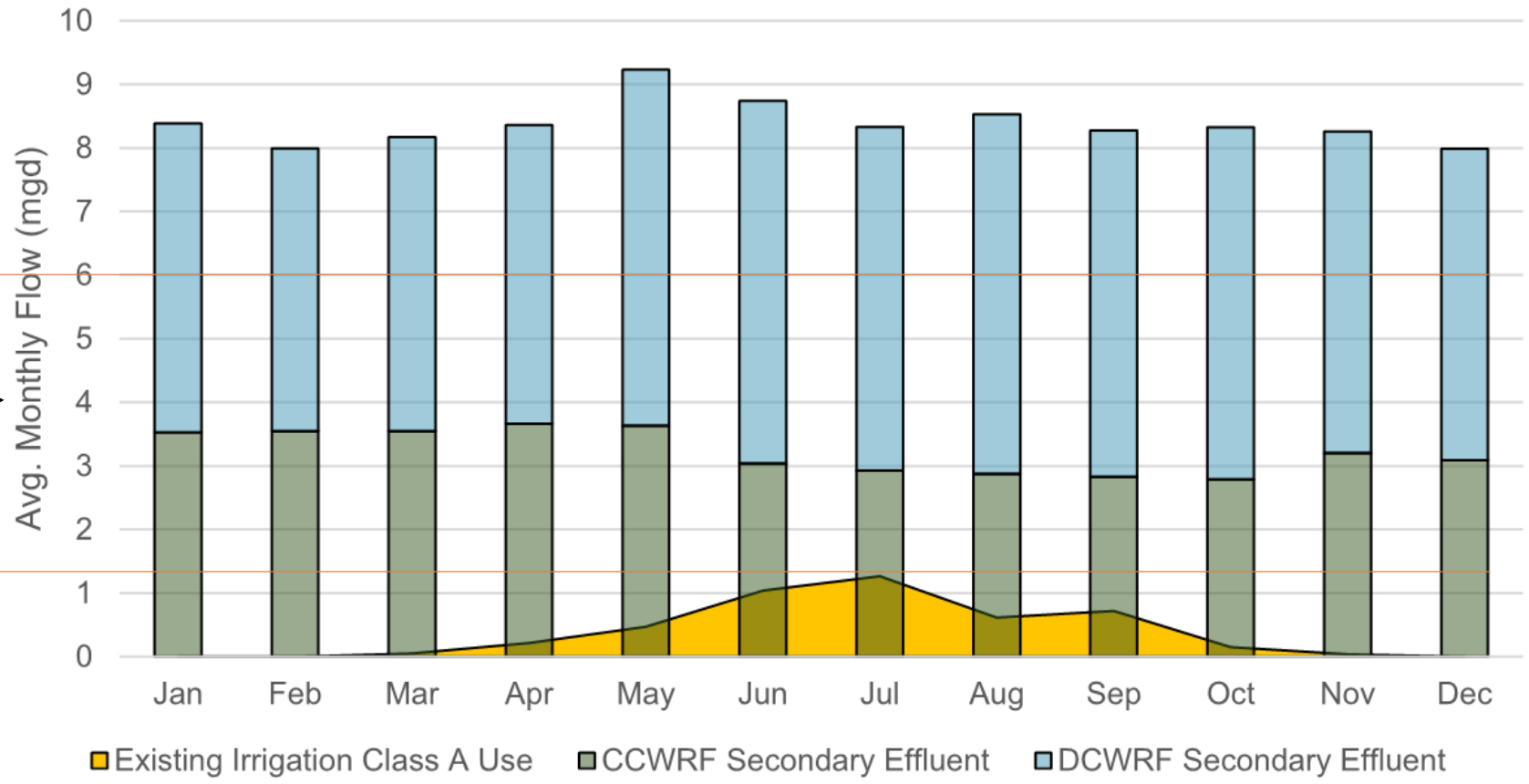
- Acidify Reuse Water
- Salinity Assessment
- Gypsum Soil Amendments
- Nutrient Loading & Fertilization Practices
- Application Practices

Reuse Supply and Demand

Peak Hour Demand = 6 mgd

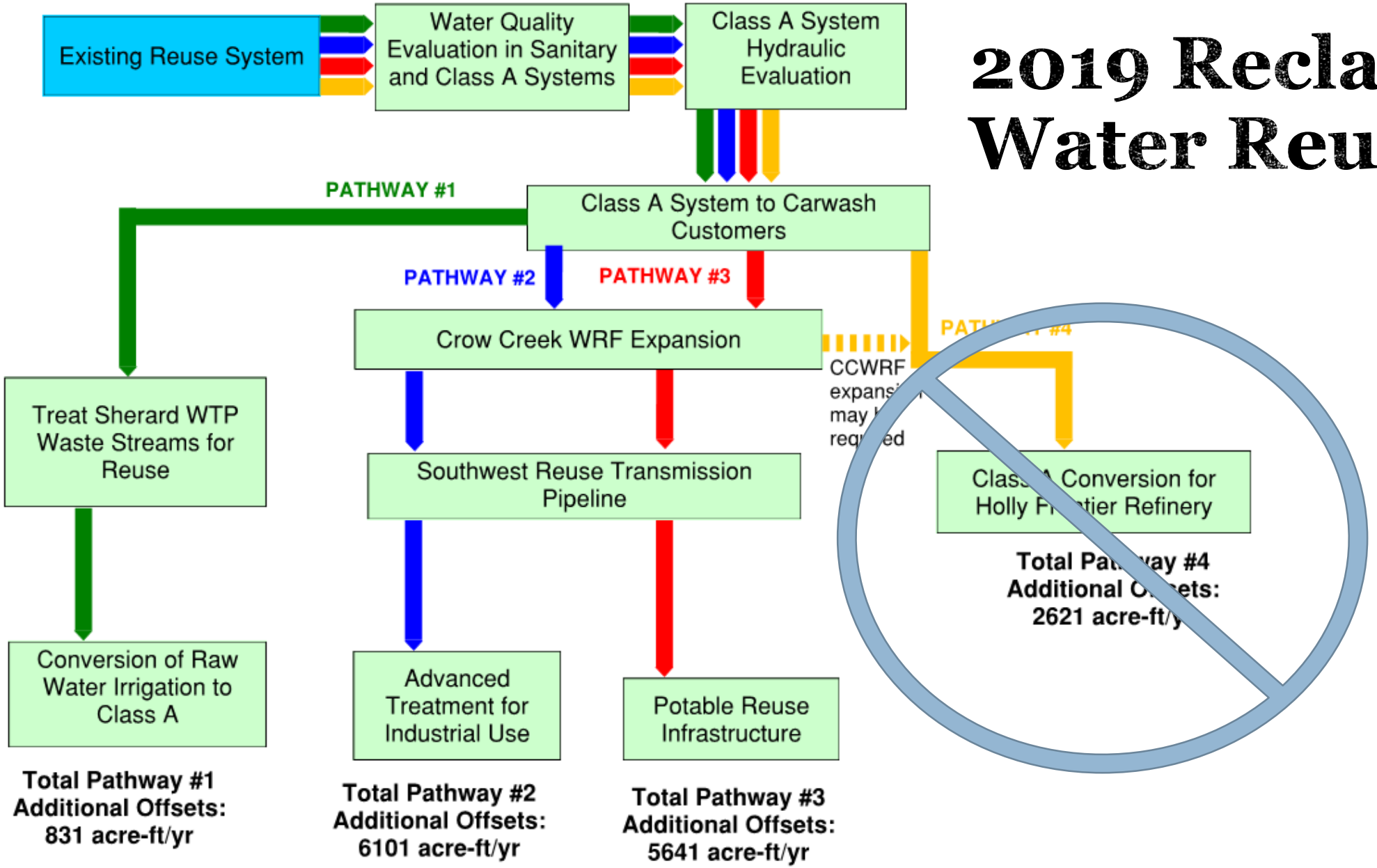
Class A Treatment Capacity = 4 mgd

Max Day Reuse Demand < 2mgd



Storage

2019 Reclaimed Water Reuse Study



Data Center Destination

Pro

- High Summer Volume
- Relatively Clean Discharge
- Funding Partner

Con

- Slug Loading
- High TDS
- Treatment, Distribution, and Sink

Data Center Reuse Catch-22

If we build it, will they come?

- Customer Cooperation
- Public Private Partnerships
  - Commercial
  - Industrial
  - Residential
- Codes and Regulations
- Rate Structure

Questions

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