Water Reuse in Tennessee

A Municipal Utility Provider's Perspective & UOTF Case Study

APRIL 20, 2015

ENVIRONMENTAL SHOW OF THE SOUTH

GATLINBURG, TN

THE FORECAST

POPULATION GROWTH: 2010 TO 2035

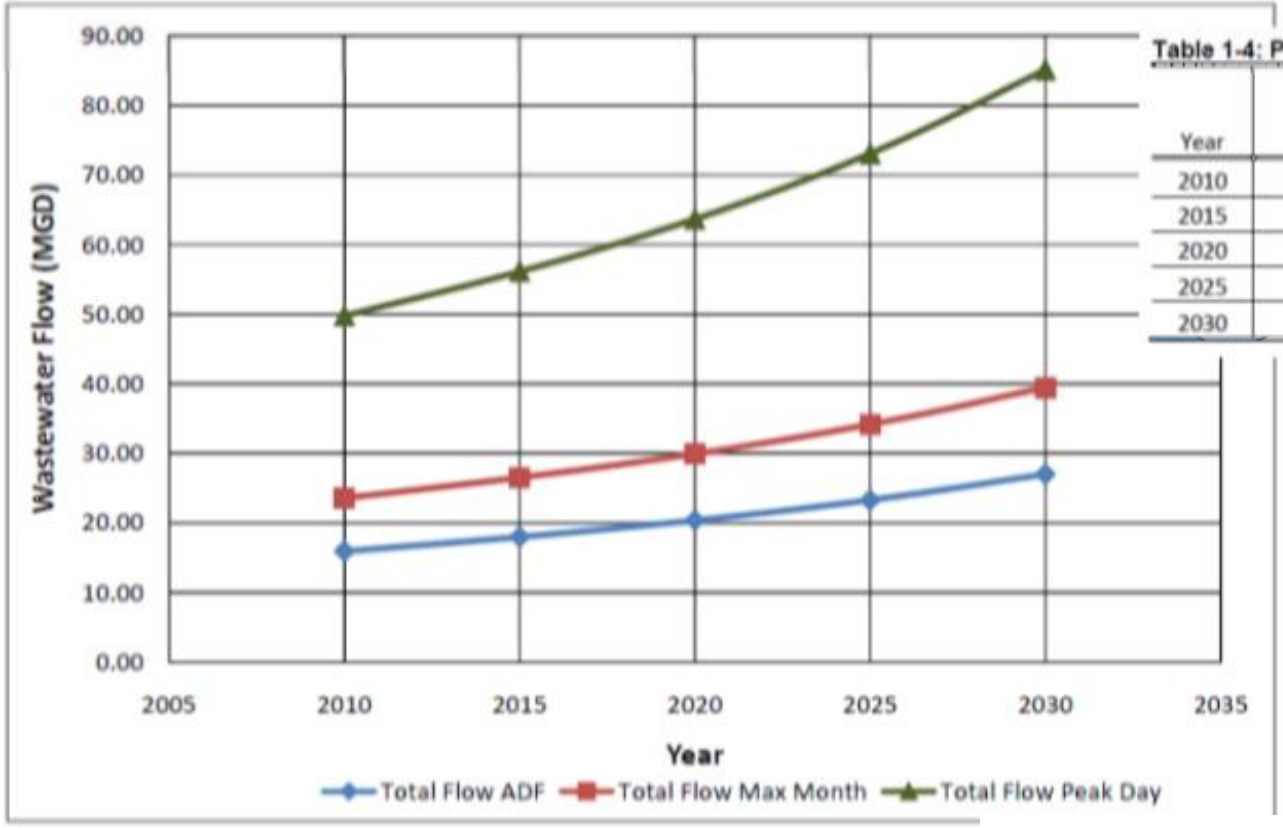
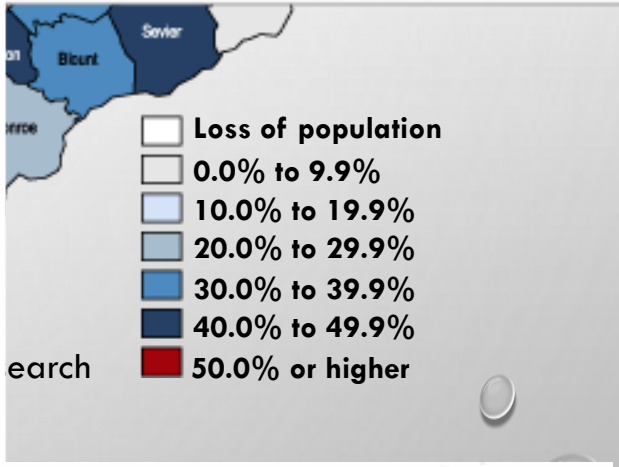


Figure 1-15: Projected Wastewater Flows for the Total Service Area

Table 1-4: Projected Wastewater Flows for the Total Service Area

Year	Total Flow ADF (MGD)	Total Flow Max Month (MGD)	Total Flow Peak Day (MGD)
2010	15.94	23.57	49.77
2015	17.99	26.52	56.12
2020	20.37	29.94	63.67
2025	23.29	34.14	73.06
2030	27.00	39.48	85.10



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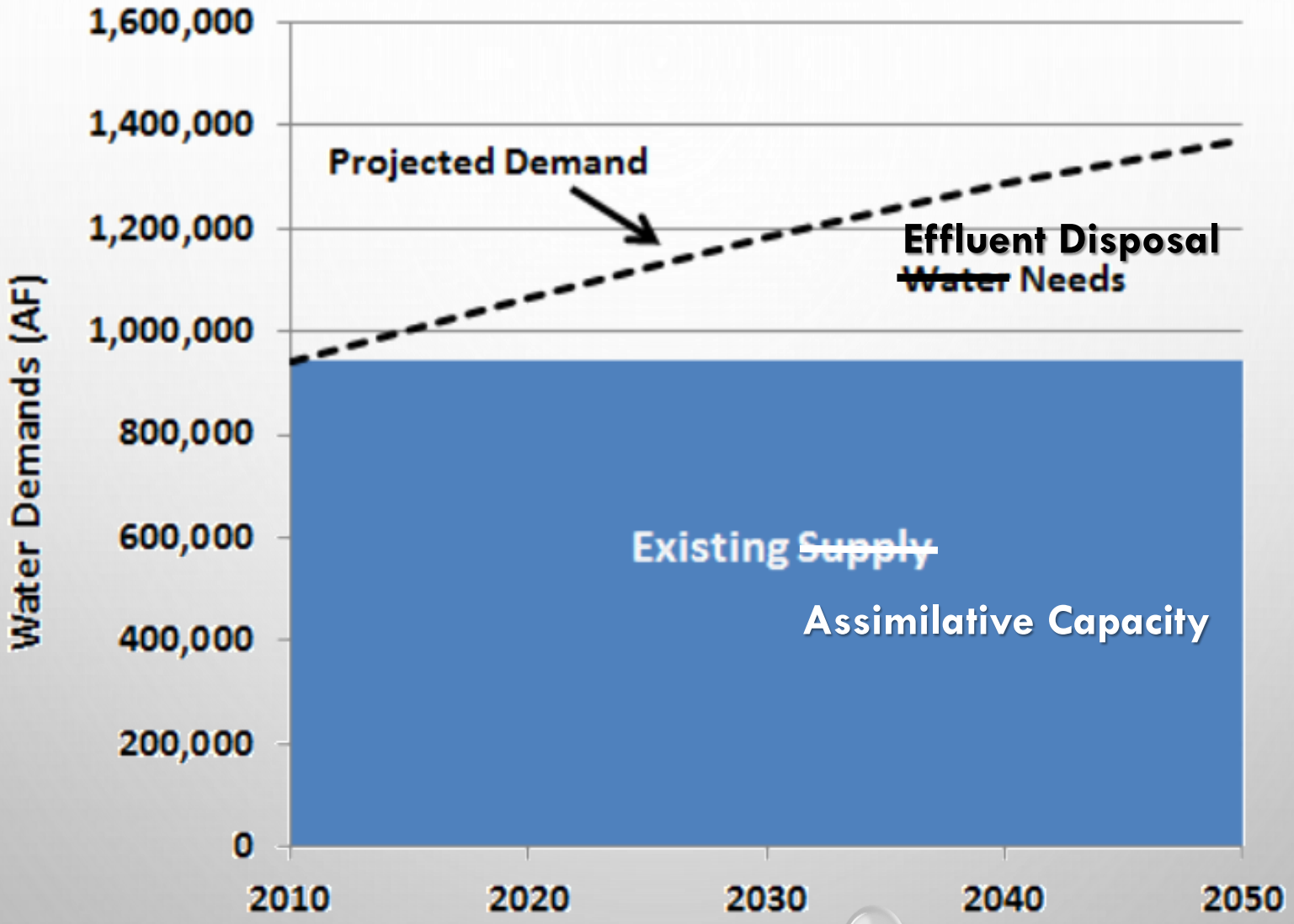
Population Projections	2015	2035
Murfreesboro:	124,745	228,090
Planning Area (UGB + City):	202,140	362,388
Rutherford County:	309,088	509,910

THE LIMITING FACTOR

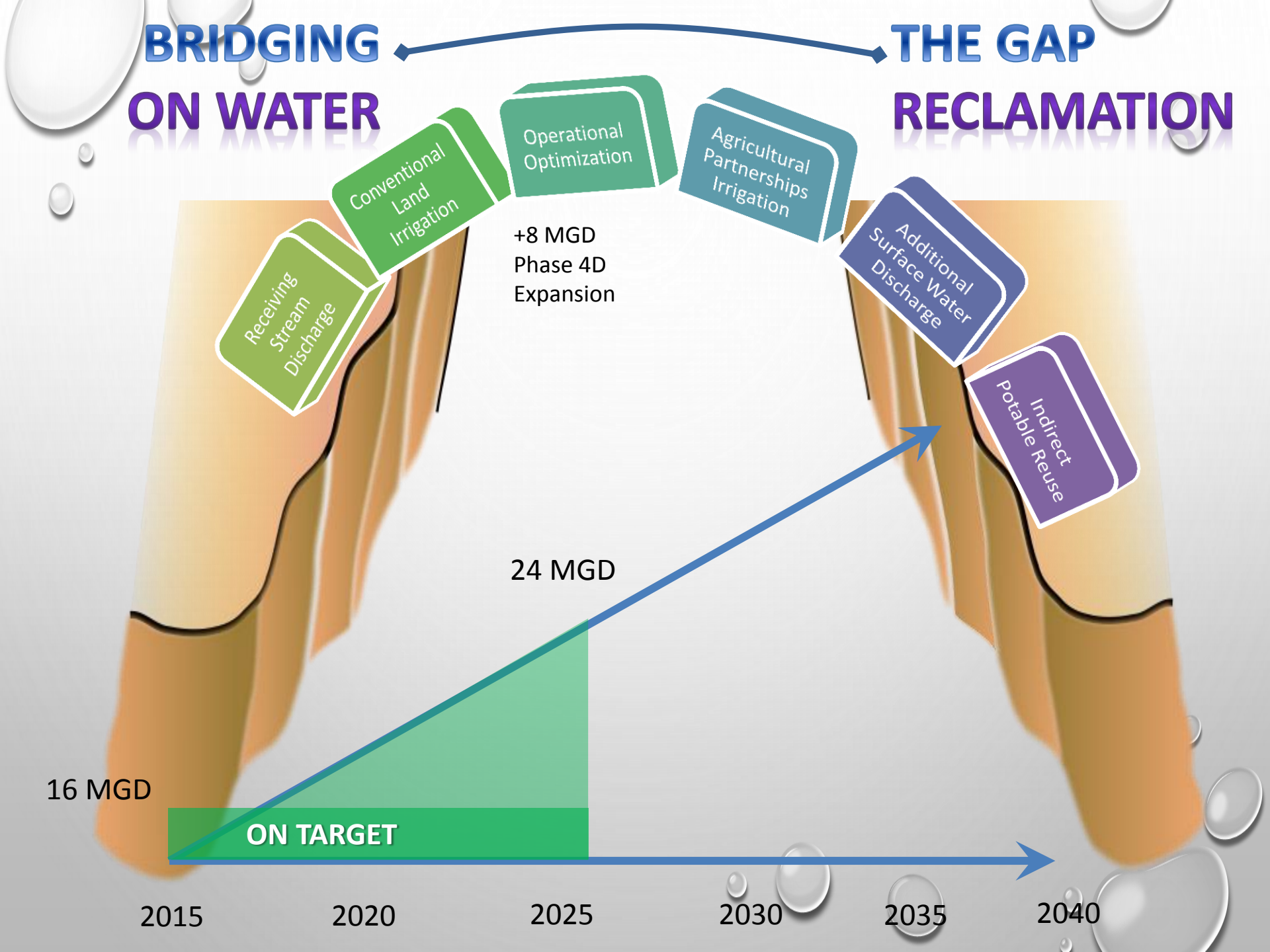
THE STONES RIVER IS A SMALL RECEIVING STREAM

THE CHALLENGE

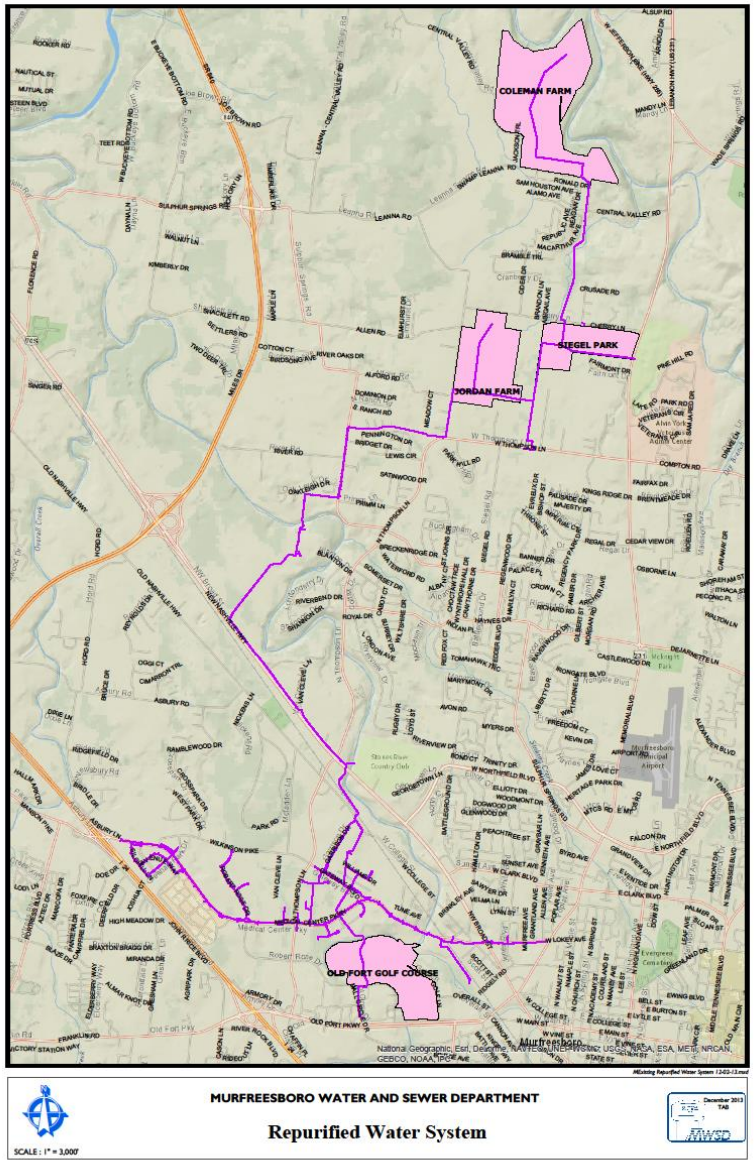


BRIDGING THE GAP

ON WATER RECLAMATION



THE FOUNDATION FOR EFFLUENT DISPOSAL IS BUILT



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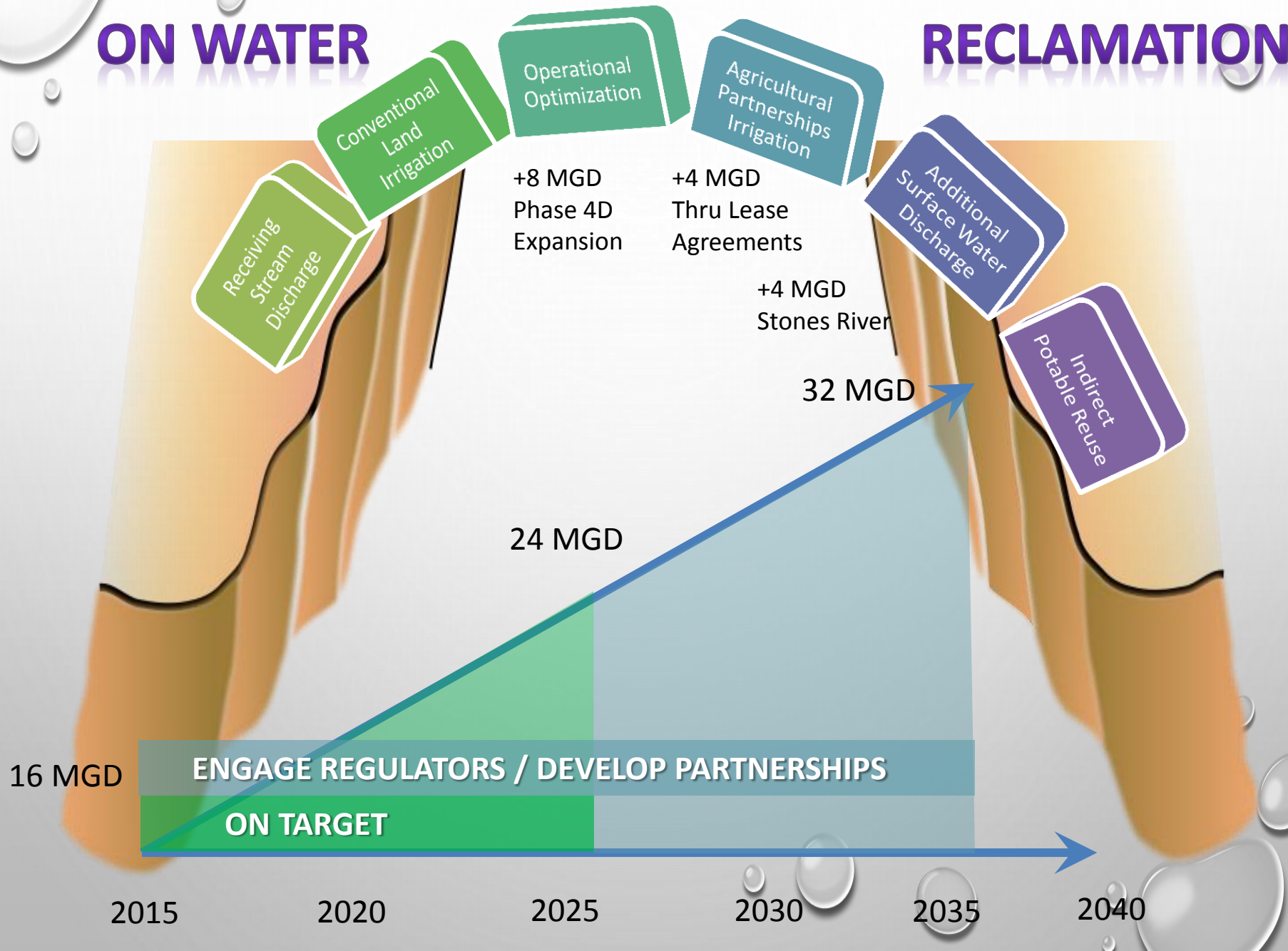
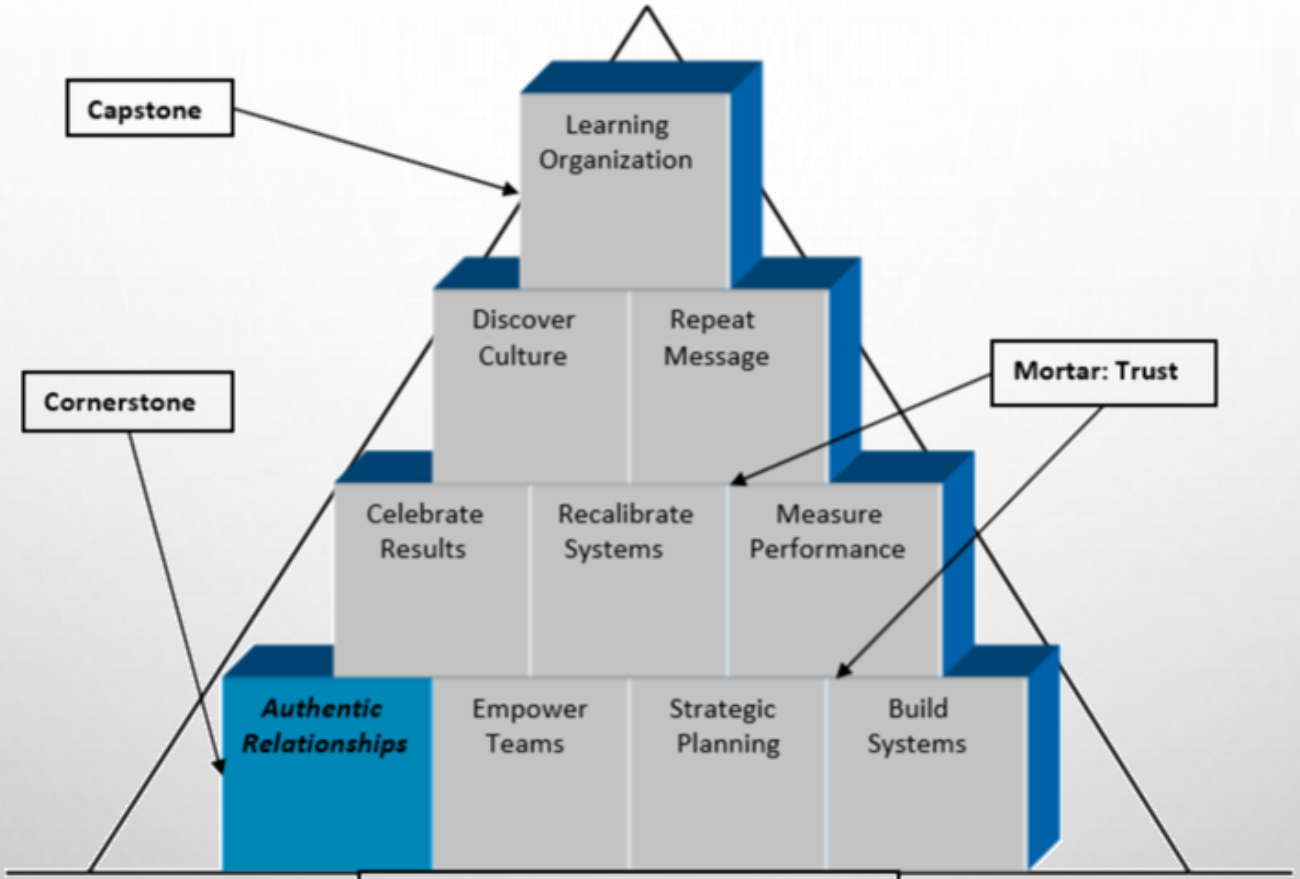


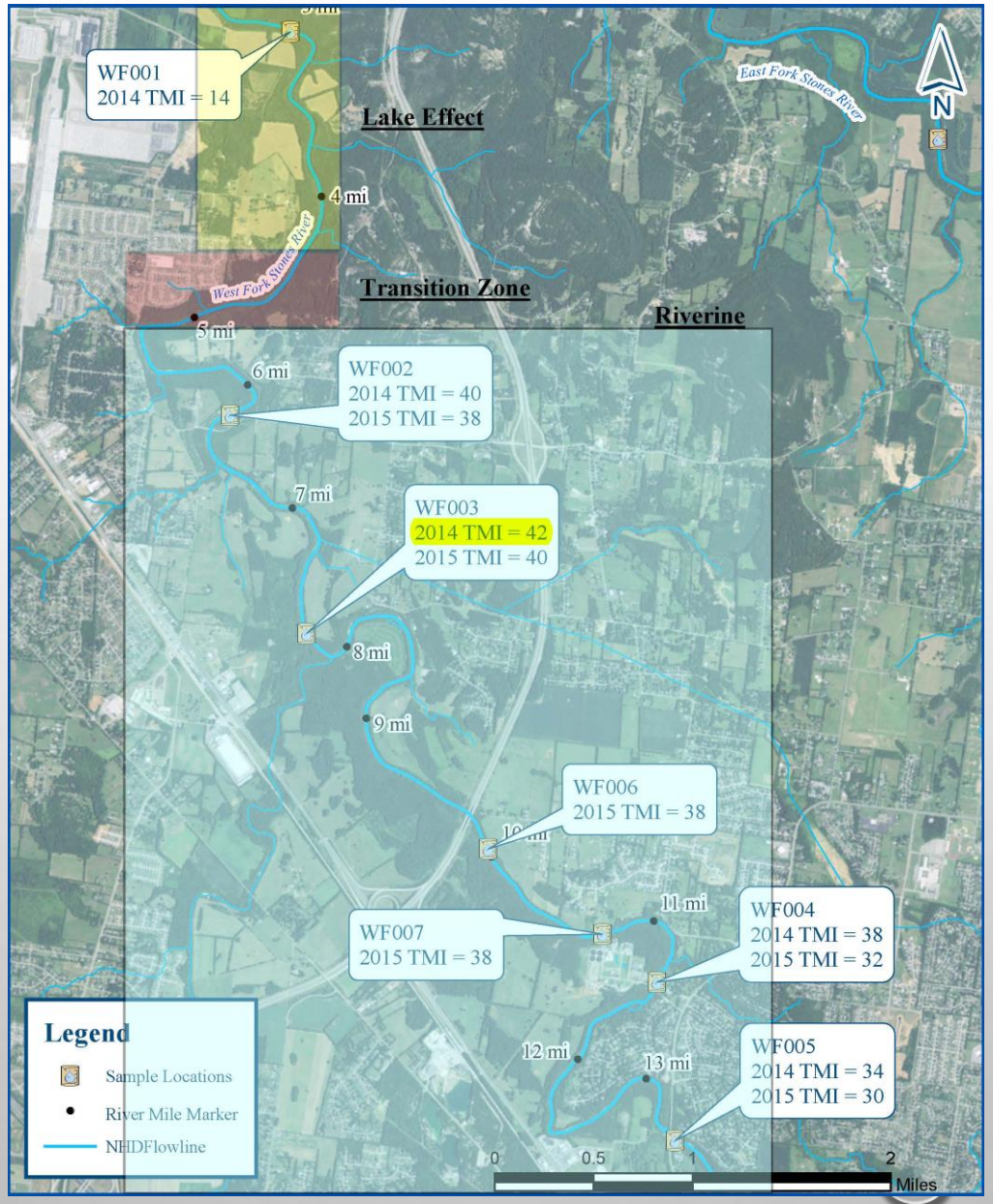
Strategic Elements of Change Above the Surface

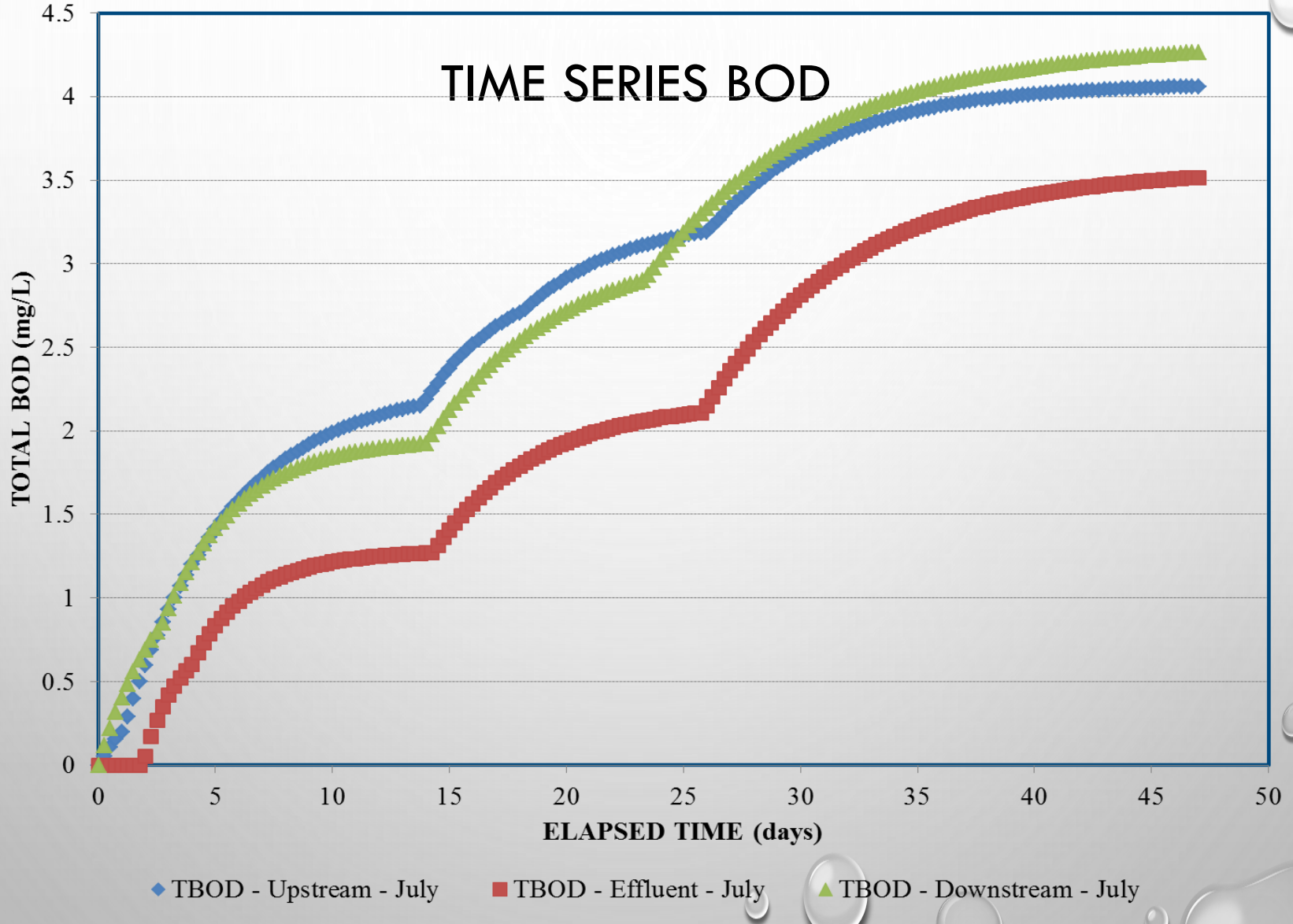


Below the Surface Elements:

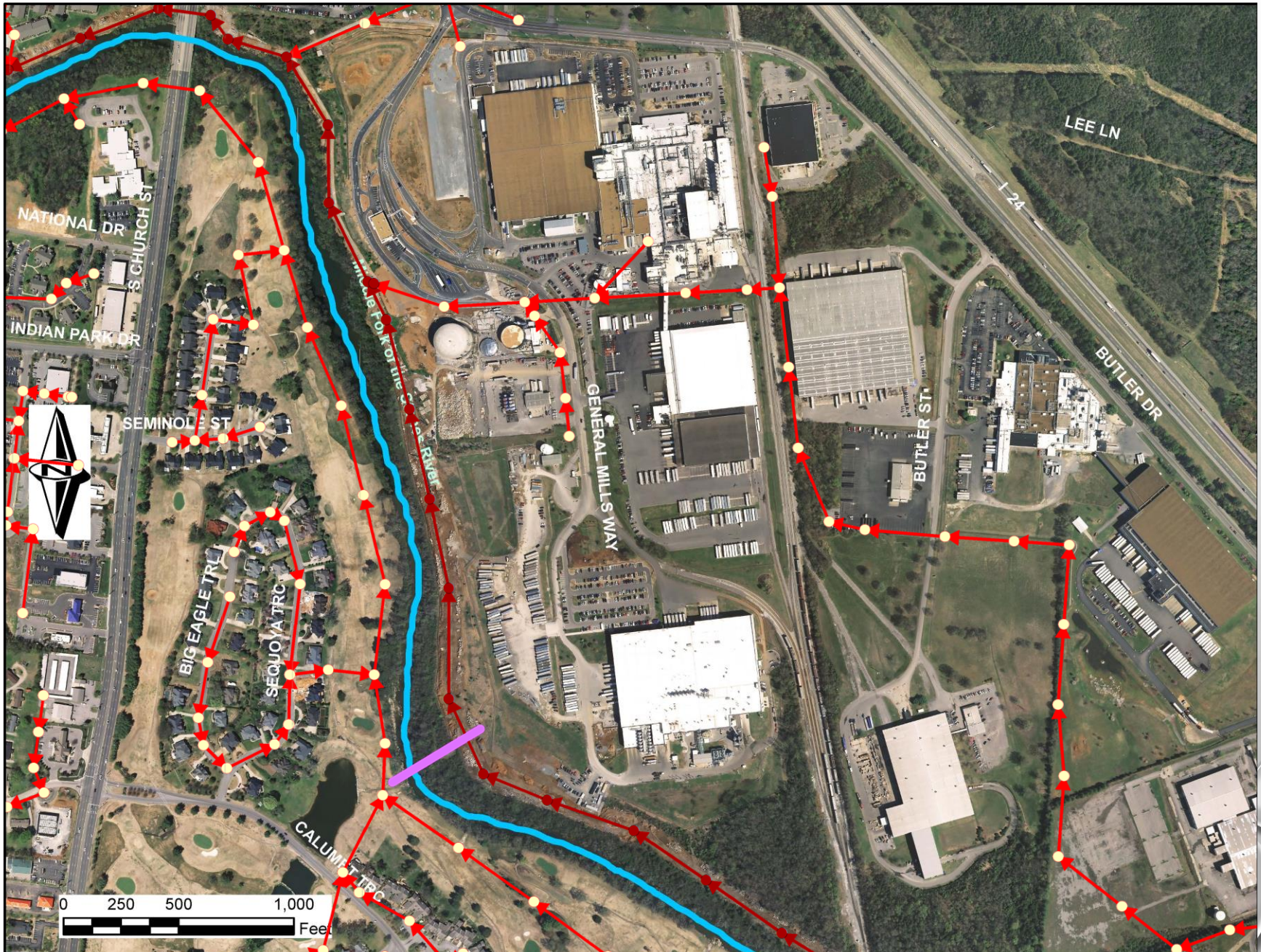
Leadership Principles
Core Values
Clear Expectations
The Leader's Vision

SAMPLE LOCATIONS AND TMI SCORES




TIME SERIES BOD
TOTAL BOD (mg/L)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
5
10
15
20
25
30
35
40
45
50
ELAPSED TIME (days)
TBOD - Upstream - July
TBOD - Effluent - July
TBOD - Downstream - July

GENERAL MILLS & INDIAN HILLS COLLABORATION



GENERAL MILLS COST OF SEWER TO MWSD

Discharge to Sewer (gpd)	936,000
MWSD Sewer Rate ($/1000 gal)	$5.67
Sewer Costs ($/day)	$5,307
Sewer Costs ($/yr)	$1,937,099

GENERAL MILLS OFFSETS SEWER COSTS WHEN INDIAN HILLS IRRIGATES

Land Application on Indian Hills (gpd)	50,000
MWSD Sewer Rate ($/1000 gal)	$5.67
Sewer Offset Costs ($/day)	$283
Sewer Offset Costs ($/yr)	$103,477

WHAT IF INDIAN HILLS IRRIGATES MORE AND CHARGES A FEE LESS THAN MWSD?

Land Application on Indian Hills (gpd)	100,000
Indian Hills Application Rate ($/kgal)	$2.85
Land Application Costs ($/day)	$285
Land Application Costs ($/yr)	$104,025
Equals Indian Hills Revenue ($/yr)	$104,025

WHAT IF INDIAN HILLS INSTALLS AND IRRIGATION SYSTEM FOR OPTIMAL PERFORMANCE

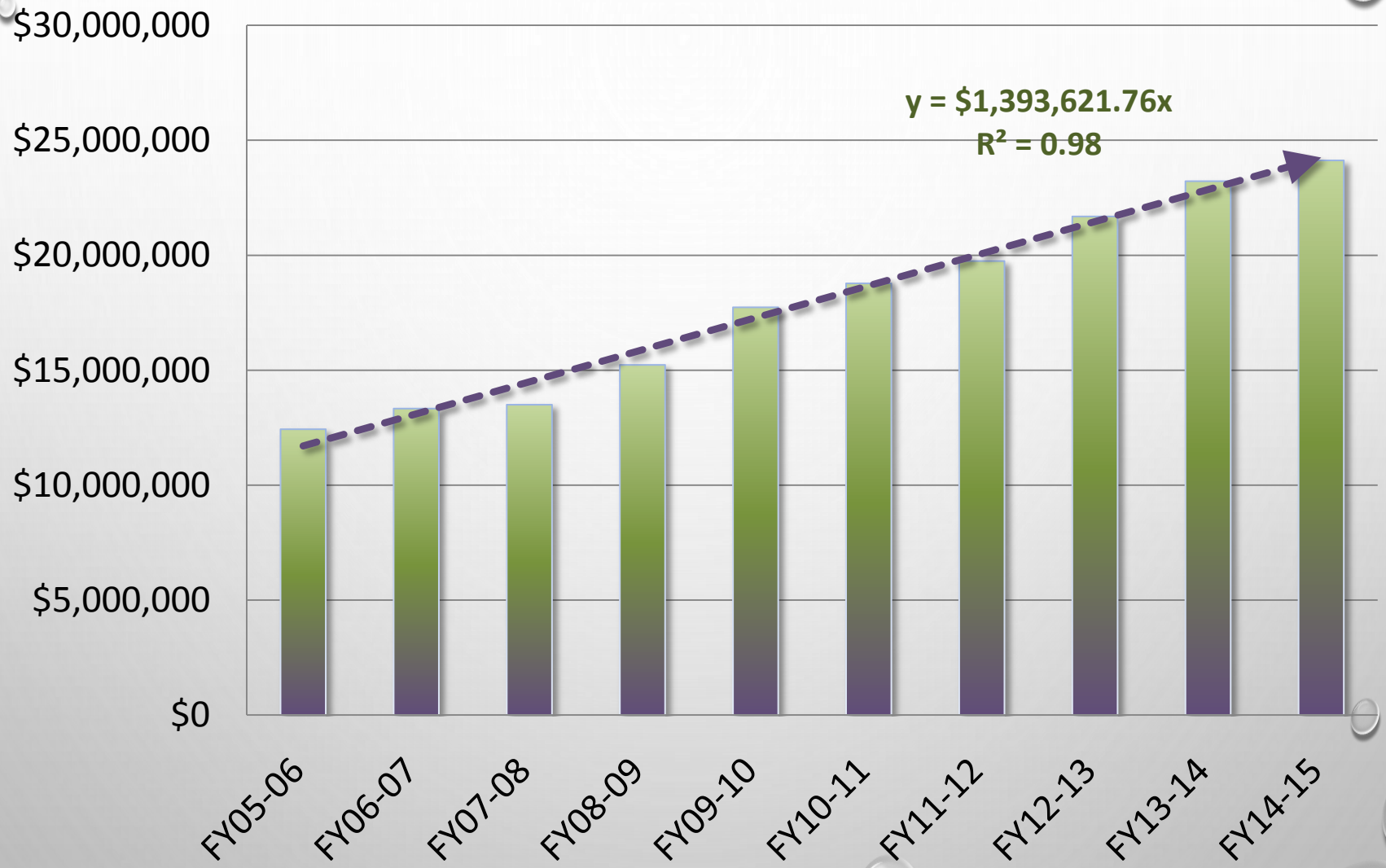
1/8" Rain per Day Indian Hills = 200 MG Annually Offset to Sewer
New Dual-Pipe Irrigation System = $2,600,000

Disposal Volume (gpd)	Disposal Volume (annual)	Daily Revenue	Annual Savings & Revenue	**Payback Period**
100,000	36,500,000	$285.00	$104,025.00	**25.0**
200,000	73,000,000	$570.00	$208,050.00	**12.5**
400,000	146,000,000	$1,140.00	$416,100.00	**6.2**
550,000	200,750,000	$1,567.50	$572,137.50	**4.5**

MWSD CON – REVENUE LOSS

Land Application on Indian Hills (gpd)	550,000
Sewer Rate ($/1000 gal)	$5.67
MWSD Loss of Revenue ($/day)	$3,118
MWSD Loss of Revenue ($/yr)	$1,138,252
MWSD Annual Sewer Rate Revenue	$24,122,658
% Loss of Sewer Rate Revenue	4.7%

SEWER RATE REVENUE



MWSD PRO – LOWER TP LOADING

Discharge to Sewer (gpd)	936,000
Gen Mills Phosphorous Conc (ppm)	35
Mass sent to SCWWTP (lbs/day)	273
Limit at SCWWTP (lbs/day)	307

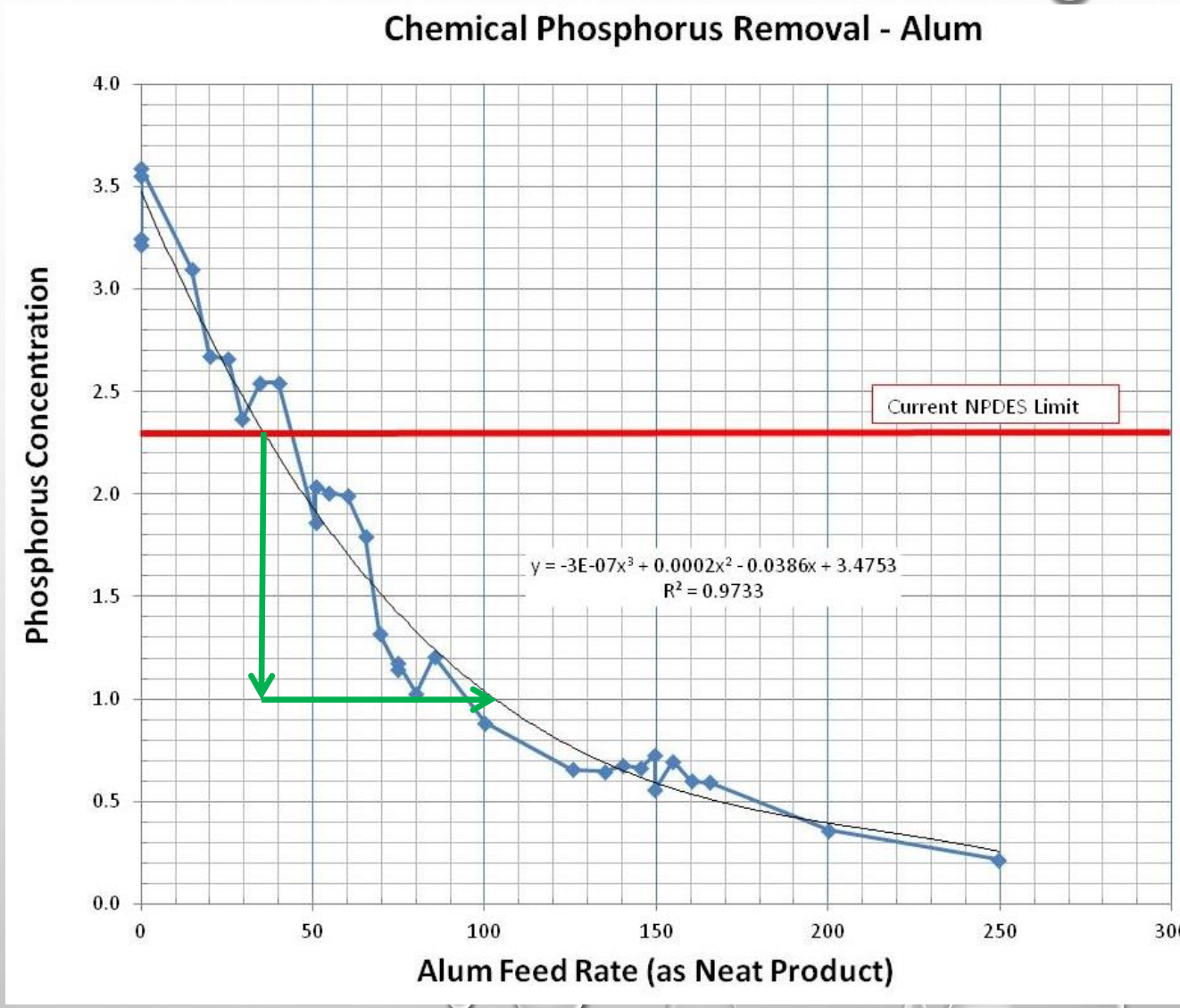
89% OF LIMIT

Discharge to Sewer (gpd)	386,000
Gen Mills Phosphorous Conc (ppm)	35
Mass sent to SCWWTP (lbs/day)	112
Limit at SCWWTP (lbs/day)	307

36% OF LIMIT

MWSD AVOIDED COSTS

- $475,000 in Capital Costs Associated with an Alum Feed System at Treatment Plant
- $1.36M annual chemical costs, or $0.32 per pound feeding 11,667 pounds per day (70 ppm @ 20 MGD) of aluminum sulfate to achieve 1.0 ppm TP
- General Mills pro rata share would be $1.2M (89%) or $490k (36%)



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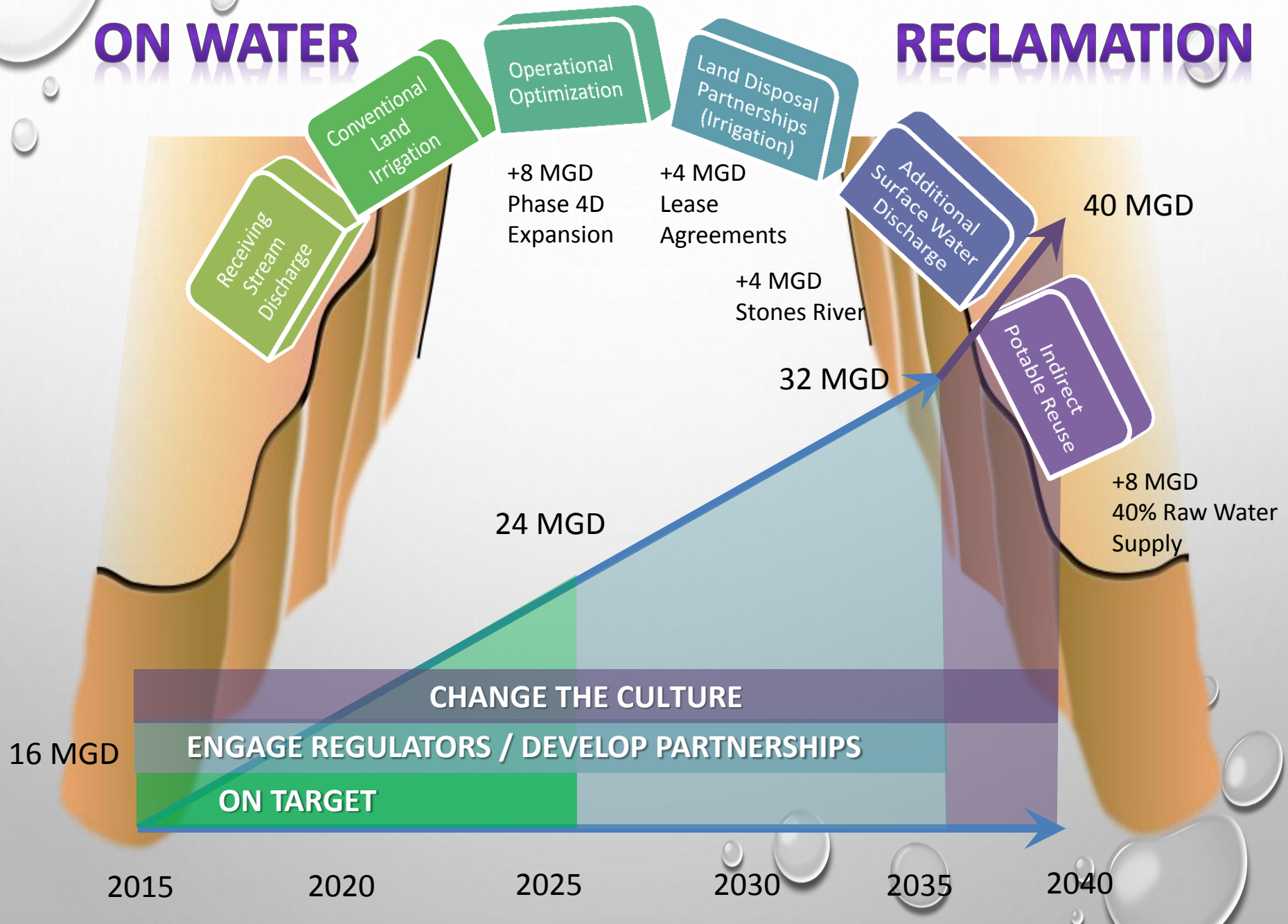

ONE WATER

RIGHT WATER FOR THE RIGHT USE

Treatment technologies are available to achieve any desired level of water quality (taken from EPA, 2012)

UOTF
A NEW PARADIGM

WATER RESOURCES UTILITY OF THE FUTURE

Past	Future
Handlers of wastewater	Managers of sustainable resources
Seeking permit compliance	Watershed-scale environmental leaders seeking least-cost, highest return solutions
Engineers designing treatment plants	Regional planners of weather-resilient, green communities
Isolated public service units	Integrated members of economically thriving local communities

QUESTIONS/DISCUSSION