



Step One of Integrated Planning: What Can You Afford? A Case Study from Upper Blackstone

January 25, 2017

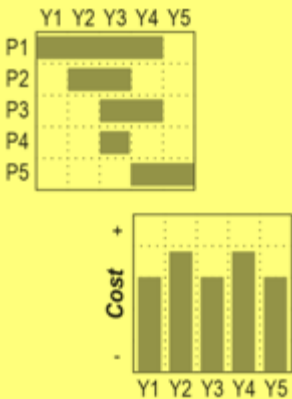


Background

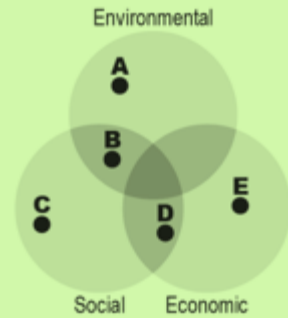
- Upper Blackstone AOC May 2014 for Nitrogen and Phosphorus NPDES permit limits
- AOC required an “*Integrated Planning Report for Wet Weather Management in the UBWPAD and City of Worcester*” be submitted by December 31, 2015
- UBWPAD solicits consultant to perform a Financial Capability Assessment in November 2014.

Typical IP Methodology

Step 1 Project List



Step 2 Prioritization Criteria



Step 3 Project Scores

	Criteria				
	Env.		Soc.	Eco.	
	A	B	C	D	E
P1	#	#	#	#	#
P2	#	#	#	#	#
P3	#	#	#	#	#
P4	#	#	#	#	#
P5	#	#	#	#	#

Step 4 Importance Weighting



Step 5 Calculation Algorithm

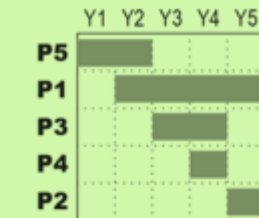


Step 6 Weighted Total Scores

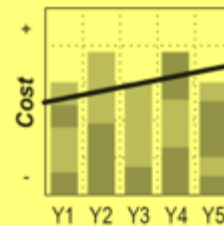
	Criteria					#
	Env.		Soc.	Eco.		
	A	B	C	D	E	
P5	#	#	#	#	#	#
P1	#	#	#	#	#	#
P3	#	#	#	#	#	#
P4	#	#	#	#	#	#
P2	#	#	#	#	#	#

Output:
Prioritized List

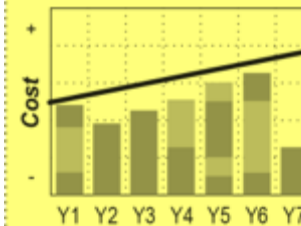
Step 7 Priority Schedule



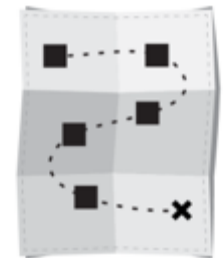
Step 8 Financial Analysis



Step 9 Final Integrated Plan



Step 10 Repeatable Process



FCA Process

Financial
Capability
Assessment

- Baseline FCA in 2015 dollars
- Follows 1997 EPA Guidance

Enhanced
Analysis Case
Study

- Provides detailed affordability considerations
- Used for IP scenario evaluation

District's
Compliance
Requirements

- Compliance schedule
- Flexibility in capital plan

1997 EPA Financial Capability Assessment (FCA)



EPA Methodology (1997)

PHASE 2: Economic Indicators	PHASE 1 : Residential Indicator		
	Low (below 1.0 %)	Mid-Range (between 1.0 and 2.0 %)	High (greater than 2.0 %)
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
Strong (Above 2.5)	Low Burden	Low Burden	Medium Burden

Phase 1: Residential Indicator for Worcester and District Composite

Row	Item	District + Communities	Worcester
<i>Median Household Income</i>			
201	MHI in 2013	\$54,868	\$45,932
202	CPI Adjustment Factor	1.031	1.031
203	Adjusted MHI	\$56,558	\$47,347
204	Annual Cost per Household	\$571	\$523
205	Residential Indicator		
	CPH as a percentage of adjusted MHI	1.01%	1.10%
	Portion Associated with UBWPAD Assessments	0.50%	45.46%

Phase 2: Financial Capability Indicators

Indicator	Strong	Mid-Range	Weak
Bond Rating	AAA-A or Aaa-A	BBB or Baa	BB-D or Ba-C
Net Debt as a % of FMPV	Below 2%	2 - 5%	Above 5%
Unemployment	More than 1 percentage point below the national average	+/- 1 percentage point of the national average	More than 1 percentage point above the national average
MHI	More than 25% above national MHI	+/- 25% of national MHI	More than 25% below national MHI
Property Tax revenue as a % of FMPV	Below 2%	2 - 4%	Above 4%
Property Tax Revenue Collection Rate	Above 98%	94 - 98%	Below 94%

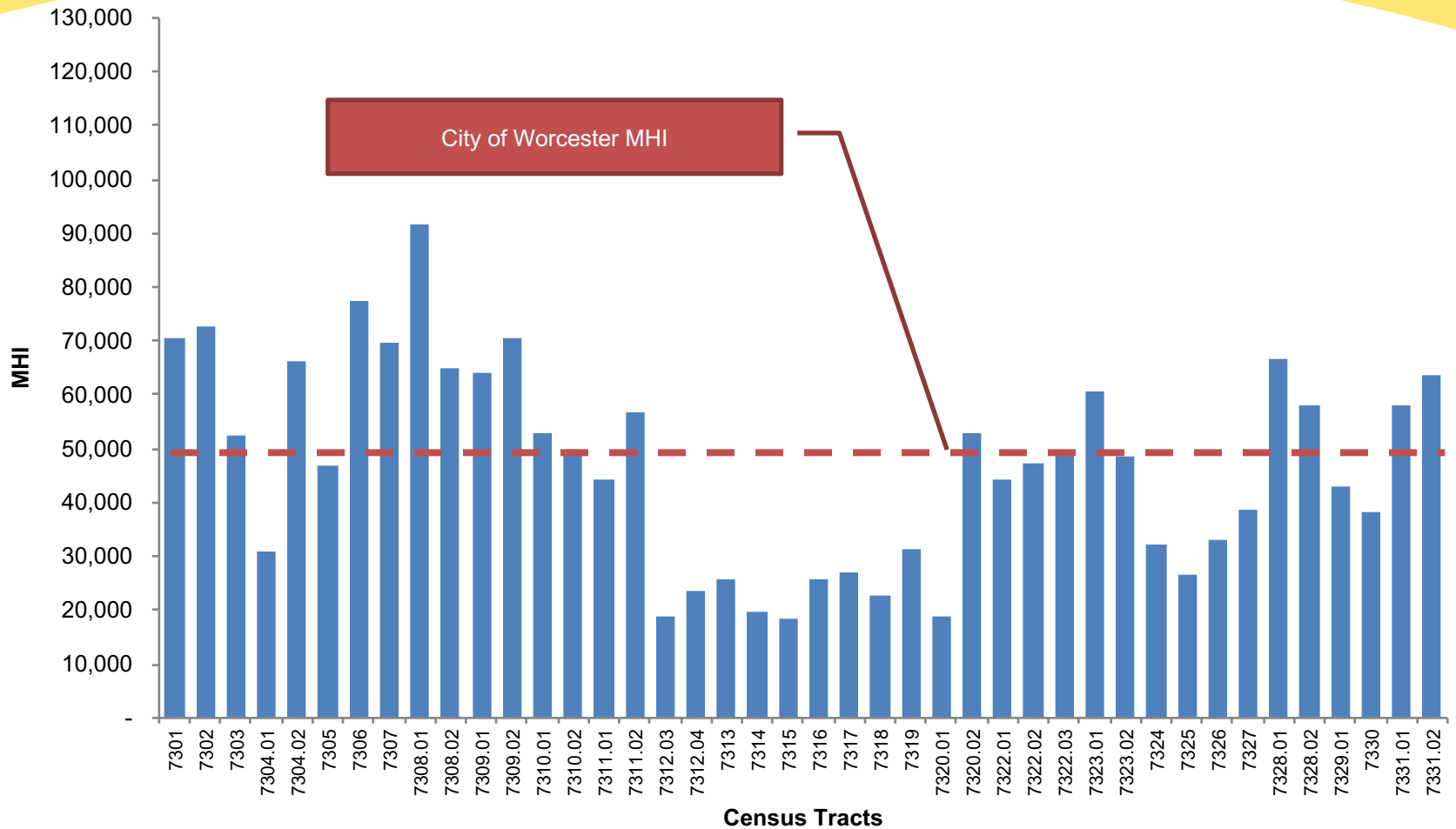


City Results

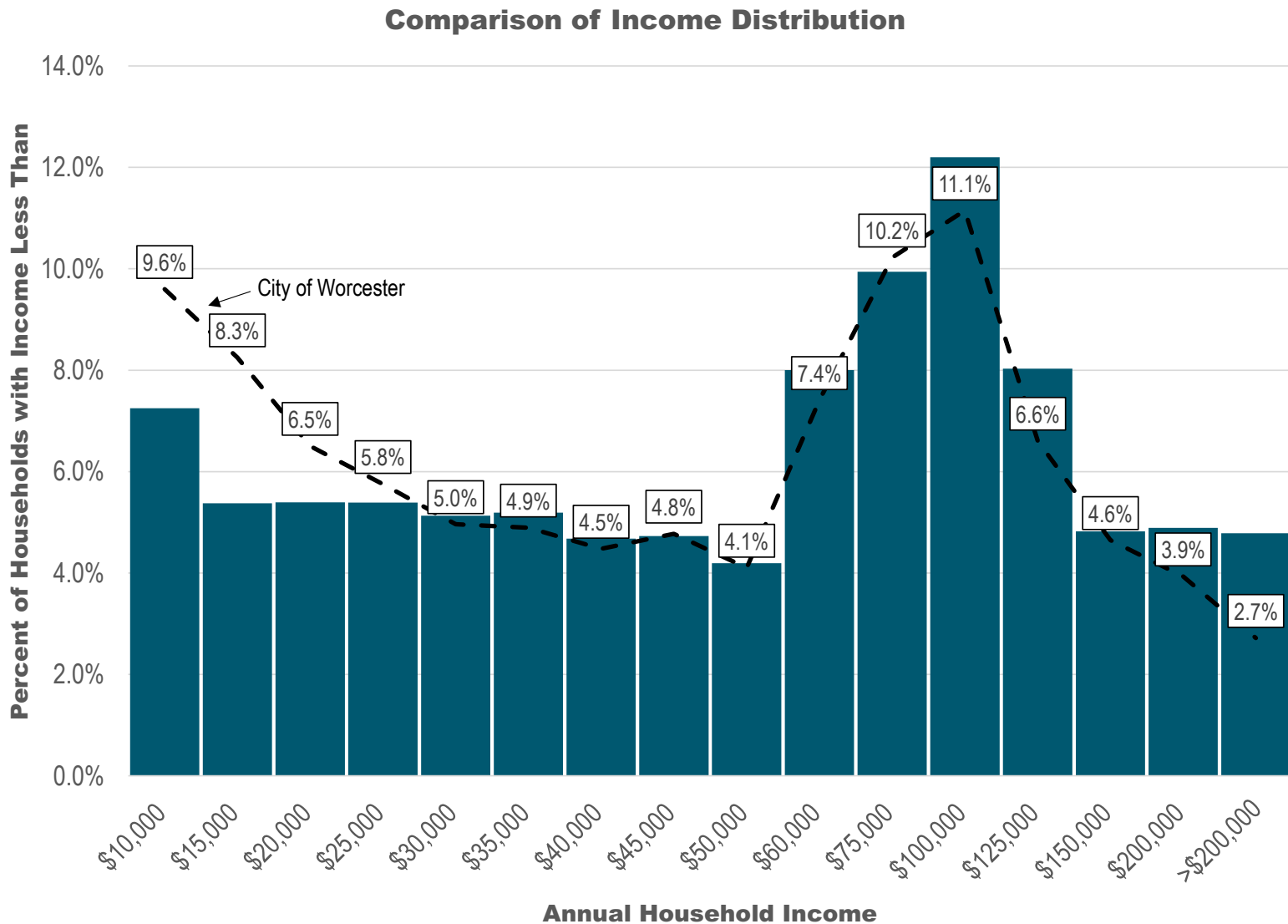
Additional Considerations

- Bond Ratings
- Capital Improvements
- OPEB Liability
- Rate Increases (political realities)
- Pending Stormwater requirements
- Enhanced Affordability Analysis

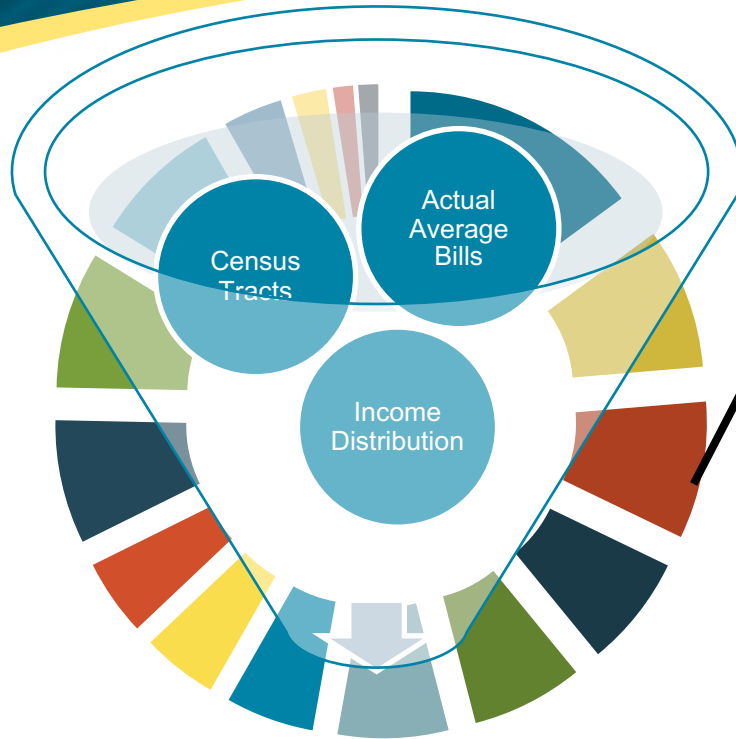
MHI by Census Tract for Worcester



Worcester has disproportionately more low income households than national norm



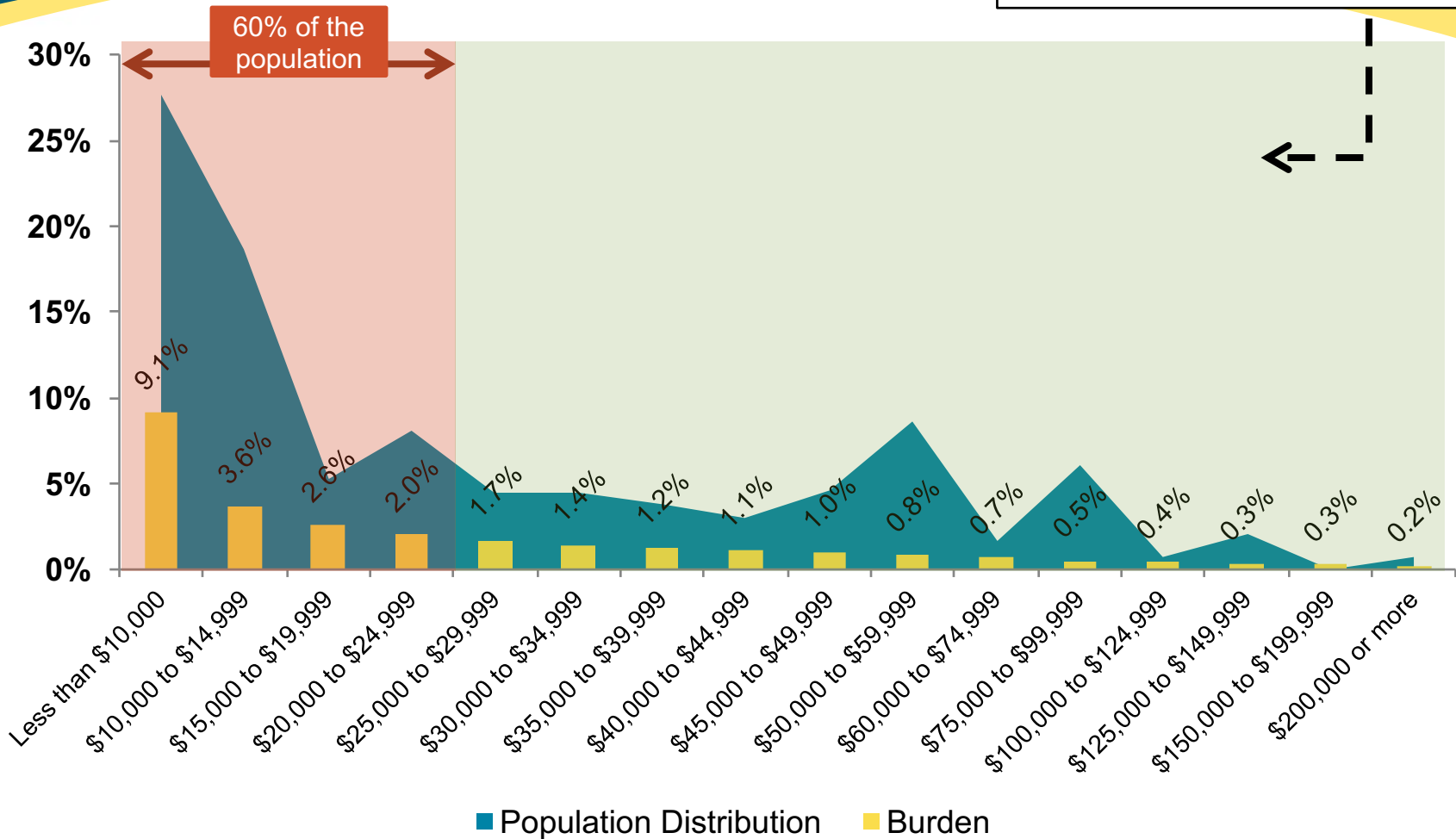
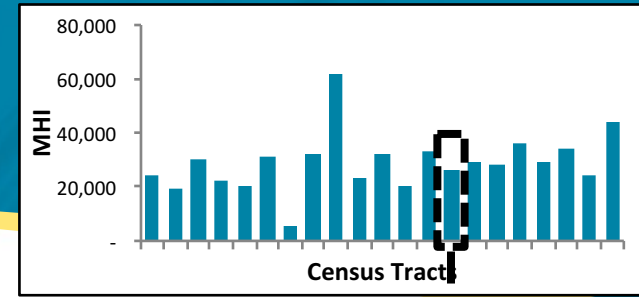
How Weighted Average Residential Index Works



1. Gather census tract data
2. Determine percent of population in each income group
3. Calculate actual average bills by tract
4. Calculate burden by tract from tract MHI and actual bills
5. Weight burden by tract income distribution
6. Apply to all census tracts in service area

**Population-Weighted Average of
16 Standard Income Groups
Across All Census Tracts in
Service Area**

Weight of Income Distribution



Adjustment for Income Distribution Skew

Income Bins	Bin Midpoint	United States			City of Worcester		
		% Pop in Bin	Bill as % of Midpoint	Weighted Impact	% Pop in Bin	Bill as % of Midpoint	Weighted Impact
< \$10,000	\$5,000	7.2%	21.2%	1.5%	9.6%	18.4%	1.8%
\$10,001 - \$15,000	\$12,500	5.4%	8.5%	0.5%	8.3%	7.3%	0.6%
\$15,001 - \$20,000	\$17,500	5.4%	6.1%	0.3%	6.5%	5.2%	0.3%
\$20,001 - \$25,000	\$22,500	5.4%	4.7%	0.3%	5.8%	4.1%	0.2%
\$25,001 - \$30,000	\$27,500	5.1%	3.9%	0.2%	5.0%	3.3%	0.2%
\$30,001 - \$35,000	\$32,500	5.2%	3.3%	0.2%	4.9%	2.8%	0.1%
\$35,001 - \$40,000	\$37,500	4.7%	2.8%	0.1%	4.5%	2.4%	0.1%
\$40,001 - \$45,000	\$42,500	4.7%	2.5%	0.1%	4.8%	2.2%	0.1%
\$45,001 - \$50,000	\$47,500	4.2%	2.2%	0.1%	4.1%	1.9%	0.1%
\$50,001 - \$60,000	\$55,000	8.0%	1.9%	0.2%	7.4%	1.7%	0.1%
\$60,001 - \$75,000	\$67,500	9.9%	1.6%	0.2%	10.2%	1.4%	0.1%
\$75,001 - \$100,000	\$87,500	12.2%	1.2%	0.1%	11.1%	1.0%	0.1%
\$100,001 - \$125,000	\$112,500	8.0%	0.9%	0.1%	6.6%	0.8%	0.1%
\$125,001 - \$150,000	\$137,500	4.8%	0.8%	0.0%	4.6%	0.7%	0.0%
\$150,000 - \$200,000	\$175,000	4.9%	0.6%	0.0%	3.9%	0.5%	0.0%
> \$200,000	\$200,000	4.8%	0.5%	0.0%	2.7%	0.5%	0.0%
Total Weighted Average Residential Indicator				3.9%	4.0%		
Percent of Skew					3.3%		
Threshold for High Burden					2.0%		
Threshold for High Burden – Adjusted for Local Skew					1.93%		






Weighted Average Affordability Modeling

Affordability Color Coding

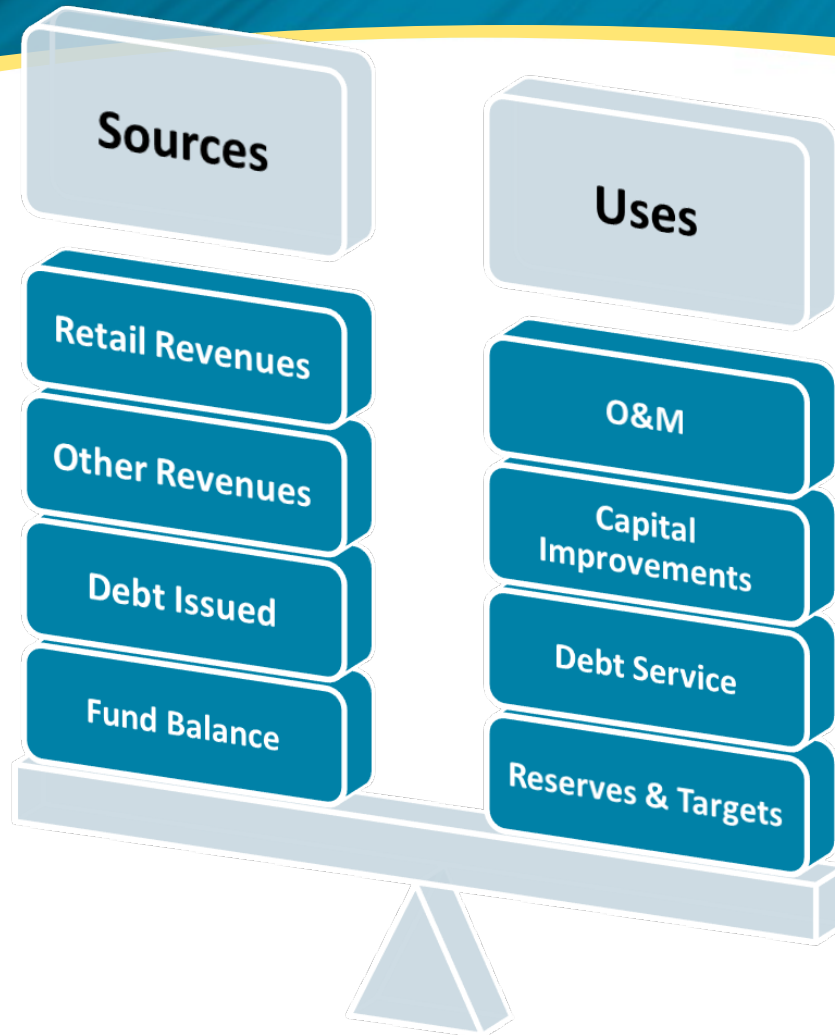
Rate and Inflation Assumptions

Description	Current 2014	Projected 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023	Projected 2024	Projected 2025	Projected 2026
Financial Plan Rate Adjustment	0.0%	5.5%	5.5%	0.6%	1.2%	4.6%	8.5%	12.4%	12.8%	5.6%	3.0%	2.0%	1.7%
Annual Expected Inflation	0.0%	0.0%	1.7%	1.4%	1.3%	1.3%	1.3%	1.3%	1.2%	1.2%	1.1%	1.1%	1.0%
Cumulative Rate Adjustments	100.0%	105.5%	111.3%	112.0%	113.3%	118.5%	128.6%	144.5%	163.0%	172.2%	177.3%	180.8%	183.9%
Cumulative Inflation	100.0%	100.0%	101.7%	103.2%	104.5%	105.9%	107.3%	108.7%	110.0%	111.3%	112.5%	113.7%	114.9%
Index for Affordability	100.0%	105.5%	109.4%	108.5%	108.4%	111.9%	119.9%	133.0%	148.2%	154.7%	157.6%	159.0%	160.1%

Affordability Index Thresholds **Calibrated to a 2% INDEX**

Financial Impact		Index	Color
Low	Less than	1.00%	
Low-Mid	Up to	1.50%	
Mid	Up to	1.75%	
Mid-High	Up to	2.00%	
High	Higher than	2.00%	

Financial Plan



Key Financial Plan Assumptions: UBWPAD

Retail Revenues

0.75% growth of volume in future years, based on regional growth projections

Other Revenues

\$3M annually from septage and other miscellaneous income remain consistent

Debt Proceeds

All capital will be funded through SRF loans, with 20 year terms at 2.0%

O&M Expenses

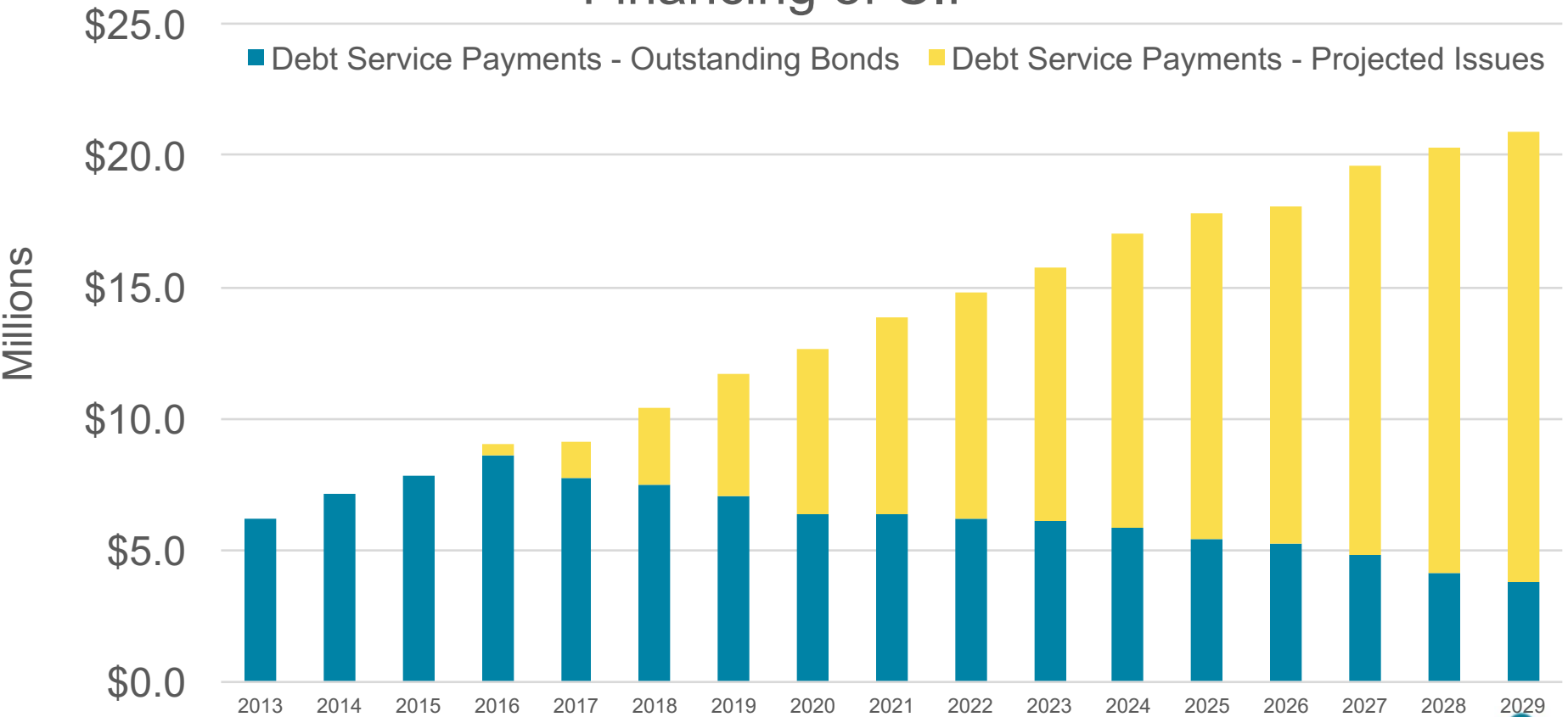
Escalated at 2.0% per year for 5 years, then 2.15% going forward. Includes O&M impact from CIP of \$2M in 2019

Establishing Reserves and Policy Targets

- Goal of increasing bond rating and avoiding cash crunches
- Maintain Debt Service Coverage of 1.1
- Combine Plant Insurance and Plant Replacement Reserves, set at \$2.38M
- Operating Reserve growing to 3 months of O&M.
- OPEB Reserve of \$820k growing \$417k annually
- Debt Service Reserve of 10% annual debt service, building up to 100%

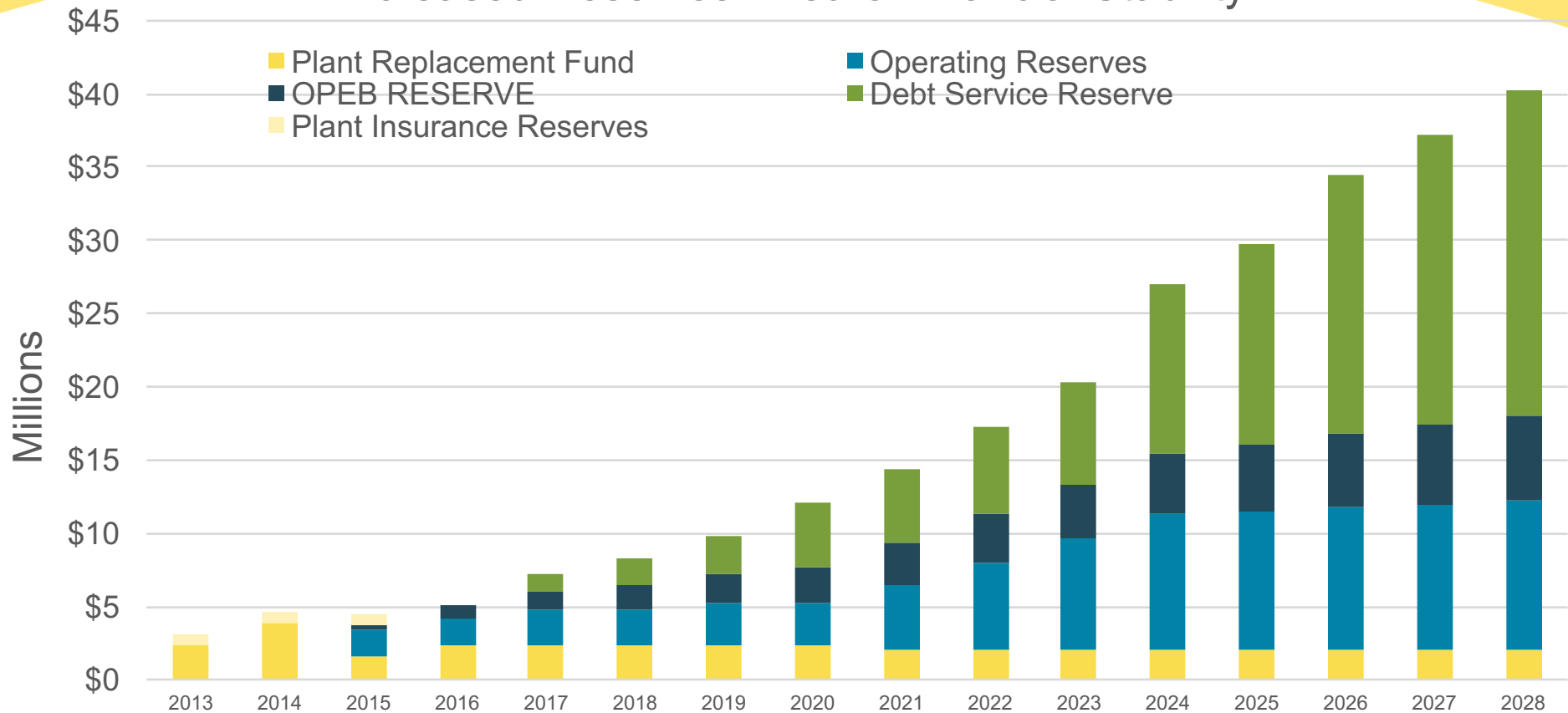
Projected Debt Service

Debt Service Increasing Due to 100% Debt Financing of CIP



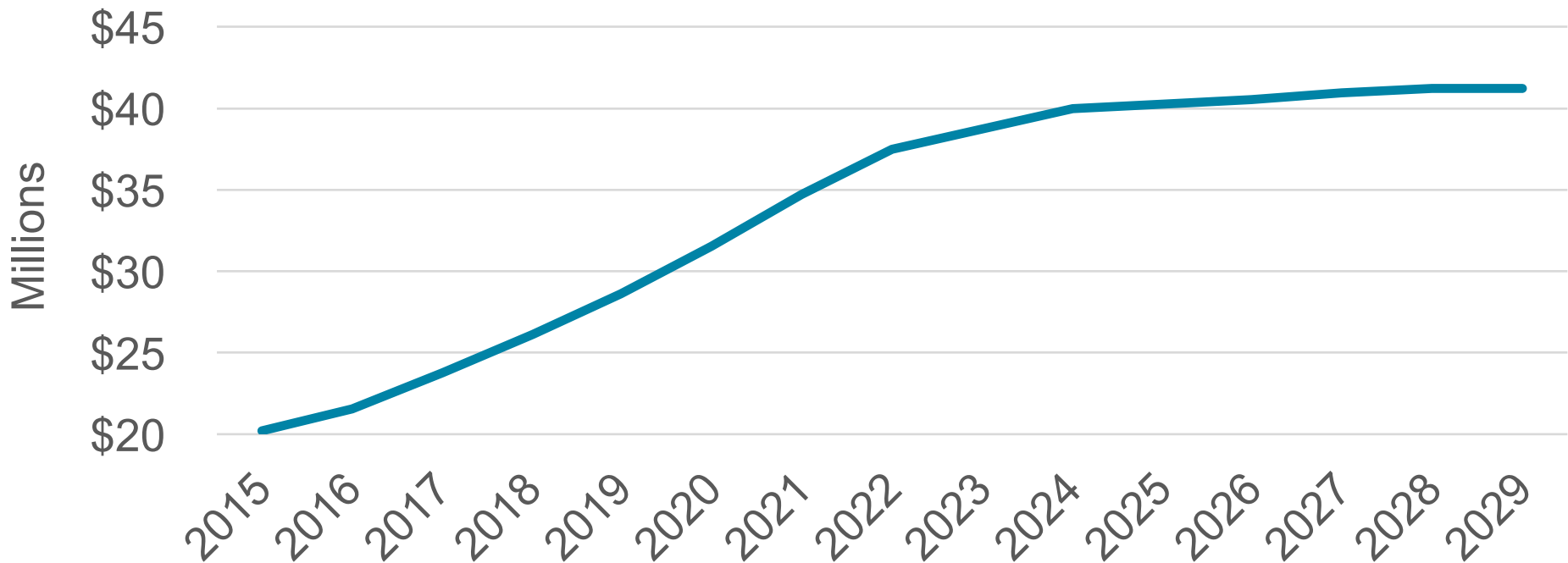
Projected Reserve Levels

Increased Reserves Ensure Financial Stability



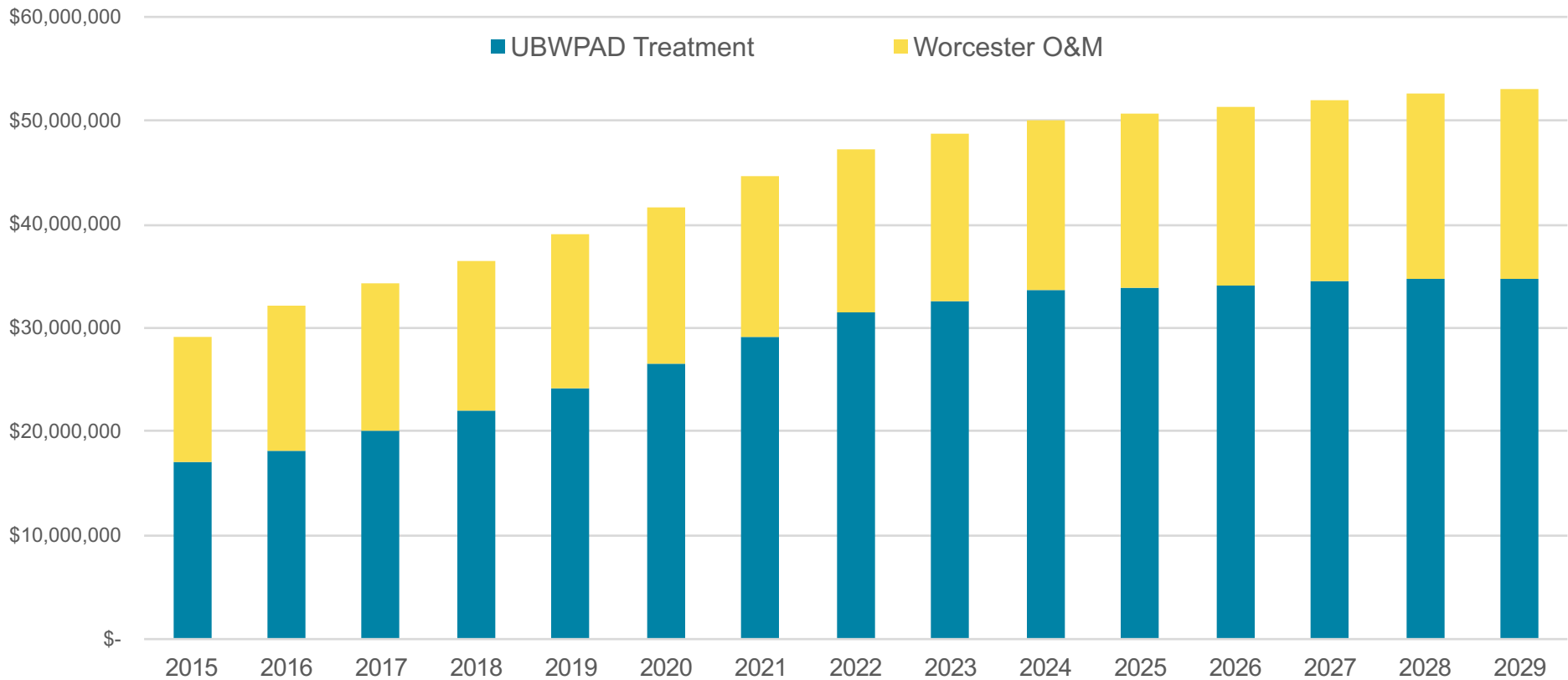
Rate Revenue Requirements

Rate Revenues Rise to Meet Increased Operating Costs



Operations and Maintenance Expenses

UBWPAD Treatment Increases at a Greater Rate than General O&M



Key Financial Plan Assumptions: Worcester

Retail Revenues

No growth of volume or customer counts in future years

Other Revenues

\$2.8M annually from sewer added to taxes and other miscellaneous income remain consistent

Debt Proceeds

All capital will be funded through GO Bonds, with 20 year terms at 4.0%

O&M Expenses

Escalated at 2.0% per year for 5 years, then 2.15% going forward. Includes O&M impact from UBWPAD

Reserves and Policy Targets

- Debt Service Coverage target of 1.0 for GO bonds
- Operating Reserve targeting 3 months of O&M
- Debt Service Reserve of one year of annual debt service for new GO Bonds starting in 2016

Output of the Financial Model Drives the Affordability Impacts

	Budget 2014	Projected 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019
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Operating and Maintenance Expenses	\$56,399,999	\$58,509,203	\$60,701,729	\$62,981,007	\$65,350,614	\$67,364,278
Annual Debt Service - Outstanding Debt	22,821,092	22,549,076	22,649,124	22,133,026	20,902,872	17,429,694
Annual Debt-Service - Projected Issues	0	4,793,321	4,793,321	7,493,634	7,493,634	8,225,541
Capital Projects	26,889,280	43,915,818	48,025,823	38,986,978	37,366,127	31,095,606
Bond Issuance Costs	0	371,733	0	232,422	0	0

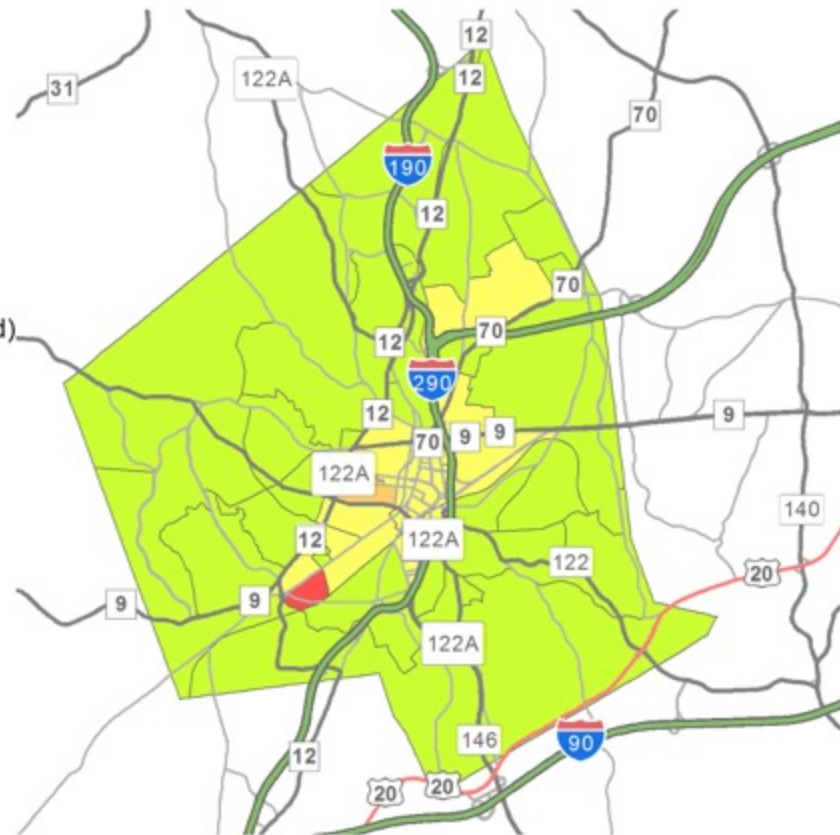
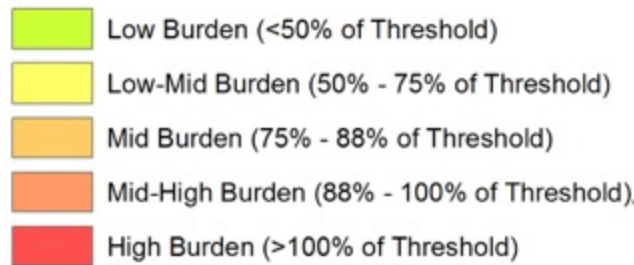
Census Tract	Number of Households	MHI	Current 2014	Projected 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021	Projected 2022	Projected 2023	Projected 2024	Projected 2025	Projected 2026	
150	1,736	\$42,500	1.02%	1.11%	1.18%	1.20%	1.23%	1.30%	1.41%	1.57%	1.75%	1.83%	1.91%	1.95%	2.00%	\$1,158,233
151	1,745	23,882	1.79%	1.94%	2.07%	2.11%	2.16%	2.28%	2.47%	2.76%	3.08%	3.25%	3.35%	3.43%	3.51%	\$5,273,352
152	1,451	11,612	3.82%	4.14%	4.40%	4.49%	4.60%	4.84%	5.25%	5.85%	6.53%	6.89%	7.11%	7.28%	7.44%	\$2,130,330
153	866	33,281	1.29%	1.40%	1.49%	1.52%	1.55%	1.64%	1.78%	1.98%	2.21%	2.33%	2.41%	2.47%	2.52%	\$7,273,000
154	901	33,750	1.28%	1.39%	1.48%	1.51%	1.55%	1.63%	1.77%	1.97%	2.20%	2.32%	2.40%	2.45%	2.51%	\$2,130,330
155	1,655	50,670	0.85%	0.92%	0.97%	0.99%	1.02%	1.07%	1.17%	1.30%	1.45%	1.53%	1.58%	1.62%	1.65%	\$7,273,000
156	1,024	52,576	0.78%	0.85%	0.90%	0.92%	0.95%	1.00%	1.08%	1.21%	1.35%	1.42%	1.47%	1.51%	1.54%	\$7,273,000
157	1,382	52,000	0.86%	0.93%	0.99%	1.01%	1.03%	1.09%	1.18%	1.31%	1.47%	1.55%	1.60%	1.63%	1.67%	\$2,130,330
158	1,491	60,223	0.72%	0.78%	0.83%	0.85%	0.87%	0.92%	1.00%	1.11%	1.24%	1.31%	1.35%	1.38%	1.41%	\$2,130,330
159	1,108	49,972	0.86%	0.94%	1.00%	1.02%	1.04%	1.10%	1.19%	1.33%	1.48%	1.56%	1.61%	1.65%	1.69%	\$465,000
160	1,523	27,313	1.56%	1.69%	1.80%	1.84%	1.89%	1.99%	2.16%	2.40%	2.68%	2.83%	2.92%	2.99%	3.06%	\$223,872
161	1,839	28,456	1.56%	1.69%	1.80%	1.83%	1.88%	1.98%	2.14%	2.39%	2.66%	2.81%	2.90%	2.97%	3.03%	\$223,872
163	1,135	56,509	0.79%	0.85%	0.91%	0.92%	0.95%	1.00%	1.08%	1.20%	1.34%	1.42%	1.46%	1.50%	1.53%	\$465,000
164	1,698	30,729	1.39%	1.50%	1.60%	1.63%	1.67%	1.76%	1.91%	2.13%	2.38%	2.51%	2.59%	2.66%	2.71%	\$223,872
165	1,812	53,682	0.85%	0.92%	0.97%	0.99%	1.01%	1.07%	1.16%	1.29%	1.44%	1.52%	1.57%	1.60%	1.64%	\$223,872
166	707	35,313	1.24%	1.34%	1.42%	1.45%	1.49%	1.57%	1.70%	1.89%	2.11%	2.23%	2.30%	2.36%	2.41%	\$223,872
167	1,238	31,421	1.34%	1.45%	1.55%	1.58%	1.62%	1.71%	1.85%	2.07%	2.31%	2.43%	2.51%	2.57%	2.63%	\$223,872
168	1,308	64,625	0.68%	0.73%	0.78%	0.80%	0.82%	0.86%	0.93%	1.04%	1.16%	1.22%	1.26%	1.29%	1.32%	\$1,967,185
169	850	65,455	0.72%	0.78%	0.82%	0.84%	0.86%	0.90%	0.98%	1.09%	1.22%	1.28%	1.32%	1.35%	1.38%	\$1,967,185
170	1,762	51,384	0.87%	0.94%	1.00%	1.02%	1.05%	1.10%	1.19%	1.33%	1.49%	1.57%	1.62%	1.66%	1.69%	\$1,967,185
171	1,844	39,038	1.11%	1.20%	1.28%	1.31%	1.34%	1.41%	1.53%	1.71%	1.90%	2.01%	2.07%	2.12%	2.17%	\$1,082,204

Revenue Surplus/(Deficiency)	\$2,820,000	\$6,102,078	\$9,513,799	\$12,652,976	\$15,901,984	\$18,884,981
Revenue Increase Required	3.3%	7.1%	11.1%	14.7%	18.5%	21.9%

Total Revenues from Customers	\$90,687,978	\$94,040,595	\$97,525,640	\$100,731,992	\$104,050,516	\$107,097,515
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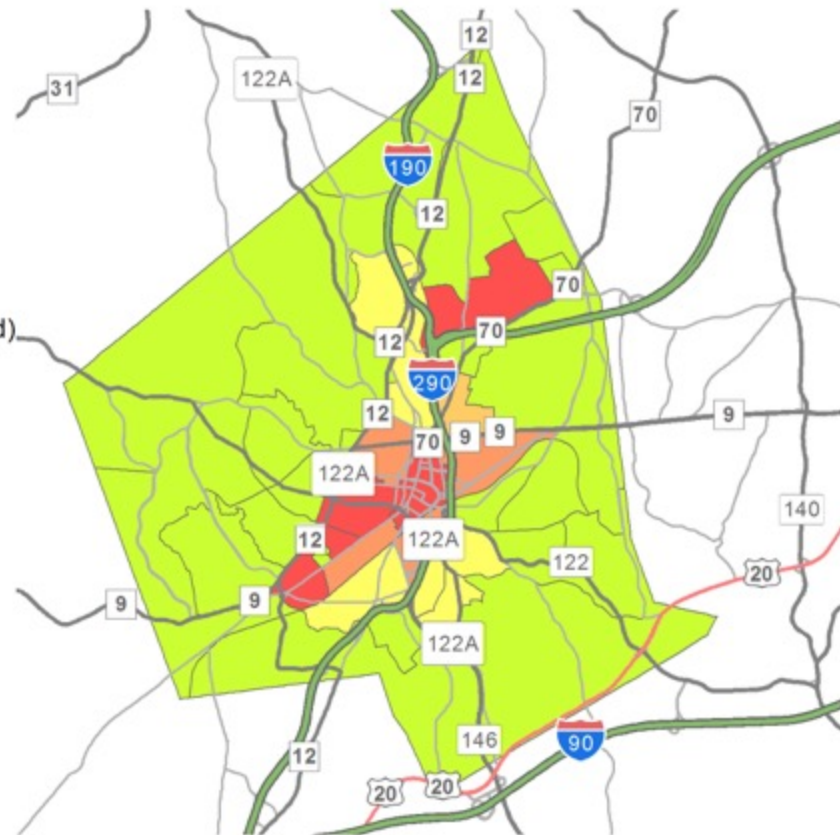
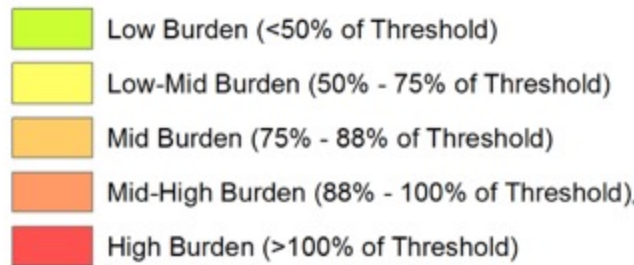
To date, Worcester has maintained broadly affordable rates

Affordability in 2015 by Census Tract



Baseline Scenario results in impaired affordability in five Worcester census tracts

Affordability in 2029 by Census Tract



Scenario Matrix

		Worcester		
		Baseline	+ \$20 M CIP	+ \$20 M CIP + Stormwater
Upper Blackstone	Baseline	Scenario 1	Scenario 2	Scenario 3
	+ Asset MGMT	Scenario 4	Scenario 5	Scenario 6
	+ back into schedule with Worcester rate cap at 5%	Scenario 7		
	No AO		Scenario 8	

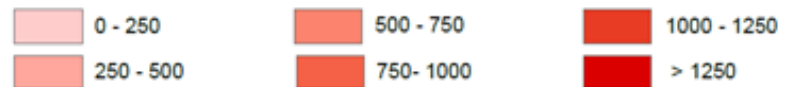
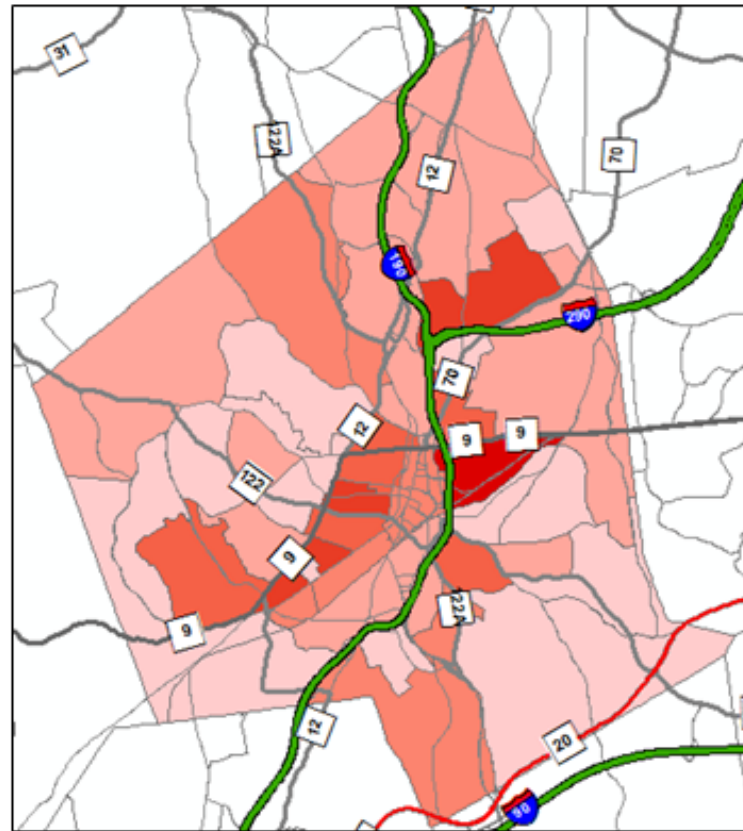
Scenario 2 – Affordability

Unaffordable Number of Households

Total Households	Unaffordable	Percentage
68,845	19,575	28.4%

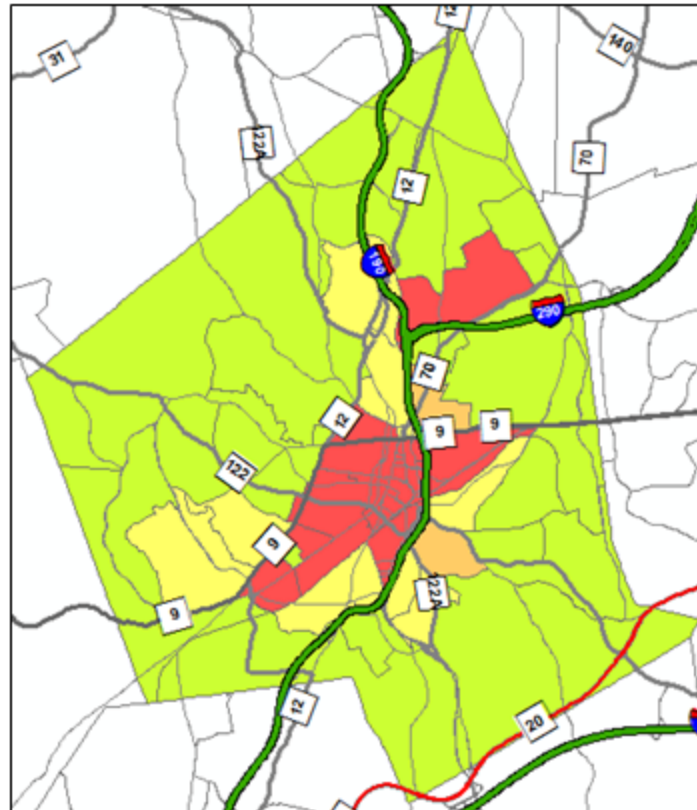
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2016	2025	2029
0.7%	1.2%	1.2%



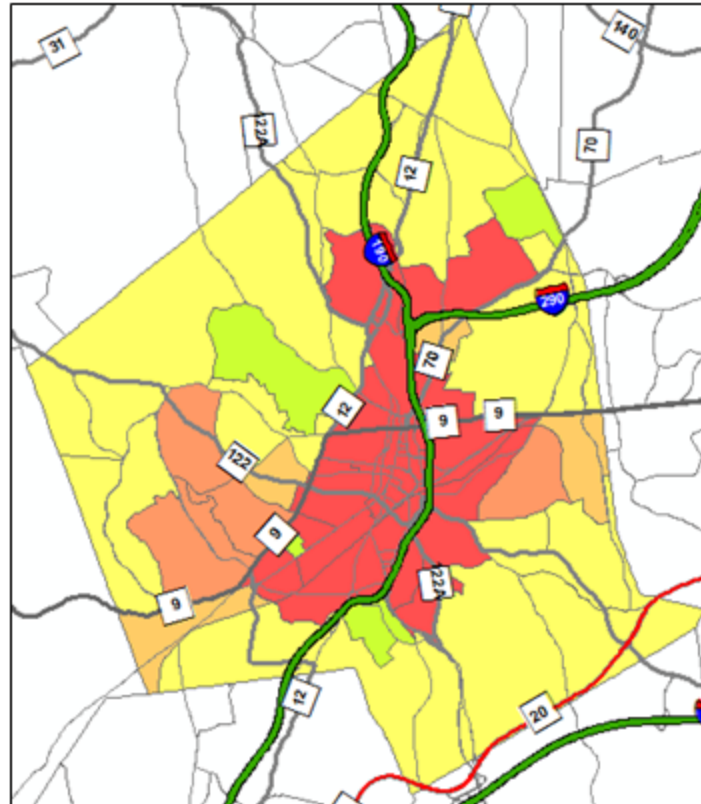
Scenario 2 – Affordability

2029 Census Tract



Scenario 3 – Affordability

2029 Census Tract



Results and Next Steps

- Along with technical factors, this analysis resulted in a revised AOC schedule received from EPA - August 2016
 - Extends schedule for N and P upgrades at UBWPAD
- City of Worcester is completing an Integrated Plan due February 2019
- Rebaseline the financial plans for the revised AOC schedule

Acknowledgements

- Karla Sangrey - Upper Blackstone
- Matt Labovites and Phil Guerin – City of Worcester DPW&P
- MWH Financial Team
 - Carol Malesky
 - Andy Baker

A large water droplet is shown in the center of the frame, having just hit a surface, creating a series of concentric ripples that spread outwards. The background is a soft, out-of-focus green and blue gradient. A dark green arrow-shaped graphic points towards the center from the left side. The text "Thank You" is centered over the ripples.

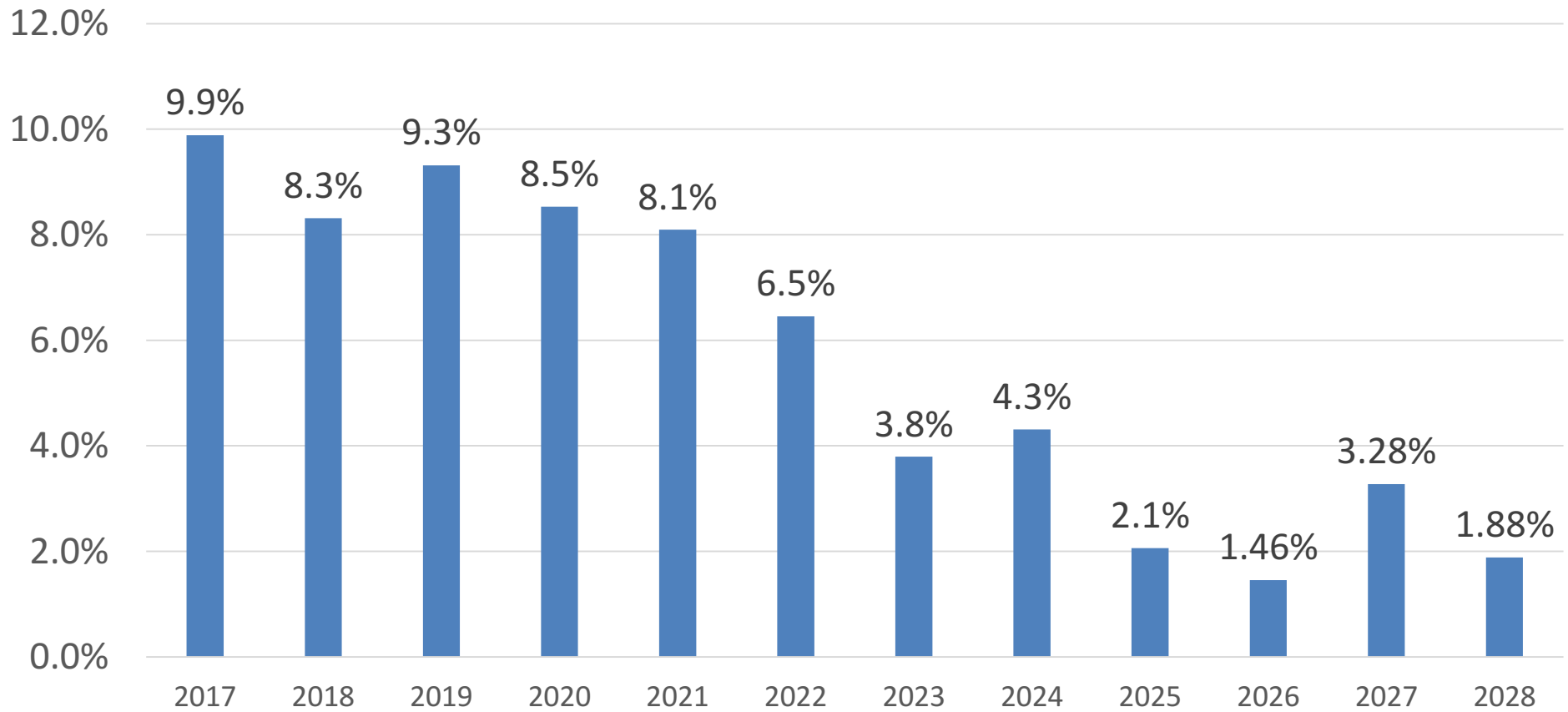
Thank You



now
part of



Scenario 1 – Baseline/Baseline



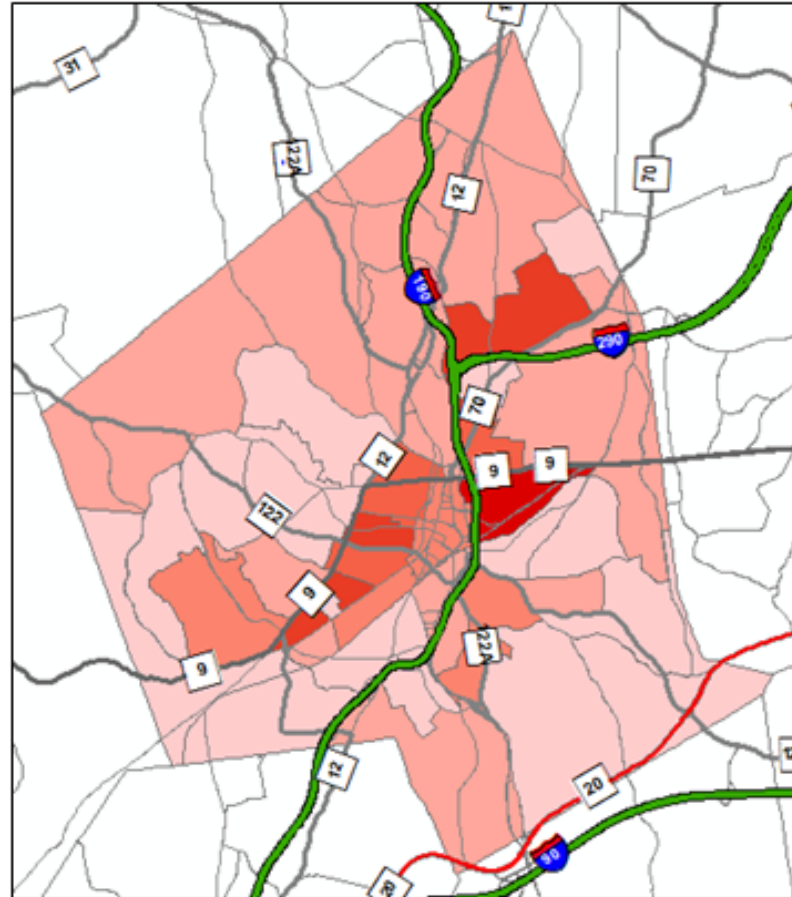
Scenario 1 – Affordability

Unaffordable Number of Households

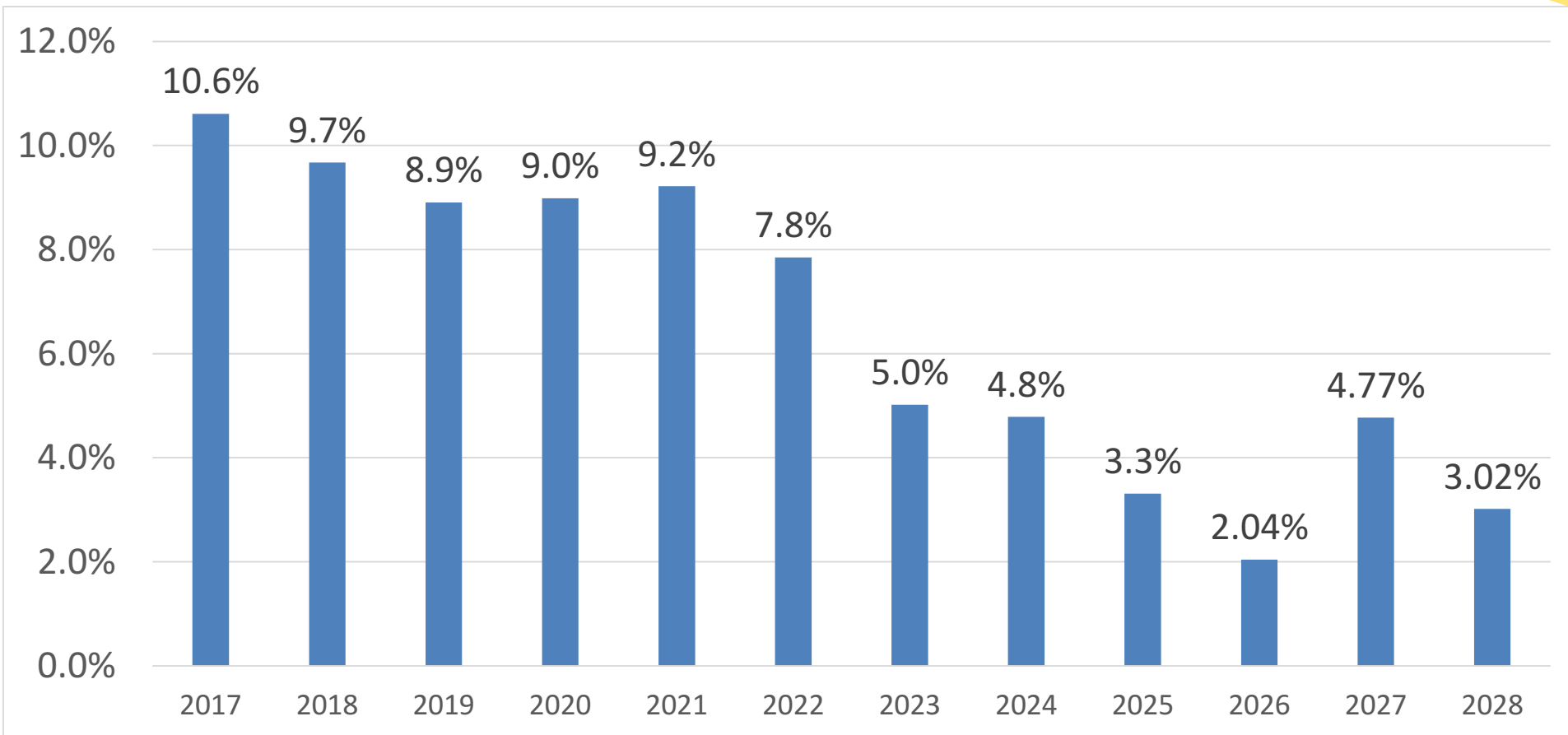
Total Households	Unaffordable	Percentage
68,845	17,611	25.6%

WARi

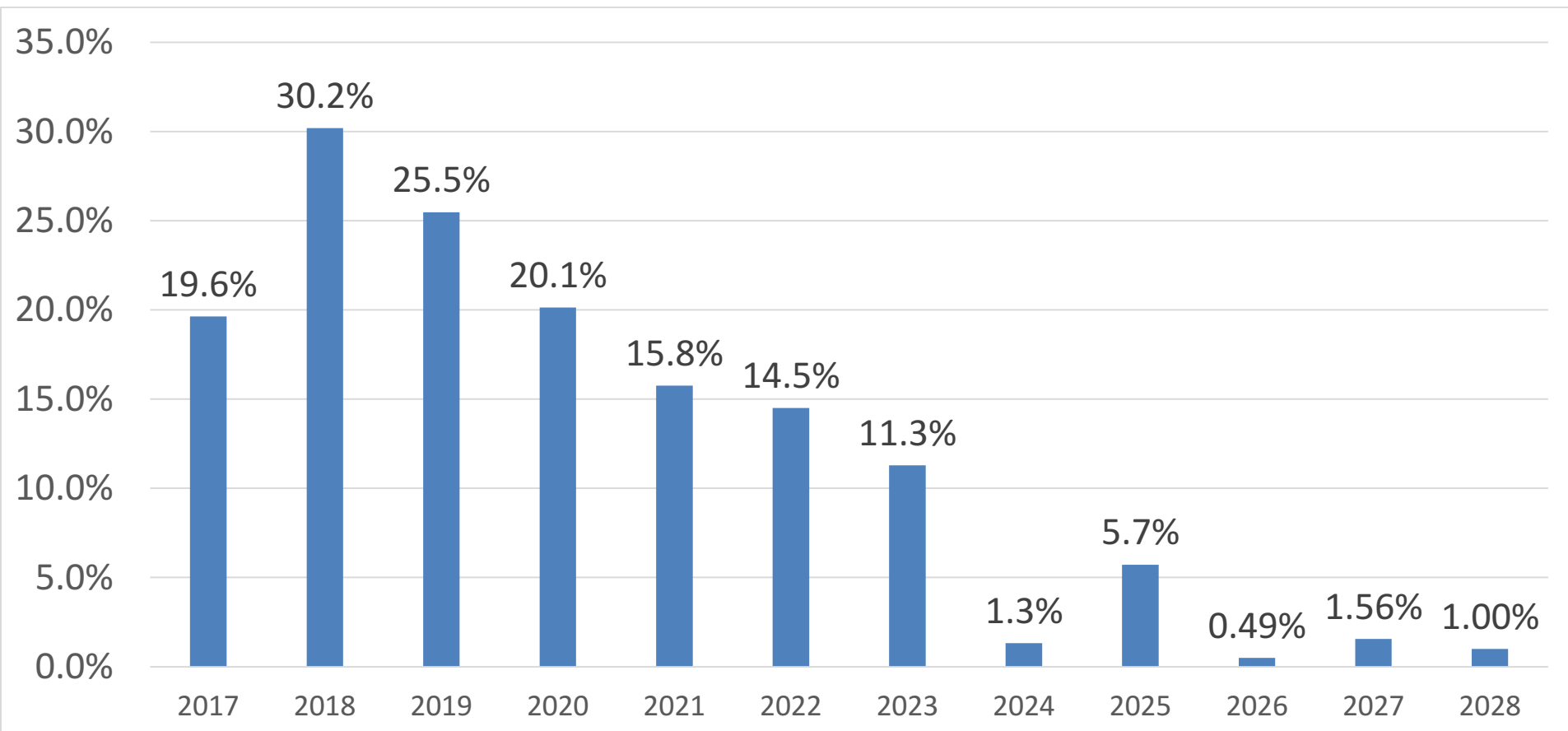
2016	2025	2029
0.7%	1.1%	1.1%



Scenario 2 – Baseline / \$20M CIP



Scenario 3 – Baseline / Stormwater



Scenario 3 – Affordability

Unaffordable Number of Households

Total Households	Unaffordable	Percentage
68,845	31,551	45.8%

WARi

2016	2025	2029
0.7%	2.3%	2.2%

