CITY OF ANN ARBOR
WATER & SEWER RATE STUDY
ADVISORY COMMITTEE DISCUSSION

7.11.2017
Welcome & Introduction to Project

- Thank you for your interest and participation!
  - Critical to ensuring needs are met in a sustainable way

- The Project:
  - Evaluate the needs of the system, values of the community, and expectations of the customers
  - Engage the community to:
    - Validate rate objectives (equity, affordability, conservation)
    - Give input for the financial plan to fund level of service

- Goal: Recommendations to Council in December of 2017 for implementation in July of 2018 (next fiscal year)
Agenda

- Background Information
- 2017 Rate Study Overview
- Community Survey
- Initial Issues
- Financial Model Review
Background Information
Summary of Most Recent Study

- In 2003 the City engaged Carter Burgess to complete a water & wastewater cost of service study.

- The study included evaluation of:
  - Revenue Sufficiency
  - Cost Allocation
  - Rate Structure Alternatives
    - Use of Inclining Block Rate Structure
    - Removed Minimum Use Allowance

- Rates have since evolved
  - Tiers (sizing and pricing)
## Summary of Current Rate Structure

- **Reduced 4\textsuperscript{th} tier rate** (concerns of large users)
- **Indexed annually to meet costs**

<table>
<thead>
<tr>
<th></th>
<th>Residential 1</th>
<th>Residential 2</th>
<th>Water Only**</th>
<th>Commercial Rate (Locations may also have a second, Water Only** meter)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate is based on a single water meter used in a home</td>
<td>Rate when a second Water-Only* meter is also used in a home</td>
<td>Rate for the second meter for non sewer water uses, such as for irrigation</td>
<td>Tier 1 = $3.81 (peaking factor $\leq 5$)</td>
</tr>
<tr>
<td>1-7 CCFs*</td>
<td>$1.55 per CCF</td>
<td>$1.55 per CCF</td>
<td>$5.89 per CCF</td>
<td>Tier 2 = $7.26 (peaking factor $&gt;5 &lt; 8$)</td>
</tr>
<tr>
<td>8-28 CCFs*</td>
<td>$3.37 per CCF</td>
<td>$3.37 per CCF</td>
<td>$5.89 per CCF</td>
<td>Tier 3 = $12.44 (peaking factor $\geq 8$)</td>
</tr>
<tr>
<td>29-45 CCFs*</td>
<td>$5.89 per CCF</td>
<td>$3.37 per CCF</td>
<td>$5.89 per CCF</td>
<td></td>
</tr>
<tr>
<td>Over 46 CCFs*</td>
<td>$5.89 per CCF</td>
<td>$3.37 per CCF</td>
<td>$5.89 per CCF</td>
<td></td>
</tr>
<tr>
<td><strong>Water Customer Charge</strong></td>
<td>$11.25/quarter for 5/8\textsuperscript{th} inch standard residential meter; charge varies by meter size</td>
<td>$11.25/quarter for 5/8\textsuperscript{th} inch standard residential meter; charge varies by meter size</td>
<td>Residential: No charge Commercial: Charge varies by size of meter</td>
<td>Customer charge varies by size of water meter</td>
</tr>
<tr>
<td><strong>Sewer Service Rate per CCF*</strong></td>
<td>$4.58 per CCF</td>
<td>$4.58 per CCF</td>
<td>No sewer fees</td>
<td>$4.58 per CCF</td>
</tr>
<tr>
<td><strong>Sewer Customer Charge</strong></td>
<td>$11.25/quarter for 5/8\textsuperscript{th} inch standard residential meter; charge varies by meter size</td>
<td>$11.25/quarter for 5/8\textsuperscript{th} inch standard residential meter; charge varies by meter size</td>
<td>No charge</td>
<td>Customer charge varies by size of water meter</td>
</tr>
</tbody>
</table>
# Quarterly Residential Fee Survey

*(Based on publicly available data as of May 2017)*

<table>
<thead>
<tr>
<th>City</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Park, MD (WSSC)</td>
<td>$280.59</td>
</tr>
<tr>
<td>Bloomington, IN</td>
<td>$187.64</td>
</tr>
<tr>
<td>West Lafayette, IN</td>
<td>$186.00</td>
</tr>
<tr>
<td>New Brunswick, NJ</td>
<td>$179.65</td>
</tr>
<tr>
<td>State College, PA</td>
<td>$173.20</td>
</tr>
<tr>
<td>Champaign, IL</td>
<td>$170.86</td>
</tr>
<tr>
<td>Columbus, OH</td>
<td>$158.98</td>
</tr>
<tr>
<td>Iowa City, IA</td>
<td>$150.49</td>
</tr>
<tr>
<td>Madison, WI</td>
<td>$140.88</td>
</tr>
<tr>
<td>East Lansing, MI</td>
<td>$140.12</td>
</tr>
<tr>
<td>Ann Arbor, MI</td>
<td>$123.82</td>
</tr>
<tr>
<td>Minneapolis, MN</td>
<td>$118.44</td>
</tr>
<tr>
<td>Evanston, IL</td>
<td>$101.59</td>
</tr>
<tr>
<td>Lincoln, NE</td>
<td>$81.17</td>
</tr>
</tbody>
</table>

Combined Water & Sewer Bill Survey at 13,000 Gallons per Quarter
2017 Rate Study Overview
Study Objectives

- Projection of full cost of service
  - Develop multi-year financial management plan
  - Integrate capital and asset management needs
- Evaluate customer class cost allocations and rate structures with affordability in mind
- Engage community stakeholders
  - Solicit input and comments regarding community expectations related to water/sewer rates
- Develop dynamic model for future use
  - Long-term sustainability & ongoing financial management
Every Step Conducted With Stakeholders

Revenue Requirements
- Operating Costs
- Capital Costs
- Financial Policies
- Debt Coverage
- Reserves

Cost Allocation
- Define Classes of Users
- Fair & Equitable
- Comparison to Current Revenue Recovery

Rate Design
- Evaluate Objectives
  - Affordability
  - Conservation
  - Identify Structures
  - Customer Impacts

Analysis
- Fee & Policy Review
- Adjustment Drivers
- National Trends
- Local Practices
Public Spending (CAPEX) on Water Utility Infrastructure

Source: Congressional Budget Office, Bluefield Research

Water & Sewer bills have increased at 3x the rate of inflation since 2000.

Real Household Income

Water & Sewer bills have increased at 3x the rate of inflation since 2000.

Figure 7. Indoor average gallons per capita per day, REU1999, REU2016, High Efficiency Studies

<table>
<thead>
<tr>
<th>Gallons per Person</th>
<th>REU1999</th>
<th>REU2016</th>
<th>High Efficiency (DeCao et al. 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>69.3</td>
<td>58.6</td>
<td>36.7</td>
</tr>
</tbody>
</table>
$1 Trillion in Water and Sewer Infrastructure

Simply Not Enough to Cover What’s Needed

Infrastructure costs alone could triple the size of a typical family’s water bills.
How We Will Understand Affordability

With 53 data points for every census tract, affordability information can become overwhelming, especially over a multi-year horizon. But good information is usable information – We will use graphics like the above to understand, communicate, and address affordability in the city.
Study Will Link Affordability to Rates

- LINK #1 – Change in Required Revenue
- LINK #2 – Identify Residential Portion of System Costs
- LINK #3 – Projected Bills and Impacts by Census Tract

Long-Range Financial Plan
- System-wide Revenue Requirements

Cost of Service
- Residential
- Non-Residential

WARi™
Study Schedule & Path Forward

- Current status: populating models & initializing analysis
- Completion in late 2017 for 7/1/18 implementation
  - Council in Dec/Jan of 2017 – Hearings in April of 2018
- Monthly progress meetings with Advisory Committee:
  - Today – Introductory
  - August – Revenue Requirements & Cost of Service
  - September – Cost of Service, Rate Structure & Affordability
  - October – Rate Structure & Affordability
  - November – Wrap-up / number finalization
  - December – Review presentation materials for Council
Community Survey
Of the 679 Customers who responded

Q2 In what zip code(s) are your home or businesses located where you pay your water/sewer bill?

Answered: 681  Skipped: 3

- 51% in 48103
- 28% in 48104
- 18% in 48105
- 3% in 48108
Q3 Do you currently pay your water bill as a resident or business owner, both, or neither? Select all that apply.

Answered: 662   Skipped: 22

95% Respondents Were Residents
Q4 How would you rate the current condition of the water and sewer infrastructure (including treatment plants and underground pipes, etc) in Ann Arbor?

Answered: 678  Skipped: 6

- 46% rated Infrastructure Good or Better
- 31% rated Infrastructure Fair or Poor
Q5 Overall, how satisfied are you with the quality of your water and sewer service?

- 31% are Very Satisfied
- 47% are Satisfied
- 8% are Dissatisfied or Very Dissatisfied
Q6 How concerned, if at all, are you about each of the following aspects of the water and sewer services in Ann Arbor?

Answered: 679   Skipped: 5

Very Concerned or Somewhat Concerned About:

1. Being Able to Drink Water Straight from Tap (90%)
2. Lakes and Rivers being safe for Swimming, Fishing, and Other Recreation (93%)
3. Having a Robust Water Supply to Sustain my Community Through a Crisis (85%)
73% are willing to pay higher water bill to improve and modernize the water systems to ensure safe and reliable water and sewer service.

27% believe their water bill is too high and would not be willing to pay more to sustain and modernize the water and sewer system.
Q11 Is there anything else you would like the City to know about concerns you have related to water and sewer services, rates, or communications?

Answered: 277  Skipped: 407

277 Comments were received and currently being tabulated for review and discussion.
Initial Issues
Traditional Cost of Service

- M1 provides detailed **inter-class** cost allocation
- **Intra-class** cost allocations in M1 are less specific
- Communities rarely focus on tying conservation rates *directly* to cost

![Illustration of Base-Extra Capacity Cost Allocation](image)

Cost of Service
- Supply
- Treatment
- Transmission & Pumping
- Customer Billing
- Meters & Services

Components
- Base Demand
- Maximum Day Demand
- Maximum Hour Demand
- Customer Billing
- Meters & Services

Functions
- Single Family
- Multi-Family
- Commercial
- Industrial
- Irrigation
- Wholesale

Customer Classes

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*Illustration of Base-Extra Capacity Cost Allocation*
How do we allocate costs to tiers?

Quantifying the marginal costs of water service
- Sources of supply
- Allocation of max day and peak hour costs
- Water conservation programs
- Development of alternative supplies
- Avoided costs

Other options: Use of unrestricted funds
- E.g., ad valorem property tax revenues
Why do we link costs to tier pricing?

- Enhances intra-class equity
- Provides transparency
- Creates narrative for customer service
- Helps utility understand its own costs
- Enhances defensibility (some states)
Cost Allocation Framework

- Raw Water Pumping
- Raw Water Transport
- Raw Water Storage

- Treatment
- Transmission/Distribution Network
- Storage

- Pumping
- Customer
- Overhead
- Meter Reading
- Program Costs

Avg.—Day Demand Costs | Max Day Demand Costs | Max Hour Demand Costs | Fixed Charge Costs
## Example Distribution of Costs to Customers Classes

<table>
<thead>
<tr>
<th></th>
<th>Single-Family Residential</th>
<th>Multi-Family Residential</th>
<th>Commercial/Institutional</th>
<th>Industrial</th>
<th>Landscape/Irrigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base Capacity</strong></td>
<td>$467,672</td>
<td>$89,326</td>
<td>$55,276</td>
<td>$5,622</td>
<td>$30,755</td>
</tr>
<tr>
<td><strong>Extra Capacity - Max Day</strong></td>
<td>$174,270</td>
<td>$25,669</td>
<td>$20,605</td>
<td>$2,020</td>
<td>$28,059</td>
</tr>
<tr>
<td><strong>Extra Capacity - Max Hour</strong></td>
<td>$124,383</td>
<td>$19,677</td>
<td>$14,705</td>
<td>$-</td>
<td>$20,487</td>
</tr>
<tr>
<td><strong>Public Fire Protection</strong></td>
<td>$17,234</td>
<td>$4,706</td>
<td>$2,309</td>
<td>$370</td>
<td>$-</td>
</tr>
<tr>
<td><strong>Customer</strong></td>
<td>$469,924</td>
<td>$42,768</td>
<td>$20,990</td>
<td>$1,443</td>
<td>$9,315</td>
</tr>
<tr>
<td><strong>Rate Revenue Requirement</strong></td>
<td><strong>$1,253,490</strong></td>
<td><strong>$182,147</strong></td>
<td><strong>$113,887</strong></td>
<td><strong>$9,456</strong></td>
<td><strong>$88,616</strong></td>
</tr>
</tbody>
</table>
Example Distribution of Costs to Customers Classes

Single-Family Residential Only

Tier 3
- Max Hour… $25K
- Max Day… $32K
- Base Capacity… $113K
- Base… $67K

Tier 2
- Max Hour… $20K
- Max Day… $27K
- Base Capacity… $113K
- Base… $67K

Tier 1
- Max Hour… $17K
- Max Day… $20K
- Base Capacity… $287K
- Base… $67K

Allocated based on peak-weighted volume in each tier

Fixed Meter Charge
- 50% of Max Day and Max Hour + Public Fire Protection

Fixed Account Charge
- Customer Service
Water Use Allocation Example

**Challenge**: Class-based tiers do not account for differences in occupancy and property sizes.

**Tier 1: Indoor** water allowance = 8 TGAL

- People per Household: 4.70
- Typical Indoor Use (Gallons per capita per day): 55
- Typical Essential Domestic Use (gal/month): 7,863
- First Tier Usage Amount (gallons / month): 8,000

**Tier 2**: Reasonable **outdoor** use = 7 TGAL

- Second Tier Usage Amount (gallons / month): 7,000
- Second Tier Threshold: 15,000

**Excessive use** for typical home > 15 TGAL (All remaining use)

<table>
<thead>
<tr>
<th>Typical parcel (sq. ft.)</th>
<th>7,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square inches of area in 1/3 acre</td>
<td>2,090,880</td>
</tr>
<tr>
<td>% of area that is irrigable</td>
<td>33%</td>
</tr>
<tr>
<td>Reference ET for CIMIS Zone 12 (inches)</td>
<td>53.4</td>
</tr>
<tr>
<td>Average annual rainfall</td>
<td>11.3</td>
</tr>
<tr>
<td>Crop Coefficient</td>
<td>0.7</td>
</tr>
<tr>
<td>Irrigation Efficiency</td>
<td>70%</td>
</tr>
<tr>
<td>Water Budget (HCF per month)</td>
<td>8.8</td>
</tr>
<tr>
<td>Second Tier Usage Amount (gallons)</td>
<td>7,000</td>
</tr>
<tr>
<td>Second Tier Threshold</td>
<td>15,000</td>
</tr>
</tbody>
</table>
# Residential Tier Sizing Example

<table>
<thead>
<tr>
<th></th>
<th>Average Family</th>
<th>Value</th>
<th>Block Max</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>People per Household</td>
<td></td>
<td>2.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Indoor Use (Gallons per Capita per Day)</td>
<td></td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Essential Domestic Use (CCF/month)</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>First Tier Usage Amount (CCF)</strong></td>
<td></td>
<td>7</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Large Family</th>
<th>Value</th>
<th>Block Max</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>People per Household</td>
<td></td>
<td>6.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Indoor Use (Gallons per Capita per Day)</td>
<td></td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Essential Domestic Use (CCF/month)</td>
<td></td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Tier Usage Amount (CCF)</strong></td>
<td></td>
<td>14</td>
<td>14</td>
<td>9</td>
</tr>
</tbody>
</table>

### Amount of Typical Irrigation For a Property

- **Typical parcel (sq. ft.)**
  - 10,890

- **Square inches of area in 1/4 acre**
  - 2,090,880 (calculated)

- **% of area that is irrigable**
  - 25% Source: assumption

- **Reference ET (inches)**

- **Average annual rainfall**
  - 36.0

- **Crop Coefficient**
  - 75% Source: http://ucanr.edu/sites/UcAnr/UC_Agri/UC_Agri_Hort/UrbanHort/Water_Use_of_Turfgrass_and_Landscape_Plant_Materials/Turfgrass_Crop_Coefficients_Kc/

- **Irrigation Efficiency**
  - 70% Source: Methodology for Estimating Landscape Irrigation Demand, p. 13 & 14

- **Water Budget (CF per month)**
  - 5.8 (calculation)

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Block Max</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Third Tier Usage Amount (CCF)</strong></td>
<td>6</td>
<td>20</td>
<td>&gt;9</td>
</tr>
<tr>
<td><strong>Fourth Tier Usage Amount (CCF)</strong></td>
<td>All Use</td>
<td>&gt;20</td>
<td>&gt;9</td>
</tr>
</tbody>
</table>
A Representative Household?

- Indoor Usage: 3 people using 59 gallons per person per day = 5,300 gallons a month
A Representative Household? (cont.)

- Indoor Usage: 3 people using 59 gallons per person per day = 5,300 gallons a month
- Outdoor Usage: 10,000 sqft lot with 2,500 sqft irrigable, 4,300 gallons for normal irrigation a month.
A Representative Household? (cont.)

- Indoor Usage: 3 people using 59 gallons per person per day = 5,300 gallons a month
- Outdoor Usage: 20,000 sqft lot with 5,000 sqft irrigable, 8,600 gallons for normal irrigation a month.
## Commercial Rate Structure

<table>
<thead>
<tr>
<th>Commercial Tiers:</th>
<th>1 (Peaking &lt;=5)</th>
<th>1 (Peaking &gt;5,&lt;8)</th>
<th>1 (Peaking &gt;=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate:</td>
<td>$3.81</td>
<td>$7.26</td>
<td>$12.44</td>
</tr>
<tr>
<td>Volume Distribution 2016:</td>
<td>97.8%</td>
<td>1.5%</td>
<td>.7%</td>
</tr>
</tbody>
</table>

- Commercial rate structure is effectively a uniform rate
- Commercial customers have a profit motive to conserve
Readiness to Serve Charge

- Readiness to serve charges based on meter size represent an equitable way to meet fixed cost recovery goals, while recognizing the greater potential instantaneous demands larger meters are capable of.

<table>
<thead>
<tr>
<th>Meter Size:</th>
<th>5/8”</th>
<th>1”</th>
<th>2”</th>
<th>4”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Flow GPM:</td>
<td>20</td>
<td>50</td>
<td>160</td>
<td>1,000</td>
</tr>
</tbody>
</table>
Monthly vs Quarterly Billing

- Benefits of Monthly Billing
  - Affordability in the form of smaller more regular budget friendly bills
  - Clear conservation signals stemming from a shorter consumption to bill generation time period
  - Comports with industry best practices

- Cost Considerations
  - Higher cycle frequency cost (Appx. 500k yr.)
Summary of Key Issues

- Cost Allocation Methodology
- Residential Tier Sizing
- Commercial Rate Structure
- Readiness to Serve Fee
- Monthly vs Quarterly billing
Financial Model Review