THOMAS JEFFERSON PLANNING DISTRICT COMMISSION

Return on Investment Model

User Guide

Last Updated

7/11/2013

The Thomas Jefferson Planning District Commission developed a Return on Investment model that calculates the financial impacts of public water and sewer systems. An Excel® Spreadsheet serves as the platform for this model. The following is a user guide to that spreadsheet.

Return on Investment Model: User Guide

This document is a user guide, to assist localities as they work with the Thomas Jefferson Planning District Commission's Return on Investment Model. The following sections provide a general overview of the model, but there are also detailed steps for how to run the model successfully. This guide discusses how staff structured the model and how the calculations function. With step by step instructions and screenshots, someone can easily change the model assumptions to assess various system options.

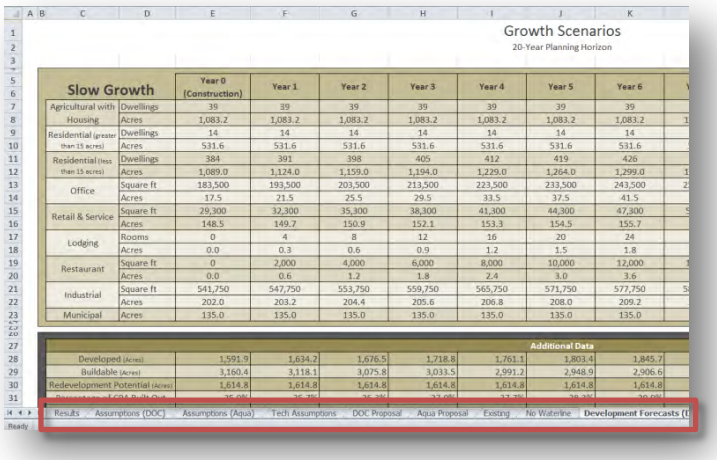
Background:

In January 2012, Fluvanna County requested that the Thomas Jefferson Planning District Commission (TJPDC) develop a fiscal impact analysis on a proposed water and sewer-line for their primary growth area, Zion Crossroads. The County needed a way to assess the financial implications of the proposal. Consequently, local officials contracted with the TJPDC to develop a financial model that would make these calculations. Several months later, staff completed the original Return on Investment (ROI) model, in the form of a complex Excel® spreadsheet. With that model, County officials could see how a public water and sewer system would influence local budgets as well as the landscape, since these investments would likely encourage private development in the area.

Following completion of the original Return on Investment Model, Fluvanna County identified a need to compare different water and sewer system options. Those options would include choices between providers, treatment facilities and system design. The County needed a new model that would allow for them to enter various assumptions and proposals, and compare the finances of each alternative. At the County's request, TJPDC redesigned the ROI spreadsheet. This new model is more complex and incorporates new data, but is also easier to use. TJPDC staff also designed the model to be more general, allowing other localities to use this spreadsheet to assess the financial implications of new water and/or sewer system extensions.

General Structure:

The ROI model is a large Excel® spreadsheet that dynamically shows the resulting changes to model parameters. It provides a 20-year planning horizon, allowing a locality to assess near and long-term implications. To account for different development and market trends, the spreadsheet also allows comparisons of various outcomes. The default scenarios are "slow", "expected" and "high" growth for the study area. As is true of any forecasting model, there is no absolute certainty of the future. With multiple scenarios, the user can account for growth rates that are higher or lower than expected.



The ROI is organized into several interrelated tabs, shown at the bottom of the spreadsheet *(see above)*. There are seven groups of tabs that are grouped and ordered based on their function. These groups are described below:

Results
The results tab provides a financial summary of the various scenarios. The tables show *annual net revenue* and *cumulative net revenue*. Tables and graphs allow the user to see the overall finances associated with the water and sewer system under the various proposals. The data is organized under three sets of tables and charts. These categories include:

1. Net Revenue from Land Uses: This table depicts the costs and revenues from new land development that could result from new water or sewer system capacity. It excludes the costs and revenues from water or sewer systems. Costs include general government services, debt services and schools. Revenue accounts for tax income and includes real estate, personal property, and sales taxes. There are also placeholders for a meals and lodging tax.
2. Net Revenue from Water and Sewer: This table excludes the figures from county services or tax revenue. This table only shows the financial costs and revenues associated with water or sewer service. These figures include revenues from user and connection fees. It also accounts for costs associated with capital investments, maintenance, system management, depreciation and other line items.
3. All Costs and Revenues: This table combines the financial figures from the first two tables. This provides combined, net revenue that accounts for development and water/sewer service. This report can be used to assess overall impact on local government costs and revenue resulting from extensions of water and wastewater infrastructure.

Assumptions
The ROI allows the user to change the various assumptions that factor into the calculations. The user will find these inputs in the three tabs, labeled: “Assumptions (Proposal#1)”, “Assumptions (Proposal#2)” and “Technical Assumptions.” In total, there are 226 assumptions related to growth rates, tax rates, costs from development, and many other categories. You will find additional assumptions under the “Proposal” tabs, discussed in the next section.

Proposals
The third set of tabs (labeled “Proposals”) hold the specific details of each water/sewer proposal. These tabs include the proposed user and connection fees. The lower tables record the system costs and capacities.

Existing and No Waterline
The next tabs show information on existing conditions and a control scenario. The “Existing” tab shows the existing land uses in the study area. This is a snapshot of the study area at year 0. The “No Waterline” tab shows what would occur if the locality chose not to invest in the proposed water and sewer system. This is structured to be an extrapolation of growth trends from the previous decade.

Development
The fifth set of tabs show the development forecasts, or the growth that the locality will experience in the next 20 years as a result of water and/or sewer infrastructure. There is a development forecast for each water/sewer proposal. There are two sets of tabs because localities may believe that one proposal will encourage more or less development than the other. These tabs are labeled as "Development Forecasts (___)."

Pro Forma
These are the financial figures for the two water/sewer-line options. Refer to the tabs, labeled "___ Proposal." These pro forma tables allow the user to identify the financial difference between the two water/sewer options. Since there are three growth scenarios, there are three pro forma tables associated with each proposal.

Property Records
This tab contains all of the existing property information for the study/service area. Each row (horizontal line) is a separate property record. These records constitute the study area for the given project. Data on this tab sets the existing conditions for the study area, including average property values, existing land uses and acreage. Accurate input data for the study area is critical for use of the Return on Investment Model.

How to Use the Spreadsheet:

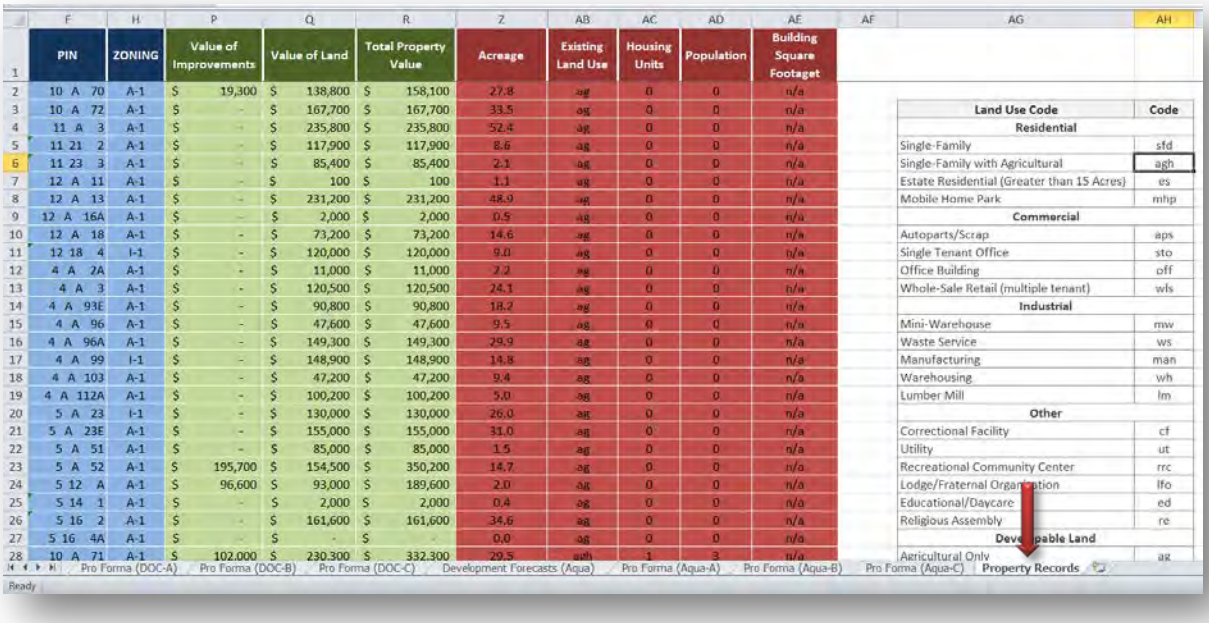
There are six steps needed to complete a successful application of the ROI spreadsheet. These steps allow the user to input data on basic assumptions, which populate the equations throughout the spreadsheet. Instructions for completing the six steps are included below. Please refer to the "*note*" comments at the end of each step to avoid common errors.

Step 1: Define the Study Area and Collect Property Records

The first step in this process is the most complicated task. The user must define the study or service area and find the property records for all parcels within those boundaries. Most localities have property records uploaded in electronic mapping software, called Geographic Information Systems (GIS). This software serves as the main tool for accessing the required parcel data. The user must access these records and import them into the spreadsheet.

Enter the property records into the last tab of the spreadsheet, labeled "Property Records." There must be property records for every parcel in the study area. These records also must have at least five columns of data, including:

- Total Land Value
- Acreage
- Existing Land Uses
- Housing Units
- Building Square Footage



PIN	ZONING	Value of Improvements	Value of Land	Total Property Value	Acreage	Existing Land Use	Housing Units	Population	Building Square Footage
10 A 70	A-1	$ 19,300	$ 138,800	$ 158,100	27.8	ag	0	0	n/a
10 A 72	A-1	$ -	$ 167,700	$ 167,700	33.5	ag	0	0	n/a
11 A 3	A-1	$ -	$ 235,800	$ 235,800	52.4	ag	0	0	n/a
11 21 2	A-1	$ -	$ 117,900	$ 117,900	8.6	ag	0	0	n/a
11 23 3	A-1	$ -	$ 85,400	$ 85,400	2.1	ag	0	0	n/a
12 A 11	A-1	$ -	$ 100	$ 100	1.1	ag	0	0	n/a
12 A 13	A-1	$ -	$ 231,200	$ 231,200	48.9	ag	0	0	n/a
12 A 16A	A-1	$ -	$ 2,000	$ 2,000	0.5	ag	0	0	n/a
12 A 18	A-1	$ -	$ 73,200	$ 73,200	14.6	ag	0	0	n/a
12 18 4	I-1	$ -	$ 120,000	$ 120,000	9.0	ag	0	0	n/a
4 A 2A	A-1	$ -	$ 11,000	$ 11,000	2.2	ag	0	0	n/a
4 A 3	A-1	$ -	$ 120,500	$ 120,500	24.1	ag	0	0	n/a
4 A 93E	A-1	$ -	$ 90,800	$ 90,800	18.2	ag	0	0	n/a
4 A 96	A-1	$ -	$ 47,600	$ 47,600	9.5	ag	0	0	n/a
4 A 96A	A-1	$ -	$ 149,300	$ 149,300	29.9	ag	0	0	n/a
4 A 99	I-1	$ -	$ 148,900	$ 148,900	14.8	ag	0	0	n/a
4 A 103	A-1	$ -	$ 47,200	$ 47,200	9.4	ag	0	0	n/a
4 A 112A	A-1	$ -	$ 100,200	$ 100,200	5.0	ag	0	0	n/a
5 A 23	I-1	$ -	$ 130,000	$ 130,000	26.0	ag	0	0	n/a
5 A 23E	A-1	$ -	$ 155,000	$ 155,000	31.0	ag	0	0	n/a
5 A 51	A-1	$ -	$ 85,000	$ 85,000	1.5	ag	0	0	n/a
5 A 52	A-1	$ 195,700	$ 154,500	$ 350,200	14.7	ag	0	0	n/a
5 12 A	A-1	$ 96,600	$ 93,000	$ 189,600	2.0	ag	0	0	n/a
5 14 1	A-1	$ -	$ 2,000	$ 2,000	0.4	ag	0	0	n/a
5 16 2	A-1	$ -	$ 161,600	$ 161,600	34.6	ag	0	0	n/a
5 16 4A	A-1	$ -	$ -	$ -	0.0	ag	0	0	n/a
10 A 71	A-1	$ 102,000	$ 230,300	$ 332,300	29.5	agh	1	3	n/a

Land Use Code	Code
Residential	
Single-Family	sfd
Single-Family with Agricultural	agh
Estate Residential (Greater than 15 Acres)	es
Mobile Home Park	mhp
Commercial	
Autoparts/Scrap	aps
Single Tenant Office	sto
Office Building	off
Whole-Sale Retail (multiple tenant)	wls
Industrial	
Mini-Warehouse	mw
Waste Service	ws
Manufacturing	man
Warehousing	wh
Lumber Mill	lm
Other	
Correctional Facility	cf
Utility	ut
Recreational Community Center	rrc
Lodge/Fraternal Organization	lfo
Educational/Daycare	ed
Religious Assembly	re
Developable Land	
Agricultural Only	ag

Total Land Value

Every locality employs assessors to estimate the dollar values of properties within the jurisdictional boundaries of the community. These assessments are necessary for the locality, in order to collect real estate taxes, which are collected based on these land values. For the ROI spreadsheet, the total land value must be included in the "Property Records" tab. These data control the existing land values and serve as the foundation for assumptions regarding future land values.

Acreage

In the spreadsheet, the property records must include values for acreage. These figures will determine how much land is available for development. This data will also identify the amount of land dedicated for existing land uses.

Existing Land Uses

In some communities, the local assessors will identify the existing land uses for all properties within the jurisdictional boundaries. In most cases, these land use records are less specific or outdated. To ensure reliable data, the user should conduct a land use inventory of the study area. Refer to aerial photography and local development records to collect this data. Site visits may be time consuming but are the best way to conduct an existing land use inventory.

Housing Units

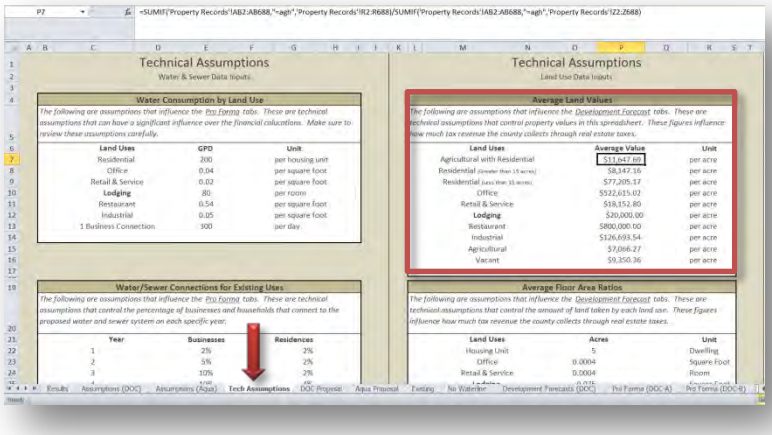
While conducting an existing land use inventory, identify every housing unit in the study area. Again, site visits are the most reliable way to collect this data. Some properties may have multiple housing units, as seen with multi-family apartments or duplexes. It is important to have an accurate count for housing units, to establish a baseline for the model.

Building Square Footage

For non-residential uses, the model measures development in square feet. Estimate the existing square-footage for the retail/service, restaurant and industrial land uses. There are several sources that help the user find this data. First, the local assessor may already include square-footage in the assessment records. Use GIS or other mapping software to calculate these areas, if records do not already exist. Another way to find building square-footage is to review approved site plans and development records from the study area.

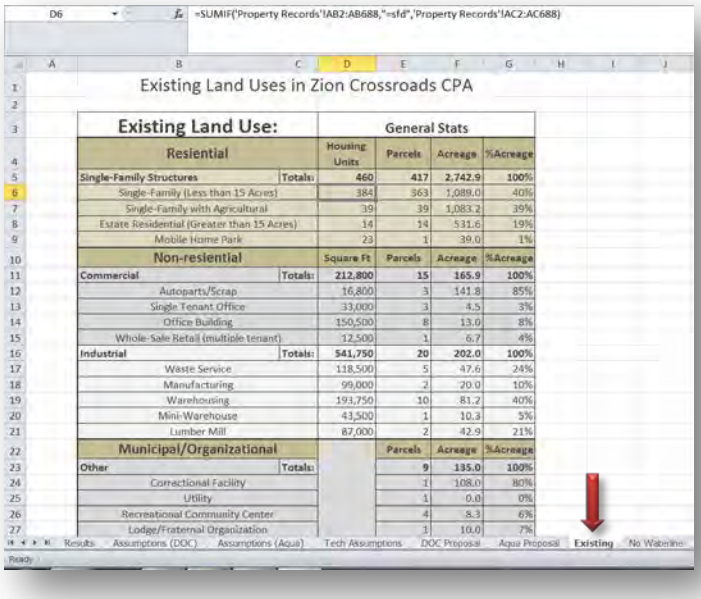
Equations

The "Property Records" tab feeds into several equations throughout the spreadsheet. When the user updates these property records, he or she must also update these equations.



Refer to the tab labeled "Tech Assumptions." The figures under the "Average Land Values" table pull directly from the property records. Restructure these equations to fit with the new records.

The property records data also feed into the tab labeled “Existing.” This tab shows information on existing conditions and shows the existing land uses in the study area. This is a snapshot of the study area at year 0. The user must refer to this tab and update the land use classifications and equations.



D6 =SUMIF('Property Records'!AB2:AB688,"=sfd",'Property Records'!AC2:AC688)

Existing Land Uses in Zion Crossroads CPA

Existing Land Use:		General Stats			
Resiential		Housing Units	Parcels	Acreage	%Acreage
Single-Family Structures	Totals:	460	417	2,742.9	100%
Single-Family (Less than 15 Acres)		384	363	1,089.0	40%
Single-Family with Agricultural		39	39	1,083.2	39%
Estate Residential (Greater than 15 Acres)		14	14	531.6	19%
Mobile Home Park		23	1	39.0	1%
Non-resiential		Square Ft	Parcels	Acreage	%Acreage
Commercial	Totals:	212,800	15	165.9	100%
Autoparts/Scrap		16,800	3	141.8	85%
Single Tenant Office		33,000	3	4.5	3%
Office Building		150,500	8	13.0	8%
Whole-Sale Retail (multiple tenant)		12,500	1	6.7	4%
Industrial	Totals:	541,750	20	202.0	100%
Waste Service		118,500	5	47.6	24%
Manufacturing		99,000	2	20.0	10%
Warehousing		193,750	10	81.2	40%
Mini-Warehouse		43,500	1	10.3	5%
Lumber Mill		87,000	2	42.9	21%
Municipal/Organizational			Parcels	Acreage	%Acreage
Other	Totals:		9	135.0	100%
Correctional Facility			1	108.0	80%
Utility			1	0.0	0%
Recreational Community Center			4	8.3	6%
Lodge/Fraternal Organization			3	10.0	7%

Results Assumptions (DOC) Assumptions (Aqua) Tech Assumptions DOC Proposal Aqua Proposal Existing No Waterline

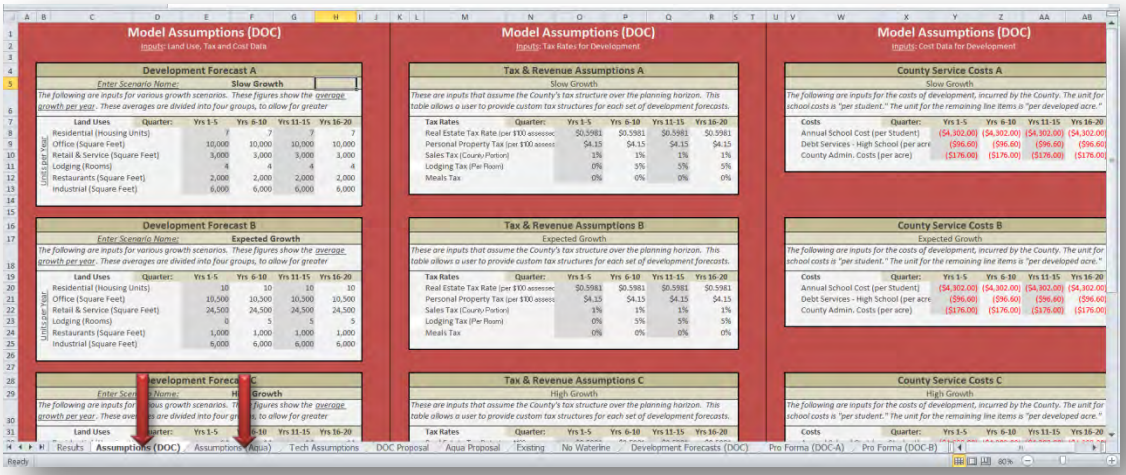
Ready

Notes: Contact the local GIS specialist or assessor to determine if the property records are the most recent on file. The property records may be in dbf format, particularly if the data originates from GIS files. To convert that data for use in Excel®, the user may have to open the folders in Microsoft Access®.

In most instances, local staff should contact the TJPDC for assistance with step one, due to the complexity of these steps.

Step 2: Enter Basic Assumptions

The second step is entering the basic assumptions that are associated with future development. Go to the second and third tabs of the spreadsheet, which are labeled "Assumptions." The ROI compares two different proposals, so there are different sets of assumptions for each proposal.



Under these tabs there are three sets of tables. These include "Development Forecasts", "Tax and Revenue Assumptions" and "County Service Costs." Provide inputs for each growth scenario. The user can change the names of those growth scenarios. Rename the scenarios under the first set of tabs, "Development Forecasts", and that name will populate the rest of the spreadsheet.

<u>Development Forecast</u>

Enter future land use assumptions under the "Development Forecast" tables. These tables show a 20-year period and allow the user to enter annual growth rates in 5-year increments. The user will develop three different growth forecasts. Typically, the first forecast will show slower than expected growth. The second should illustrate expected development rates. The third forecast should depict higher than expected growth. These forecasts will provide an analysis that considers a wide variety of market conditions.

Development Forecast A

Enter Scenario Name: **Slow Growth**

The following are inputs for various growth scenarios. These figures show the average growth per year. These averages are divided into four groups, to allow for greater

	Land Uses	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20
Units per Year	Residential (Housing Units)		7	3	3	3
	Office (Square Feet)		10,000	3,300	3,300	3,300
	Retail & Service (Square Feet)		3,000	1,700	1,700	1,700
	Lodging (Rooms)		4	4	4	4
	Restaurants (Square Feet)		2,000	0	0	0
	Industrial (Square Feet)		6,000	6,000	6,000	6,000

- Residential Inputs: Enter the anticipated growth in new dwelling units per year. There are three forecasts per water/sewer scenario. Repeat this step for all development forecast tables.

- Office Inputs: Enter the anticipated growth in square feet of office space per year. There are three forecasts per water/sewer scenario. Repeat this step for all development forecast tables.

- Retail & Service Inputs: Enter the anticipated growth in square feet of retail and service space per year. There are three forecasts per water/sewer scenario. Repeat this step for all development forecast tables.

- Lodging Inputs: Enter the anticipated growth of the number of additional rooms per year. There are three forecasts per water/sewer scenario. Repeat this step for all development forecast tables.

- Restaurant Inputs: Enter the anticipated growth in square feet of restaurant space per year. There are three forecasts per water/sewer scenario. Repeat this step for all development forecast tables.

- Industrial Inputs: Enter the anticipated growth in square feet of industrial space per year. There are three forecasts per water/sewer scenario. Repeat this step for all development forecast tables.

Tax and Revenue Assumptions

The tax tables include five categories of public revenue: a real estate, personal property, sales, lodging and meals tax. Since tax rates can change over time, the model allows the user to alter these tax rates in 5-year increments. There are three tax tables per water/sewer scenario, which are associated with the development forecast tables.

Tax & Revenue Assumptions A

Slow Growth

These are inputs that assume the County's tax structure over the planning horizon. This table allows a user to provide custom tax structures for each set of development forecasts.

Tax Rates	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20
Real Estate Tax Rate (per $100 assessed)		$0.6800	$0.6800	$0.6800	$0.6800
Personal Property Tax (per $100 assessed)		$4.00	$4.00	$4.00	$4.00
Sales Tax (County Portion)		1%	1%	1%	1%
Lodging Tax (Per Room)		5%	5%	5%	5%
Meals Tax		2%	2%	2%	2%

- Real Estate Tax Rate Inputs: Enter the anticipated real estate tax rate. The unit for these rates is a set amount "per $100 of assessed real estate value." Refer to the local finance department for existing rates. There are three forecasts per water/sewer scenario. Repeat this step for all "Tax and Revenue Assumptions" tables.

- Personal Property Tax Rate Inputs: Enter the anticipated personal property tax rate. The unit for these rates is a set amount "per $100 of assessed property value." Refer to the local finance department for existing rates. There are three forecasts per water/sewer scenario. Repeat this step for all "Tax and Revenue Assumptions" tables.

- Sales Tax Inputs: Enter the anticipated sales tax rate. The sales tax is a percentage, on the dollar, of total retail sales. Refer to the local finance department for existing rates. There are three forecasts per water/sewer scenario. Repeat this step for all "Tax and Revenue Assumptions" tables.

- Lodging Tax Inputs: Enter the anticipated lodging tax rate. The lodging tax is a percentage, on the dollar, of total room-rental income. Refer to the local finance department for existing rates. There are three forecasts per water/sewer scenario. Repeat this step for all "Tax and Revenue Assumptions" tables.

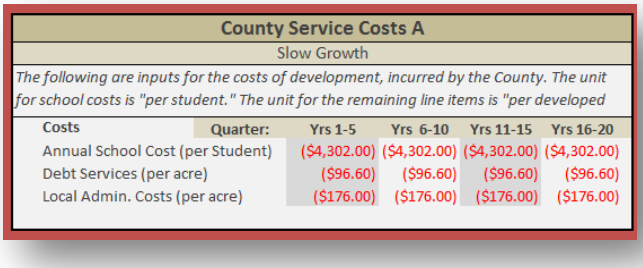
- Meals Tax Inputs: Enter the anticipated meals tax rate. The meals tax is a percentage, on the dollar, of total restaurant sales. Refer to the local finance department for existing rates. There are three forecasts per water/sewer scenario. Repeat this step for all "Tax and Revenue Assumptions" tables.

Note: Localities reassess property values on a regular basis. If the locality is establishing an equalized tax rate, which adjusts for changes in assessed values, then:

1. *Update the new property values in the "Property Records" tab, or*
2. *Maintain the existing real estate tax rate.*

County Service Costs

The final tables show local costs that are associated with development. This includes costs related to schools, police and emergency services, government administration and debt services. The exact numbers for these assumptions will change, based on the locality. There are three "Service Costs" tables per water/sewer scenario, which are associated with the "Development Forecast" tables.



County Service Costs A					
Slow Growth					
The following are inputs for the costs of development, incurred by the County. The unit for school costs is "per student." The unit for the remaining line items is "per developed					
Costs	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20
Annual School Cost (per Student)		($4,302.00)	($4,302.00)	($4,302.00)	($4,302.00)
Debt Services (per acre)		($96.60)	($96.60)	($96.60)	($96.60)
Local Admin. Costs (per acre)		($176.00)	($176.00)	($176.00)	($176.00)

- Annual School Cost Inputs: Enter the anticipated school costs, per student. Refer to the approved local budget to determine these costs. There are three forecasts per water/sewer scenario. Repeat this step for all "Service Costs" tables.
- Debt Services Inputs: Enter the anticipated costs associated with debt services. Refer to the approved local budget to determine these costs. The unit for this input is "per developed acre." The note section below describes how to calculate these figures. There are three forecasts per water/sewer scenario. Repeat this step for all "Service Costs" tables.
- Local Admin Costs Inputs: Enter the anticipated costs associated with local administration. Refer to the approved local budget to determine these costs. The unit for this input is "per developed acre." The note section below describes how to calculate these figures. There are three forecasts per water/sewer scenario. Repeat this step for all "Service Costs" tables.

Note: Review and complete assumptions for both proposals. For an "apples-to-apples" comparison, use the same assumptions for both proposals.

For school costs, find the total school costs and divide by the total number of students. For the remaining costs (admin. and debt services), find the totals for those budget line items and divide those figures by the total number of developed acres in the locality. Since vacant properties require little to no local services, avoid acreage from vacant lots in this calculation.

Equations

School Costs

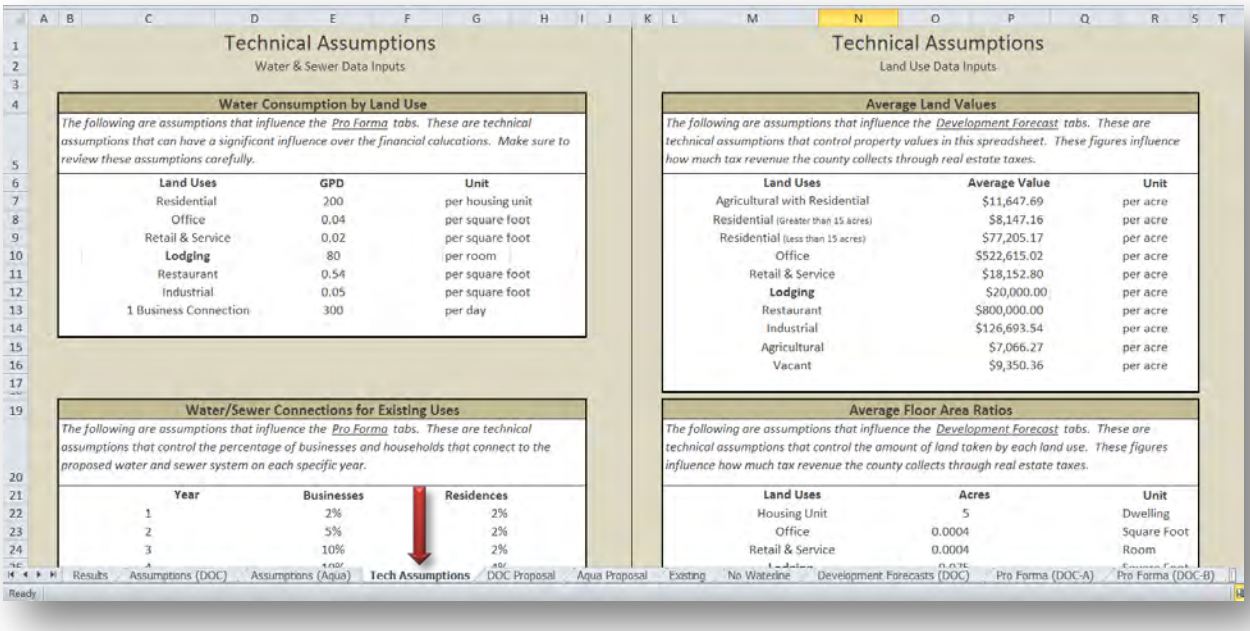
$$Input = \frac{Total\ School\ Budget}{Total\ Students}$$

Local Admin. or Debt Services

$$Input = \frac{Total\ Admin.\ or\ Debt\ Budget}{Total\ Developed\ Acres}$$

Step 3: Review Technical Assumptions

For step three, review the "Tech Assumptions" tab and confirm that those assumptions are consistent with your locality. There are five topics under this tab. The first two tables, at the upper left, address water consumption and connection rates. The tables to the right address land use assumptions. At the bottom of the "Tech Assumptions" tab, there is a "No Waterline" scenario, which acts as a control for the model. For that scenario, review the growth trends over the previous decade for your community or refer to the Weldon Cooper Center to find information on development assumptions. The two remaining tables include "Tax-Related Assumptions" and "Demographics."



Technical Assumptions

Water & Sewer Data Inputs

Water Consumption by Land Use

The following are assumptions that influence the Pro Forma tabs. These are technical assumptions that can have a significant influence over the financial calucations. Make sure to review these assumptions carefully.

Land Uses	GPD	Unit
Residential	200	per housing unit
Office	0.04	per square foot
Retail & Service	0.02	per square foot
Lodging	80	per room
Restaurant	0.54	per square foot
Industrial	0.05	per square foot
1 Business Connection	300	per day

Water/Sewer Connections for Existing Uses

The following are assumptions that influence the Pro Forma tabs. These are technical assumptions that control the percentage of businesses and households that connect to the proposed water and sewer system on each specific year.

Year	Businesses	Residences
1	2%	2%
2	5%	2%
3	10%	2%

Technical Assumptions

Land Use Data Inputs

Average Land Values

The following are assumptions that influence the Development Forecast tabs. These are technical assumptions that control property values in this spreadsheet. These figures influence how much tax revenue the county collects through real estate taxes.

Land Uses	Average Value	Unit
Agricultural with Residential	$11,647.69	per acre
Residential (Greater than 15 acres)	$8,147.16	per acre
Residential (Less than 15 acres)	$77,205.17	per acre
Office	$522,615.02	per acre
Retail & Service	$18,152.80	per acre
Lodging	$20,000.00	per acre
Restaurant	$800,000.00	per acre
Industrial	$126,693.54	per acre
Agricultural	$7,066.27	per acre
Vacant	$9,350.36	per acre

Average Floor Area Ratios

The following are assumptions that influence the Development Forecast tabs. These are technical assumptions that control the amount of land taken by each land use. These figures influence how much tax revenue the county collects through real estate taxes.

Land Uses	Acres	Unit
Housing Unit	5	Dwelling
Office	0.0004	Square Foot
Retail & Service	0.0004	Room

Results | Assumptions (DOC) | Assumptions (Aqua) | Tech Assumptions | DOC Proposal | Aqua Proposal | Existing | No Waterline | Development Forecasts (DOC) | Pro Forma (DOC-A) | Pro Forma (DOC-B)

Ready

Water Consumption by Land Use

This table controls assumptions for how much water each land use consumes on an average day. Consequently, these assumptions also control the rate of sewer treatment. These inputs influence the "Pro Forma" tabs, which calculate total water consumption and sewer treatment. The default assumptions are based on national averages, but there may be regional variations.

Water Consumption by Land Use

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Retail & Service	0.02	per square foot
Lodging	80	per room
Restaurant	0.54	per square foot
Industrial	0.05	per square foot
1 Business Connection	300	per day

- Residential Input: Enter the average water consumption for a single household. The unit is "gallons per day."
- Office Input: Enter the average water consumption of office uses, per square foot. The unit is "gallons per day."
- Retail & Service Input: Enter the average water consumption of retail and service uses, per square foot. The unit is "gallons per day."

- Lodging Input: Enter the average water consumption of lodging uses, per rented room. The unit is "gallons per day."
- Restaurant Input: Enter the average water consumption of restaurants and dinning uses, per square foot. The unit is "gallons per day."
- Industrial Input: Enter the average water consumption of industrial uses, per square foot. The unit is "gallons per day."
- Business Connection Input: Enter the GPD limit for a single water connection, or EMU, associated with business customers. The unit is "gallons per day."

Water/Sewer Connections for Existing Uses

This table also influences the "Pro Forma" tabs. These assumptions control the percentage of connections, on a given year, from existing businesses and households.

Water/Sewer Connections for Existing Uses

The following are assumptions that influence the Pro Forma tabs. These are technical assumptions that control the percentage of businesses and households that connect to the proposed water and sewer system on each specific year.

Year	Businesses	Residences
1	2%	2%
2	5%	2%
3	10%	2%
4	10%	4%
5	13%	5%
6	15%	10%
7	10%	10%
8	10%	10%
9	5%	10%
10	0%	5%
Total:	80%	60%

- Business Inputs: Enter the percentage of water/sewer connections for each year, associated with businesses. The total percentage at the bottom of the table should not exceed 100 percent.
- Residential Inputs: Enter the percentage of water/sewer connections for each year, associated with residences. The total percentage at the bottom of the table should not exceed 100 percent.

Average Land Values

The land value assumptions influence the "Development Forecast" tabs. These are technical assumptions that control property values in this spreadsheet. These figures influence how much tax revenue the locality collects through real estate taxes. The values are based on averages throughout the study area. As the user updates the "Property Records" tab, he or she must also update the equations in this table.

Average Land Values

The following are assumptions that influence the Development Forecast tabs. These are technical assumptions that control property values in this spreadsheet. These figures influence how much tax revenue the county collects through real estate taxes.

Land Uses	Average Value	Unit
Agricultural with Residential	$11,647.69	per acre
Residential (Greater than 15 acres)	$8,147.16	per acre
Residential (Less than 15 acres)	$77,205.17	per acre
Office	$522,615.02	per acre
Retail & Service	$18,152.80	per acre
Lodging	$20,000.00	per acre
Restaurant	$800,000.00	per acre
Industrial	$126,693.54	per acre
Agricultural	$7,066.27	per acre
Vacant	$9,350.36	per acre

- Agricultural with Residential Input: Adjust the equation to calculate the average assessed value, per acre, of a property with "agricultural with residential" uses. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.

- Residential (greater than 15 acres) Input: Adjust the equation to calculate the average assessed value, per acre, of a larger residential property. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Residential (less than 15 acres) Input: Adjust the equation to calculate the average assessed value, per acre, of a smaller residential property, less than 15 acres. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Office Input: Adjust the equation to calculate the average assessed value, per acre, of a property with offices uses. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Retail & Service Input: Adjust the equation to calculate the average assessed value, per acre, of a property with retail and service uses. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Lodging Input: Adjust the equation to calculate the average assessed value, per acre, of a property with hotels, motels or other lodging uses. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Restaurant Input: Adjust the equation to calculate the average assessed value, per acre, of a property with restaurants and dinning. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Industrial Input: Adjust the equation to calculate the average assessed value, per acre, of industrial properties. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Agricultural Input: Adjust the equation to calculate the average assessed value, per acre, of agricultural properties. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.
- Vacant Input: Adjust the equation to calculate the average assessed value, per acre, of vacant properties. The equation is: total value of the specific land use, divided by the total acreage of that land use. The property data originates from the "Property Records" tab.

Note: If a specific land use does not already existing in the study area, then use the average property value of a similar land use.

Average Floor Area Ratios

This table includes assumptions that influence the "Development Forecast" tabs. These are technical assumptions that control the amount of land taken by each land use. For example, with every square-foot of retail, the model assigns a set amount of land. Since these equations determine the amount of land associated with each land use, it influences how much tax revenue the locality collects through real estate taxes. The default assumptions are based on national and regional averages.

Average Floor Area Ratios

The following are assumptions that influence the Development Forecast tabs. These are technical assumptions that control the amount of land taken by each land use. These figures influence how much tax revenue the county collects through real estate taxes.

Land Uses	Acres	Unit
Housing Unit	5	Dwelling
Office	0.0004	Square Foot
Retail & Service	0.0004	Square Foot
Lodging	0.075	per Room
Restaurant	0.0003	Square Foot
Industrial	0.0002	Square Foot

- Housing Unit Input: Enter an average size for a new residential property. The user will enter the number of acres associated with a single household.
- Office Input: Enter the floor to area ratio for office space. This number is a fraction of land area (in acres) associated with each built square foot of office.
- Retail & Service Input: Enter the floor to area ratio for retail and service space. This number is a fraction of land area (in acres) associated with each built square foot of retail or service.
- Lodging Input: Enter the floor to area ratio for lodging. This number is a fraction of land area (in acres) associated with each room in a lodging establishment.
- Restaurant Input: Enter the floor to area ratio for restaurant space. This number is a fraction of land area (in acres) associated with each built square foot of restaurant.
- Industrial Input: Enter the floor to area ratio for industrial space. This number is a fraction of land area (in acres) associated with each built square foot of industrial.

Average Size of Businesses

The following are assumptions that influence the summary tables in the "Development Forecast" tabs. These are technical assumptions that help calculate the total number of businesses within the study area. These assumptions do not influence the financial results of the spreadsheet, nor do these figures influence calculations for water or sewer.

Average Size of Businesses

The following are assumptions that influence the summary tables in the development forecast tabs. These are technical assumptions that show the total number of businesses.

Land Uses	Average Size	Unit
Office	15,000	Square Foot
Retail & Service	5,000	Square Foot
Lodging	40	Rooms
Restaurant	5,000	Square Foot
Industrial Business	28,124	Square Foot

- Office Input: Enter the average size of an office building. To determine the average size of an office building in a particular locality, refer to approved development plans or aerial photography of existing structures. The default entry is a typical size of a small office building.
- Retail & Service Input: Enter the average size of a retail or service-related building. To determine the average size of a retail building in a particular locality, refer to approved development plans or aerial

photography of existing structures. The default entry is a typical size of a small retail or service-related building.

- Lodging Input: Enter the average size of a hotel or motel, according to the number of rented rooms. To determine the average size on a lodging establishment in a particular locality, refer to approved development plans or use national averages. The default entry is a typical size of a small hotel.

- Restaurant Input: Enter the average size of a restaurant building. To determine the average size of a restaurant in a particular locality, refer to approved development plans or aerial photography of existing structures. The default entry is a typical size of a sit-down restaurant.

- Industrial Input: Enter the average size of an industrial building. To determine the average size of an industrial building in a particular locality, refer to approved development plans or aerial photography of existing structures. Industry includes a wide variety of uses and buildings, but the default entry is a typical size of a warehouse structure.

Tax-Related Assumptions

This table includes assumptions that influence the "Development Forecast" tabs. These are technical assumptions that control values for personal property, along with the average sales for retail and restaurants. These figures influence how much tax revenue the locality collects through personal property, retail and meal taxes. The default assumptions are based on national and regional averages.

Tax-Related Assumptions

The following are assumptions that influence the Development Forecast tabs. These are technical assumptions that control values for personal property, along with sales from retail and meals, for this spreadsheet. These figures influence how much tax revenue the county collects through personal property, retail and meal taxes.

Category	Average	Unit
Personal Vehicle (Value)	$6,000.00	Per Vehicle
Personal Vehicles	2	Per Home
Lodging Sales	$200.00	Per Room
Lodging (Occupancy Rate)	40%	Per Night
Retail Sales (Existing Businesses)	$50.00	Square Foot
Retail Sales (New Businesses)	$600.00	Square Foot
Restaurant Sales	$600.00	Square Foot

- Personal Vehicle (Value) Input: Enter the average value of a personal vehicle in the study area. Contact the local Finance or Commissioner of Revenue Office for information.

- Personal Vehicles Input: Enter the average number of personal vehicles per household. Contact the local Finance or Commissioner of Revenue Office for information.

- Lodging Sales Input: Enter the average sales per room, per night, for lodging establishments in the study area. Contact the local Finance or Commissioner of Revenue Office for information.

- Lodging (Occupancy Rate) Input: Enter the average occupancy rate, per night, of a lodging establishment in the study area. Contact the local hotels or motels for information.

- Retail Sales (Existing Businesses) Input: Enter the average sales, per square foot, for existing retail businesses in the study area. Contact the local Finance or Commissioner of Revenue Office for information.

- Retail Sales (New Businesses) Input: Enter the average sales, per square foot, for new retail businesses. The default assumptions are based on national averages.

- Restaurant Sales Input: Enter the average sales, per square foot, for restaurants in the study area. Contact the local Finance or Commissioner of Revenue Office for information. The default assumptions are based on national averages.

Development Forecast – No Waterline

This development forecast shows what would occur if the locality chose not to invest in the proposed water and sewer system. This is an extrapolation of growth trends from the previous decade. As with the other development forecasts, these figures show the average growth per year. The 20-year planning horizon is divided into four groups, based on 5-year intervals.

Development Forecast

Enter Scenario Name: **Without Waterline**

The following are inputs for various growth scenarios. These figures show the average growth per year. These averages are divided into four groups, to allow for greater accuracy.

Units per Year

Land Uses	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20
Residential (Housing Units)		3	3	3	3
Office (Square Feet)		3,300	3,300	3,300	3,300
Retail & Service (Square Feet)		1,700	1,700	1,700	1,700
Lodging (Rooms)		0	0	0	0
Restaurants (Square Feet)		0	0	0	0
Industrial (Square Feet)		20,000	20,000	20,000	20,000

- Residential Inputs: Enter the anticipated growth in new dwelling units per year. Repeat this step for all 5-year intervals in the 20-year planning horizon.
- Office Inputs: Enter the anticipated growth in square feet of office space per year. Repeat this step for all 5-year intervals in the 20-year planning horizon.
- Retail & Service Inputs: Enter the anticipated growth in square feet of retail and Service space per year. Repeat this step for all 5-year intervals in the 20-year planning horizon.
- Lodging Inputs: Enter the anticipated growth in the number of additional rooms per year. Repeat this step for all 5-year intervals in the 20-year planning horizon.
- Restaurant Inputs: Enter the anticipated growth in square feet of restaurant space per year. Repeat this step for all 5-year intervals in the 20-year planning horizon.
- Industrial Inputs: Enter the anticipated growth in square feet of industrial space per year. Repeat this step for all 5-year intervals in the 20-year planning horizon.

Tax and Revenue Assumptions – No Waterline

These tax and revenue assumptions control the local tax structure over the planning horizon. This table allows a user to provide custom tax scenarios for the "no waterline" scenario.

Tax & Revenue Assumptions

Without Waterline

These are inputs that assume the County's tax structure over the planning horizon. This table allows a user to provide custom tax structures for each set of development forecasts.

Tax Rates	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20
Real Estate Tax Rate (per $100 assessed		$0.5981	$0.5981	$0.5981	$0.5981
Personal Property Tax (per $100 assess		$4.15	$4.15	$4.15	$4.15
Sales Tax (County Portion)		1%	1%	1%	1%
Lodging Tax (Per Room)		0%	5%	5%	5%
Meals Tax		0%	0%	0%	0%

- Real Estate Tax Rate Inputs: Enter the anticipated real estate tax rate. The unit for these rates is a set amount "per $100 of assessed real estate value." Refer to the local finance department for existing rates. Repeat this step for all 5-year intervals in the 20-year planning horizon.
- Personal Property Tax Rate Inputs: Enter the anticipated personal property tax rate. The unit for these rates is a set amount "per $100 of assessed property value." Refer to the local finance department for existing rates. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Sales Tax Inputs: Enter the anticipated sales tax rate. The sales tax is a percentage, on the dollar, of total retail sales. Refer to the local finance department for existing rates. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Lodging Tax Inputs: Enter the anticipated lodging tax rate. The lodging tax is a percentage, on the dollar, of total room-rental income. Refer to the local finance department for existing rates. Repeat this step for all 5-year intervals in the 20-year planning horizon.

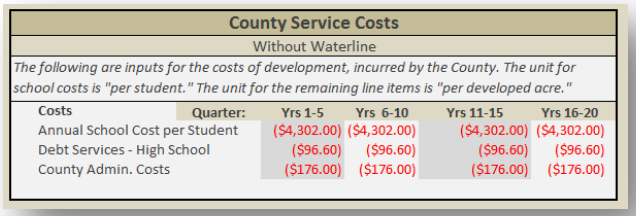
- Meals Tax Inputs: Enter the anticipated meals tax rate. The meals tax is a percentage, on the dollar, of total restaurant sales. Refer to the local finance department for existing rates. Repeat this step for all 5-year intervals in the 20-year planning horizon.

Note: Localities reassess property values on a regular basis. If the locality is establishing an equalized tax rate, which adjusts for changes in assessed values, then:

1. *Update the new property values in the "Property Records" tab, or*
2. *Maintain the existing real estate tax rate.*

County Service Costs – No Waterline

These assumptions are for the costs of development, incurred by the locality. The unit for school costs is "per student." The unit for the remaining line items is "per developed acre." The user should use the same format and methods seen in the other development forecasts, described above.



County Service Costs

Without Waterline

The following are inputs for the costs of development, incurred by the County. The unit for school costs is "per student." The unit for the remaining line items is "per developed acre."

Costs	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20
Annual School Cost per Student		($4,302.00)	($4,302.00)	($4,302.00)	($4,302.00)
Debt Services - High School		($96.60)	($96.60)	($96.60)	($96.60)
County Admin. Costs		($176.00)	($176.00)	($176.00)	($176.00)

- Annual School Cost Inputs: Enter the anticipated school costs, per student. Refer to the approved local budget to determine these costs. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Debt Services Inputs: Enter the anticipated costs associated with debt services. Refer to the approved local budget to determine these costs. The unit for this input is "per developed acre." The note section below describes how to calculate these figures. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Local Admin Costs Inputs: Enter the anticipated costs associated with local administration and services. Refer to the approved local budget to determine these costs. The unit for this input is "per developed acre." The note section below describes how to calculate these figures. Repeat this step for all 5-year intervals in the 20-year planning horizon.

For school costs, find the total school costs and divide by the total number of students. For the remaining costs (admin. and debt services), find the totals for those budget line items and divide those figures by the total number of developed acres in the locality. Since vacant properties require little to no local services, avoid acreage from vacant lots in this calculation.

Equations

School Costs

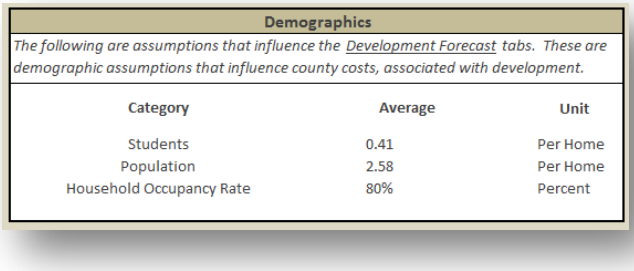
$$Input = \frac{Total\ School\ Budget}{Total\ Students}$$

Local Admin. or Debt Services

$$Input = \frac{Total\ Admin.\ or\ Debt\ Budget}{Total\ Developed\ Acres}$$

Demographics

The "Demographics" table stores data and assumptions that influence the "Development Forecast" tabs. These are demographic assumptions that influence county costs, associated with development.



Demographics

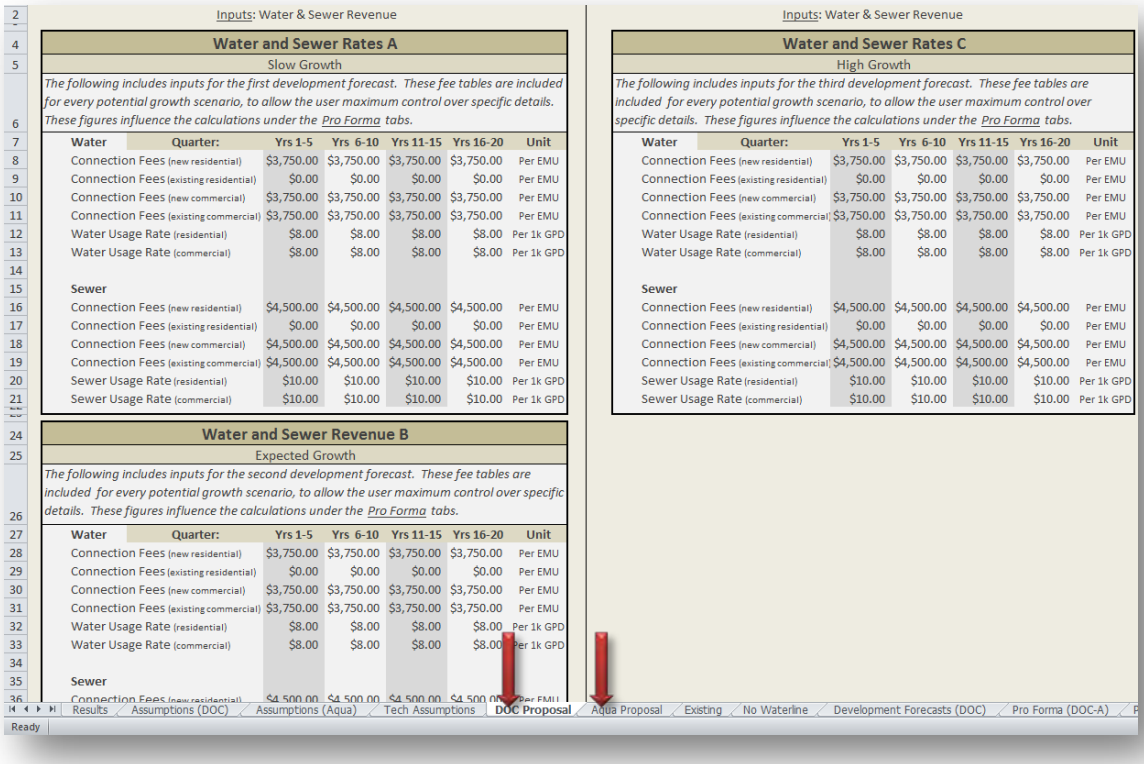
The following are assumptions that influence the Development Forecast tabs. These are demographic assumptions that influence county costs, associated with development.

Category	Average	Unit
Students	0.41	Per Home
Population	2.58	Per Home
Household Occupancy Rate	80%	Percent

- Students per Household Input: Enter the average number of students per household. To calculate this average, find the total number of households in the locality (source: US Census). Contact the local school system to identify the total number of students. Divide "total students" by "number of households."
- Population per Household Input: Enter the average household size for the locality (source: US Census).
- Household Occupancy Rate Input: Enter the average occupancy rate of households in the locality (source: US Census).

Step 4: Set the Water/Sewer Rates and Fees

For the fourth step, refer to the "Proposal" tabs. At the top of each tab there are three identical tables. Each table feeds into one of the growth scenarios, outlined in the "Assumptions" tabs. Input the proposed water and sewer rates for each scenario. The tables include inputs for proposed water connection fees and user rates. The user must enter fees and rates for every 5-year time period. The default figures are consistent with other systems in the central Virginia area.



Inputs: Water & Sewer Revenue

Water and Sewer Rates A

Slow Growth

The following includes inputs for the first development forecast. These fee tables are included for every potential growth scenario, to allow the user maximum control over specific details. These figures influence the calculations under the Pro Forma tabs.

Water	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20	Unit
Connection Fees (new residential)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Connection Fees (existing residential)		$0.00	$0.00	$0.00	$0.00	Per EMU
Connection Fees (new commercial)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Connection Fees (existing commercial)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Water Usage Rate (residential)		$8.00	$8.00	$8.00	$8.00	Per 1k GPD
Water Usage Rate (commercial)		$8.00	$8.00	$8.00	$8.00	Per 1k GPD
Sewer						
Connection Fees (new residential)		$4,500.00	$4,500.00	$4,500.00	$4,500.00	Per EMU
Connection Fees (existing residential)		$0.00	$0.00	$0.00	$0.00	Per EMU
Connection Fees (new commercial)		$4,500.00	$4,500.00	$4,500.00	$4,500.00	Per EMU
Connection Fees (existing commercial)		$4,500.00	$4,500.00	$4,500.00	$4,500.00	Per EMU
Sewer Usage Rate (residential)		$10.00	$10.00	$10.00	$10.00	Per 1k GPD
Sewer Usage Rate (commercial)		$10.00	$10.00	$10.00	$10.00	Per 1k GPD

Water and Sewer Revenue B

Expected Growth

The following includes inputs for the second development forecast. These fee tables are included for every potential growth scenario, to allow the user maximum control over specific details. These figures influence the calculations under the Pro Forma tabs.

Water	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20	Unit
Connection Fees (new residential)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Connection Fees (existing residential)		$0.00	$0.00	$0.00	$0.00	Per EMU
Connection Fees (new commercial)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Connection Fees (existing commercial)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Water Usage Rate (residential)		$8.00	$8.00	$8.00	$8.00	Per 1k GPD
Water Usage Rate (commercial)		$8.00	$8.00	$8.00	$8.00	Per 1k GPD
Sewer						
Connection Fees (new residential)		$4,500.00	$4,500.00	$4,500.00	$4,500.00	Per EMU

Inputs: Water & Sewer Revenue

Water and Sewer Rates C

High Growth

The following includes inputs for the third development forecast. These fee tables are included for every potential growth scenario, to allow the user maximum control over specific details. These figures influence the calculations under the Pro Forma tabs.

Water	Quarter:	Yrs 1-5	Yrs 6-10	Yrs 11-15	Yrs 16-20	Unit
Connection Fees (new residential)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Connection Fees (existing residential)		$0.00	$0.00	$0.00	$0.00	Per EMU
Connection Fees (new commercial)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Connection Fees (existing commercial)		$3,750.00	$3,750.00	$3,750.00	$3,750.00	Per EMU
Water Usage Rate (residential)		$8.00	$8.00	$8.00	$8.00	Per 1k GPD
Water Usage Rate (commercial)		$8.00	$8.00	$8.00	$8.00	Per 1k GPD
Sewer						
Connection Fees (new residential)		$4,500.00	$4,500.00	$4,500.00	$4,500.00	Per EMU
Connection Fees (existing residential)		$0.00	$0.00	$0.00	$0.00	Per EMU
Connection Fees (new commercial)		$4,500.00	$4,500.00	$4,500.00	$4,500.00	Per EMU
Connection Fees (existing commercial)		$4,500.00	$4,500.00	$4,500.00	$4,500.00	Per EMU
Sewer Usage Rate (residential)		$10.00	$10.00	$10.00	$10.00	Per 1k GPD
Sewer Usage Rate (commercial)		$10.00	$10.00	$10.00	$10.00	Per 1k GPD

Results | Assumptions (DOC) | Assumptions (Aqua) | Tech Assumptions | DOC Proposal | Aqua Proposal | Existing | No Waterline | Development Forecasts (DOC) | Pro Forma (DOC-A)

Ready

Water Fees and Rates

The spreadsheet allows the user to enter different rates for existing and new land uses. These lines are included, since the locality may want to waive connection fees for existing residents or businesses. There are also different inputs for residential and non-residential rates, in case the locality would like to treat these uses differently.

- Connection Fees (New Residential) Inputs: Enter the proposed water connection fee for newly built homes. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Connection Fees (Existing Residential) Inputs: Enter the proposed water connection fee for existing homes. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Connection Fees (New Commercial) Inputs: Enter the proposed water connection fee for new businesses. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Connection Fees (Existing Commercial) Inputs: Enter the proposed water connection fee for existing businesses. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Water Usage Rate (Residential) Inputs: Enter the proposed water usage rates for homes. This is a flat rate charged to the customer, per 1,000 GPD. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Water Usage Rate (Commercial) Inputs: Enter the proposed water usage rates for businesses. This is a flat rate charged to the customer, per 1,000 GPD. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

Sewer Fees and Rates

The tables include inputs for proposed sewer connection fees and user rates. The user must enter fees and rates for every 5-year time period. The default figures are consistent with other systems in the central Virginia area.

- Connection Fees (New Residential) Inputs: Enter the proposed sewer connection fee for new homes. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Connection Fees (Existing Residential) Inputs: Enter the proposed sewer connection fee for existing homes. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Connection Fees (New Commercial) Inputs: Enter the proposed sewer connection fee for new businesses. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Connection Fees (Existing Commercial) Inputs: Enter the proposed sewer connection fee for existing businesses. There are three sets of fee structures for each of the two water/sewer options,

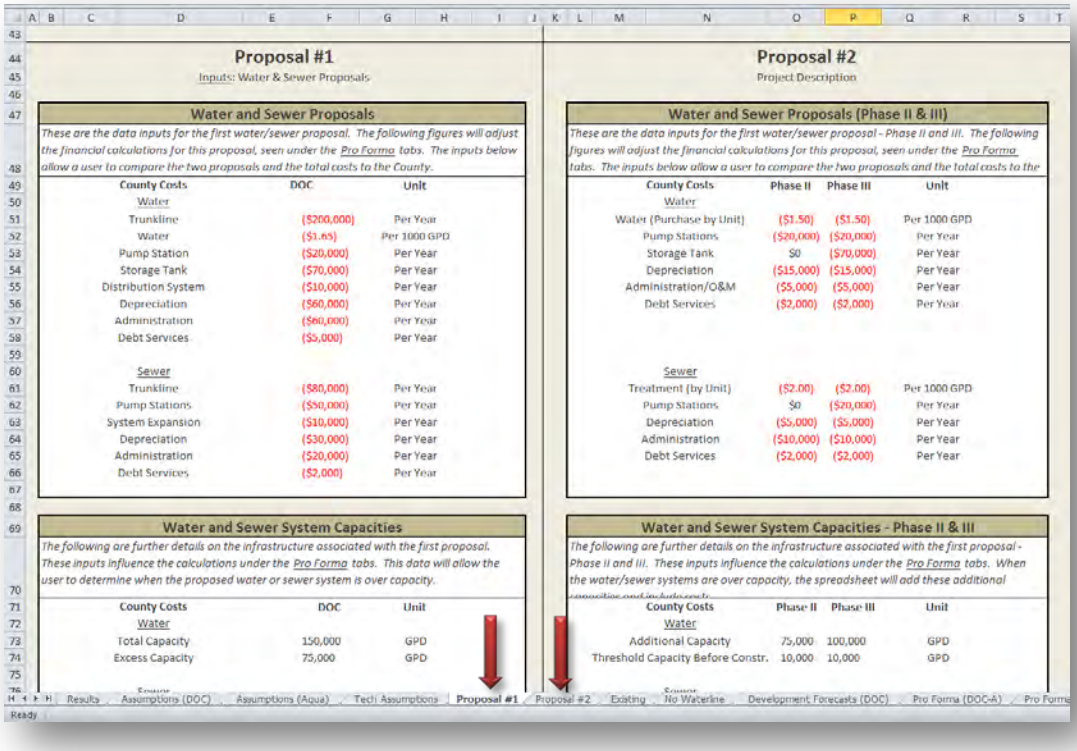
associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

- Sewer Usage Rate (Residential) Inputs: Enter the proposed sewer usage rates for homes. This is a flat rate charged to the customer, per 1,000 GPD. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.
- Sewer Usage Rate (Commercial) Inputs: Enter the proposed sewer usage rates for businesses. This is a flat rate charged to the customer, per 1,000 GPD. There are three sets of fee structures for each of the two water/sewer options, associated with the development forecasts established under the "Assumptions (___)" tabs. Repeat this step for all "Water and Sewer Revenue" tables. Repeat this step for all 5-year intervals in the 20-year planning horizon.

Note: These assumptions feed directly into the "Pro Forma" tabs. After the user enters all of the model assumptions, he or she may want to return to these tables and test different user rates and connection fees.

Step 5: Enter the System details – Costs and Capacities

The fifth step is also under the "Proposal" tabs. Refer to the tables at the bottom of the worksheet, labeled "Water and Sewer Proposals." These are the specific costs to the locality, associated with the proposed system. The tables include figures for capital, administration, operation, maintenance, depreciation, debt services and other expenses. Record these costs into the table and include the water/sewer capacities.



Proposal #1

Inputs: Water & Sewer Proposals

Water and Sewer Proposals

These are the data inputs for the first water/sewer proposal. The following figures will adjust the financial calculations for this proposal, seen under the Pro Forma tabs. The inputs below allow a user to compare the two proposals and the total costs to the County.

County Costs	DOC	Unit
Water		
Trunkline	($200,000)	Per Year
Water	($1.65)	Per 1000 GPD
Pump Station	($20,000)	Per Year
Storage Tank	($70,000)	Per Year
Distribution System	($10,000)	Per Year
Depreciation	($60,000)	Per Year
Administration	($60,000)	Per Year
Debt Services	($5,000)	Per Year
Sewer		
Trunkline	($80,000)	Per Year
Pump Stations	($50,000)	Per Year
System Expansion	($10,000)	Per Year
Depreciation	($30,000)	Per Year
Administration	($20,000)	Per Year
Debt Services	($2,000)	Per Year

Water and Sewer System Capacities

The following are further details on the infrastructure associated with the first proposal. These inputs influence the calculations under the Pro Forma tabs. This data will allow the user to determine when the proposed water or sewer system is over capacity.

County Costs	DOC	Unit
Water		
Total Capacity	150,000	GPD
Excess Capacity	75,000	GPD

Proposal #2

Project Description

Water and Sewer Proposals (Phase II & III)

These are the data inputs for the first water/sewer proposal - Phase II and III. The following figures will adjust the financial calculations for this proposal, seen under the Pro Forma tabs. The inputs below allow a user to compare the two proposals and the total costs to the

County Costs	Phase II	Phase III	Unit
Water			
Water (Purchase by Unit)	($1.50)	($1.50)	Per 1000 GPD
Pump Stations	($20,000)	($20,000)	Per Year
Storage Tank	$0	($70,000)	Per Year
Depreciation	($15,000)	($15,000)	Per Year
Administration/O&M	($5,000)	($5,000)	Per Year
Debt Services	($2,000)	($2,000)	Per Year
Sewer			
Treatment (by Unit)	($2.00)	($2.00)	Per 1000 GPD
Pump Stations	$0	($20,000)	Per Year
Depreciation	($5,000)	($5,000)	Per Year
Administration	($10,000)	($10,000)	Per Year
Debt Services	($2,000)	($2,000)	Per Year

Water and Sewer System Capacities - Phase II & III

The following are further details on the infrastructure associated with the first proposal - Phase II and III. These inputs influence the calculations under the Pro Forma tabs. When the water/sewer systems are over capacity, the spreadsheet will add these additional

County Costs	Phase II	Phase III	Unit
Water			
Additional Capacity	75,000	100,000	GPD
Threshold Capacity Before Constr.	10,000	10,000	GPD

To the right, there is a table for "Phase II & III." When the initial water and sewer capacity reaches its limits, the spreadsheet assumes that construction will begin on system expansion. Consequently, it factors in those costs for building the additional capacity. If the second phases reaches capacity, then a third phase is included in the model. Include these cost figures as well and set the threshold capacity, which is the capacity that triggers construction of the additional phases.

Water and Sewer Proposals

These are the data inputs for the water/sewer proposal. These figures will adjust the financial calculations for this proposal, seen under the "Pro Forma" tabs. The inputs allow a user to compare the two proposals and the total costs to the locality. *Note: Pay close attention to the units for these costs.*

- Water: Trunk Line Inputs: Enter the annual payments associated with the construction of the water trunk line. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Water Inputs: Enter the cost for the locality to purchase water for the system. The spreadsheet assumes that the locality will pay a flat rate per 1,000 GPD. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Water: Pump Station Inputs: Enter the annual payments associated with the construction of the water pump stations. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Water: Storage Tank Inputs: Enter the annual payments associated with the construction of an elevated storage tank. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Water: Distribution System Inputs: Enter the annual payments associated with the construction of the water distribution system. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Water: Depreciation Inputs: Enter the annual amount of depreciation for the infrastructure in the system. The spreadsheet assumes that depreciation will be a flat amount, assessed each year. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Water: Administration Inputs: Enter the annual cost to the locality for administration. The spreadsheet assumes that the administrative costs will be a flat amount, incurred each year. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Water: Debt Services Inputs: Enter the annual payments associated with the construction of the system. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. This input accounts for the interest on those loans. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Sewer: Trunk Line Inputs: Enter the annual payments associated with the construction of the sewer trunk line. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Sewer: Pump Station Inputs: Enter the annual payments associated with the construction of the sewer pump stations. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Sewer: System Expansion Inputs: Enter the annual payments associated with the construction of the sewer system expansion. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Sewer: Depreciation Inputs: Enter the annual amount of depreciation for the infrastructure in the system. The spreadsheet assumes that depreciation will be a flat amount, assessed each year. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Sewer: Administration Inputs: Enter the annual cost to the locality for administration. The spreadsheet assumes that the administrative costs will be a flat amount, incurred each year. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Sewer: Debt Services Inputs: Enter the annual payments associated with the construction of the system. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. This input accounts for the interest on those loans. Repeat this input for both water/sewer options, in the "Proposal" tabs.

Water and Sewer System Capacities

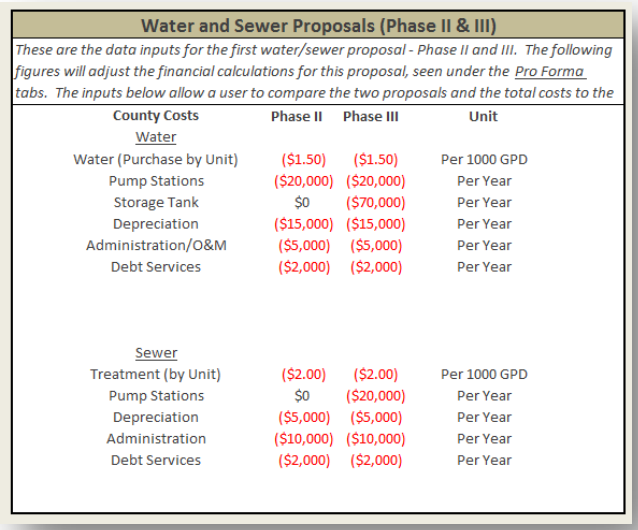
This table allows further details on the infrastructure associated with the proposal. These inputs influence the calculations under the "Pro Forma" tabs as well. This data will allow the user to determine when the proposed water or sewer system is over capacity.

Water and Sewer System Capacities

The following are further details on the infrastructure associated with the first proposal. These inputs influence the calculations under the Pro Forma tabs. This data will allow the user to determine when the proposed water or sewer system is over capacity.

County Costs	DOC	Unit
Water		
Total Capacity	200,000	GPD
Excess Capacity	120,000	GPD
Sewer		
Total Capacity	175,000	GPD
Excess Capacity	125,000	GPD

- Water: Total Capacity Inputs: Enter the total amount of capacity in the water system. This includes the actual usage in the system, plus any excess capacity. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Water: Excess Capacity Inputs: Enter the amount of remaining capacity in the water system. To determine excess capacity, subtract total existing usage by total capacity, revealing the remaining amount of water supply. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Sewer: Total Capacity Inputs: Enter the total treatment capacity in the sewer system. This includes the actual treatment in the system, plus any excess capacity. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Sewer: Excess Capacity Inputs: Enter the amount of remaining capacity in the sewer system. To determine excess capacity, subtract total existing treatment by total capacity, revealing the remaining amount of treatment capacity. Repeat this input for both water/sewer options, in the "Proposal" tabs.



Water and Sewer Proposals (Phase II & III)

These are the data inputs for the first water/sewer proposal - Phase II and III. The following figures will adjust the financial calculations for this proposal, seen under the Pro Forma tabs. The inputs below allow a user to compare the two proposals and the total costs to the

County Costs	Phase II	Phase III	Unit
Water			
Water (Purchase by Unit)	($1.50)	($1.50)	Per 1000 GPD
Pump Stations	($20,000)	($20,000)	Per Year
Storage Tank	$0	($70,000)	Per Year
Depreciation	($15,000)	($15,000)	Per Year
Administration/O&M	($5,000)	($5,000)	Per Year
Debt Services	($2,000)	($2,000)	Per Year
Sewer			
Treatment (by Unit)	($2.00)	($2.00)	Per 1000 GPD
Pump Stations	$0	($20,000)	Per Year
Depreciation	($5,000)	($5,000)	Per Year
Administration	($10,000)	($10,000)	Per Year
Debt Services	($2,000)	($2,000)	Per Year

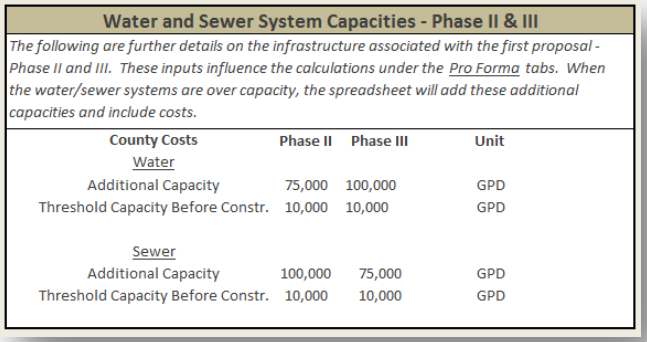
Water and Sewer Proposals (Phase II and III)
This table adjusts the financial calculations for the proposal, seen under the "Pro Forma" tabs. The inputs account for the costs of expanding the water/sewer system, once the system reaches capacity.

- Water (Purchase by Unit) Inputs: Enter the cost for the locality to purchase water for the system. The spreadsheet assumes that the locality will pay a flat rate per 1,000 GPD. Enter this rate for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Water: Pump Stations Inputs: Enter the annual payments associated with the construction of the water pump stations. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Water: Storage Tank Inputs: Enter the annual payments associated with the construction of an elevated storage tank. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Water: Depreciation Inputs: Enter the annual amount of depreciation for the infrastructure in the system. The spreadsheet assumes that depreciation will be a flat amount, assessed each year. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Water: Administration Inputs: Enter the annual cost to the locality for administration. The spreadsheet assumes that the administrative costs will be a flat amount, incurred each year. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Water: Debt Services Inputs: Enter the annual payments associated with the construction of the system. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. This input accounts for the interest on those loans. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Sewer: Treatment (by Unit) Inputs: Enter the cost for the locality to treat the effluent. The spreadsheet assumes that the locality will pay a flat rate per 1,000 GPD. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Sewer: Pump Stations Inputs: Enter the annual payments associated with the construction of the sewer pump stations. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.

- Sewer: Depreciation Inputs: Enter the annual amount of depreciation for the infrastructure in the system. The spreadsheet assumes that depreciation will be a flat amount, assessed each year. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Sewer: Administration Inputs: Enter the annual cost to the locality for administration. The spreadsheet assumes that the administrative costs will be a flat amount, incurred each year. Enter this cost for phase II and III. Repeat this input for both water/sewer options, in the "Proposal" tabs.
- Sewer: Debt Services Inputs: Enter the annual payments associated with the construction of the system. The spreadsheet assumes that the locality will use bonds (loans) to finance the construction, which the locality will pay back in annual installments. This input accounts for the interest on those loans. Repeat this input for both water/sewer options, in the "Proposal" tabs.

Water and Sewer System Capacities (Phase II and III)

These inputs influence the calculations under the "Pro Forma" tabs. When the water/sewer systems are over capacity, the spreadsheet will add these additional capacities. When the model adds these additional capacities, it also accounts for the costs of developing that capacity.



Water and Sewer System Capacities - Phase II & III

The following are further details on the infrastructure associated with the first proposal - Phase II and III. These inputs influence the calculations under the Pro Forma tabs. When the water/sewer systems are over capacity, the spreadsheet will add these additional capacities and include costs.

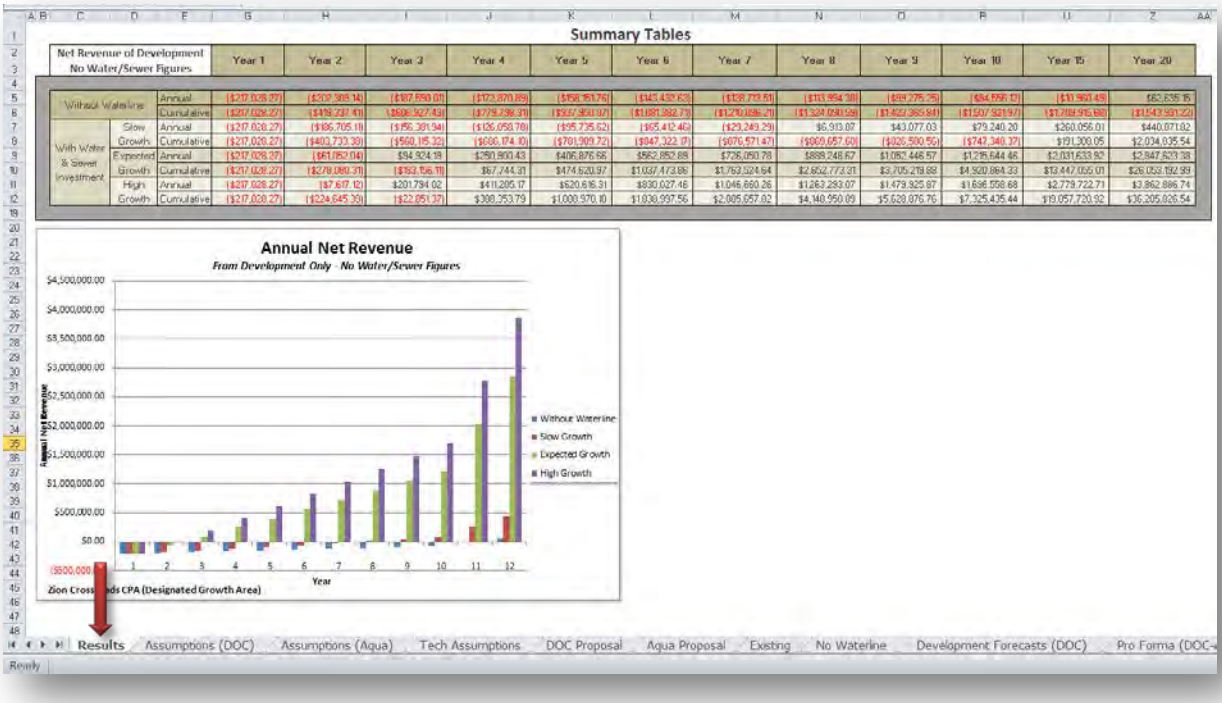
County Costs	Phase II	Phase III	Unit
Water			
Additional Capacity	75,000	100,000	GPD
Threshold Capacity Before Constr.	10,000	10,000	GPD
Sewer			
Additional Capacity	100,000	75,000	GPD
Threshold Capacity Before Constr.	10,000	10,000	GPD

- Water: Additional Capacity Inputs: Enter the additional water supply proposed for the system in phase II and III construction.
- Water: Threshold Capacity before Construction Inputs: Enter the threshold of capacity that will trigger construction of phase II and III expansion. When actual capacity drops below this threshold, the locality would begin construction on expansion.
- Sewer: Additional Capacity Inputs: Enter the additional sewer treatment capacity for the system in phase II and III construction.
- Sewer: Threshold Capacity before Construction Inputs: Enter the threshold of capacity that will trigger construction of phase II and III expansion. When actual capacity drops below this threshold, the locality would begin construction on expansion.

IMPORTANT Note: The cost figures MUST be included as negative numbers. Review the tables and make sure that every cost is either a 0 or negative number. Negative numbers will show in red as ($x,xxx.xx). Note the units of each cost. Verify that the specific costs are consistent with those units.

Step 6: Refer to the Results and Adjust Inputs

You have completed all of the data inputs. Refer to the first tab on the spreadsheet, labeled "Results." There are several tables and graphs included in the results, which will instantaneously update as the user changes the assumptions. For a more detailed review of the results, refer to the tabs labeled "Development Forecasts" or "Pro Forma."



Note: After viewing the results, the user may want to revisit steps two through five and adjust the assumptions.

Frequently Asked Questions:

The ROI spreadsheet is a technical set of equations and readouts. We included the following "frequently asked questions", since some users may be unfamiliar with these types of calculations and model. If you are having difficulty with the ROI spreadsheet, refer to the following for assistance.

Does the ROI spreadsheet assume that the water and sewer systems will eventually serve the entire study area?

Yes, refer to the final tab, labeled "Property Records." The spreadsheet allocates all properties into the same category and assumes that the water and sewer system could eventually reach all lots.

Does the spreadsheet assume that some properties will redevelop?

No, the spreadsheet only assumes that vacant properties will develop. Refer to the final tab, labeled "Property Records." Each property record has a designated land use. If you would like to identify a specific property for development, then identify that property as vacant.

What if I want to create my own scenario and provide it with a specific name?

You can rename the three growth scenarios in the "Assumptions" tabs. Go to the "Development Forecast" tables. Where is says "Enter Scenario Name:" go to the adjacent cell and type in the new name.

What if I want to account for proposals different from what is listed in the existing spreadsheet?

If you would like to change the names of the water/sewer proposals, then go to the "____ Proposal" tabs and enter new names in the cells. You can also change the names of the tabs, seen at the bottom of the screen.

Why are there different sets of development assumptions for the two proposals?

Staff included different sets of development scenarios for the two proposals, to allow the locality more flexibility. You may want to assume that one proposal will encourage more or less development than the other. For an "apples-to apples" comparison, we recommend that you enter the same growth assumptions for each proposal.

What if I want to enter the data manually, in terms of phased construction of the water/sewer system?

Go to the "Pro Forma" tabs. You can override the set equations by typing figures into the cells for phase II & III costs and capacities. When the system reaches capacity, the model assumes that all water/sewer revenues are frozen, since no additional customers can connect. The user will still see a deficit in capacity, but the financial numbers are frozen once water and treatment capacities reach zero.

Glossary:

This user guide and ROI spreadsheet includes several technical terms that may be unfamiliar to the reader. Other terms have special meanings that are specific to this document. The following terms are intended to assist the reader with this document and ROI spreadsheet.

Administration, System – the operations of the system. *See operations and management (O&M).*

Authority – an independent organization, created by the locality, for administration, management and maintenance of the water and/or sewer system. An authority typically has an appointed board of directors, in charge of the administration. The board hires staff that maintains and manages the system. Establishing an authority is one option for operating the system. The other option is for the locality to manage the system itself or to contract with a third party for operating the system.

Capacity, Excess – the amount of remaining capacity in the water or sewer system. To determine excess capacity, the spreadsheet subtracts total usage by total capacity, revealing the remaining amount of water supply or treatment.

Capacity, Total – the total amount of capacity in the water or sewer system. This includes the actual usage in the system, plus any excess capacity.

Connection, Commercial – the pipes and meters that physically connect the business to the water/sewer system. A connection is equivalent to 300 GPD. A business may have multiple connections. The locality or authority charges a fee for each connection. This term refers to both water and sewer line connections.

Connection, Residential – the pipes and meters that physically connect a home to the water/sewer system. The spreadsheet assumes one connection for each housing unit. The locality or authority charges a fee for each connection. This term refers to both water and sewer line connections.

Customer – an individual household or business that draws water from or produces waste for the water/sewer system. Customers pay usage and connection fees to the locality or authority.

Debt Services – the interest that the locality or authority must pay on its loans that are needed to build and expand onto the system.

Depreciation – the lost value of capital investments, as the water and sewer infrastructure ages. In the spreadsheet, this term also accounts for the need for repair and minor expansions to the system. Repair, replacement and expansion costs apply to pipes, pumps, tanks and other facilities in the system.

Distribution System – the pipes that connect the trunk line with individual customers. *See trunk line and customers*. These pipes typically have smaller diameters and consequently have lower capacities.

Equivalent Meter Unit (EMU) – a single water connection. For non-residential buildings, there may be multiple connections, with each equivalent to 300 gallons per day. In the spreadsheet, this term also refers to sewer connections.

Floor Area Ratio (FAR) – the total floor area of a building, divided by the area of the lot, which contains that structure. The spreadsheet includes FARs to calculate the total acreage of future development.

Forecasted Development – the anticipated growth that will occur in the future. This term is different from projected growth, which simply extrapolates growth rates from the past to anticipate the future. Forecasted figures require greater scrutiny and study than projections, and usually involving market studies or other detailed analysis.

Geographic Information Systems (GIS) – a popular mapping software that allows users to show multiple layers of data on the same map. *GIS* files serve as a common resource for defining the study area and collecting property records.

Gallons Per Day (GPD) – the number of gallons consumed on an average day. The ROI spreadsheet uses this term to describe the average water consumption on a given day, along with the average sewage collection. The equations assume that for every gallon of water consumed, there will be a gallon of effluent that must be treated.

Housing Unit – a single dwelling or household. The housing unit could include any number of individuals living in a common space, though the spreadsheet uses census numbers to calculate an average household size, which influences water consumption. There may be multiple housing units in a single building.

Land Uses – how land is occupied or utilized. Under the assumptions tabs, the spreadsheet allocates all uses into six categories, described below. There are an additional four land uses that address existing uses. The spreadsheet assumes there will be no future growth in those last four uses, which include vacant, agricultural, agricultural with residential and large-lot residential.

- *Residential* – a property occupied solely by housing. For future development, the spreadsheet assumes that residential property will only one include single-family detached housing.
- *Office* – any building in which the primary use is the conduct of a business such as (i) accounting, correspondence, research, editing, administration or analysis; (ii) the activities of a salesman, sales representative or manufacturer's representative, where no product inventory is maintained or delivered to purchasers on-site; and (iii) the activities of professionals such as engineers, architects, land surveyors, artists, lawyers, accountants, real estate brokers, insurance agents and landscape architects.
- *Retail & Service* – businesses that are purely dedicated to the sale of goods and services to the general public, onsite. These businesses do not process, manufacture, compound, assemble, package, treat or fabricate those goods. Office uses are excluded from this definition.
- *Lodging* – businesses such as hotels or motels, which rent or lease rooms by the day, week or month.
- *Restaurant* – any type of dining establishment. This term includes fast-food and sit-down dining.
- *Industrial* – enterprises engaged in the processing, manufacturing, compounding, assembling, packaging, treatment or fabricating of materials and products. For the purposes of the ROI spreadsheet, this term refers to light, medium and heavy industry. This term also refers to warehousing and other uses dedicated to mass storage of equipment or materials.
- *Vacant* – undeveloped land. It may include forested land and pastures. In the ROI spreadsheet, the acreage of vacant land decreases as development occurs.

- *Agricultural* – uses dedicated to the production of food or care of domestic animals, not including household pets. Agricultural also refers to the production of hay.
- *Agricultural with Residential* – parcels that include agricultural uses and at least one housing unit.
- *Residential, Large-Lot* – residential parcels that are greater than 15 acres.

Locality – the local government that is considering the capital investments, accessed in the ROI spreadsheet.

Pro Forma – the financial forms for the two proposals listed in the spreadsheet. Typically, the term "pro forma" refers to an accounting statement of a company's finances. For the ROI spreadsheet, the pro forma shows the finances of the locality or authority, for building and operating the water/sewer system.

Pump Station – the equipment needed to pump fluids from one elevation, or place, to another. This equipment is sometimes needed in water and sewer systems, to transport water or effluent through the piping system.

Operations and Management (O&M) – the maintenance, staffing and administration of the water and/or sewer system. These costs apply to either the locality, authority or a third party that is contracted to operate the water/sewer system. *Refer to system administration*.

Return on Investment (ROI) – a performance measurement exercise used to evaluate the profitability of a capital investment. It is also a way of comparing multiple capital investment options. The purpose is to measure the rates of return on money for a specific entity, such as a locality or authority, to decide whether or not to undertake an investment.

Revenue, Net Annual – the total amount of revenue collected in a given year, after factoring all gross costs and incomes. It accounts for the total financial return for the locality or authority on a single year.

Revenue, Net Cumulative – the total amount of revenue collected in all years, to date. This accounts for all gross costs and incomes at and before a given year. It accounts for the total financial return for the locality or authority.

Storage Tank – an elevated storage facility for water, such as a water tower. The purpose of an elevated tank is to store water at a height sufficient to pressurize the water system for distribution and fire protection.

Study Area – the area that the water/sewer system will serve, at some point during the planning horizon.

System – proposed water and/or sewer system.

Treatment, Sewer – the process of removing contaminants from sewage effluent. Treatment includes physical, chemical, and biological processes that remove contaminants. At the end of the process, the effluent will turn into environmentally safe fluids and solid waste that are suitable for disposal.

Trunk Line – the main line, or pipe, in a water or sewer system. The trunk line is a larger diameter pipe designed for moving the largest volumes of water or effluent in the system. In a water system, the trunk line serves to transform water to the distribution system, which connects directly to homes and businesses. With sewer, the smaller pipes (collection system) feed into the trunk line, which runs directly into the treatment plant.

Spreadsheet – the Excel® tables that served as the platform for the ROI Model. This document also refers to this as the model.

Usage Rate, Sewer – the fee that the county or authority charges for the treatment of sewage. The fee is accessed by the unit of 1,000 gallons per day. *See GPD*. In practice, the actual fee charged to a user is determined by the water meter. The common assumption is that for every gallon of water that a customer uses, there will be a gallon of effluent.

Usage Rate, Water – the fee that the county or authority charges for the use of water. The fee is accessed by the unit of 1,000 gallons per day. *See GPD*. In practice, the actual fee charged to a user is determined by the water meter. The common assumption is that for every gallon of water that a customer uses, there will be a gallon of effluent.

Volumetric Fee – a fee to the county or authority, designed to account for the cost of service. If the county or authority purchases water from a third party or uses the water/sewer infrastructure of that party, then this fee may be included in the set of costs.

Water Meter Replacement – the cost of replacing a water meter for every connection in the proposed system. A water meter is a device that measures the amount of water passing through a connection. *See usage rate*. Every water connection has a water meter connected to the line, before that line enters the building or destination. The locality or authority would use this meter to determine the monthly water and sewer bills for a given user. All meters eventually need replacement and the service provider typically covers this cost. The ROI spreadsheet assigns a one-time replacement cost for every water connection.