ALEXANDRIA
Environmental Policy Commission

AGENDA

Environmental Policy Commission
REGULAR MEETING
Monday, September 19, 2016
7:30 - 9:45 PM
City Hall, Room 2000 (Second Floor)

7:30 – 7:35	Welcome and public comments
7:35 – 7:45	Staff consent items and EPC updates: • Waterfront Commission • Member updates • EPC Retreat Notes
7:45–8:30	Stormwater Utility, Jesse Maines/Stormwater Division, TES
8:30-9:00	Stormwater Software, Marcus Quigley, Opti
9:00-9:45	EcoDistrict Feasibility Study for the Old Town North Small Area Plan, Khoa Tran/Office of Environmental Quality, Merrill St. Leger Demian& Greg Mella/SmithGroup
9:45	Adjourn

EPC CALENDAR - FY2017

July 2016 through June 2017

Conference Room 2000 at City Hall Unless Noted Otherwise

7:30 PM – 9:30 PM

DATE	EVENT	AGENDA ITEMS	ITEMS FOR CONSIDERATION
7-18	Regular Meeting		
9-10	**EPC Picnic/ Retreat**		
9-19	Regular Meeting	Stormwater Utility Report/EcoDistrict	
10-3	Work Session		
10-17	Regular Meeting	Stormwater Public Meeting	Stormwater proposed Public Meeting
11-7	Work Session		
11-21	Regular Meeting		
12-5	Work Session		
12-19	Regular Meeting		
1-9 2017	**Work Session**		
1- 27	Regular Meeting		
2-6			
2-27	Regular Meeting		
3-6	Work Session		
3-20	Regular Meeting		
4-3	Regular Meeting		
4-17	Regular Meeting		
5-8	Work Session		
5-22	Regular Meeting		
6-5	Work Session		
6-19	Regular Meeting		

Holidays: July 4, September: Labor Day, January 16: Martin Luther King, Jr. Day February 20: President's Day

Environmental Policy Commission
September 19, 2016 Meeting
Consent Item Reports

Staff Report/Prepared by Lisa Goldberg

Old Town North

City staff continues to work with the SmithGroup to develop performance criteria for the Old Town North Eco-District. The study evaluated the feasibility of implementing "greener" standards than are currently required from developers for energy use, water use and habitat/green space/tree canopy elements within the OTN small area plan. Scenarios were presented showing gains and costs to attain tiered levels of standards, from moderate to aggressive over existing requirements. A report is expected in the fall.

Oronoco Outfall

The RFP was released for the dredging and capping project to remediate the contaminated sediments at the Oronoco outfalls that are associated with the former Manufactured Gas Plant. This project is expected to be completed April 15, 2017. The Army Corps of Engineers granted a two month extension on allowable river work activity for this project.

National Airport Aircraft Noise

During the August meeting of The National Airport Aircraft Noise Community Working Group, the group approved a recommendation to send the proposed south flow aircraft flight modifications to the Federal Aviation Administration (FAA) for review. The proposed solution takes south flowing aircraft departures eastward and three miles southward from its current route, before allowing turns overland. If deemed feasible following FAA's technical review, a route change could be implemented within a year. Staff presented an overview of the activity of the working group to City Council on September 13.

Solarize Alexandria

The second round of Solarize Alexandria launched in August and continues through October 9, 2016. The first program ran in fall 2015 and resulted in 15 solar installations totaling 70 kW within the city. The program is led by the Northern Virginia Regional Commission and LEAP, a nonprofit energy services organization based in Charlottesville, VA. The Solarize program is designed to make it easier and more affordable for residents to install solar power systems on Alexandria homes. The program provides a free home energy efficiency check-up and solar site assessment; discount pricing through bulk purchasing; project facilitation and qualified installation; financing and federal tax incentive options; and qualification for the City of Alexandria's Solar Energy Equipment Tax Exemption.

Energy Efficiency Building Codes

The IECC—America's Model Building Energy Code—is updated every three years in a year-long process that culminates with electronic voting by Governmental Member Voting Representatives (GMVRs) of the International Code Council (ICC). GMVRs are appointed by local governments. Within Alexandria, there are 8 voting representatives; staff within the Department of Code Administration and the Fire Marshals office. As buildings within the United States account for 39%

of the country's man-made greenhouse gas emissions, building codes are undoubtedly one of the most cost effective drivers for reducing greenhouse gas emissions.

November's electronic ICC ballot will contain over two dozen proposals that will rollback or trade away recent landmark efficiency gains, and very few proposals that boost efficiency. If rollbacks prevail, the 2018 IECC will be the first in history to be weaker than the code it updates, jeopardizing support from DOE and from efficiency experts who agree that steady progress is key to meeting long-term sustainability goals. With support from the Metropolitan Council of Governments Alexandria ICC GMVRs are being briefed to defeat the rollbacks and put the 2018 IECC on a path of increased energy efficiency.

Proposed Stormwater Management Fee: Staff Recommended Framework

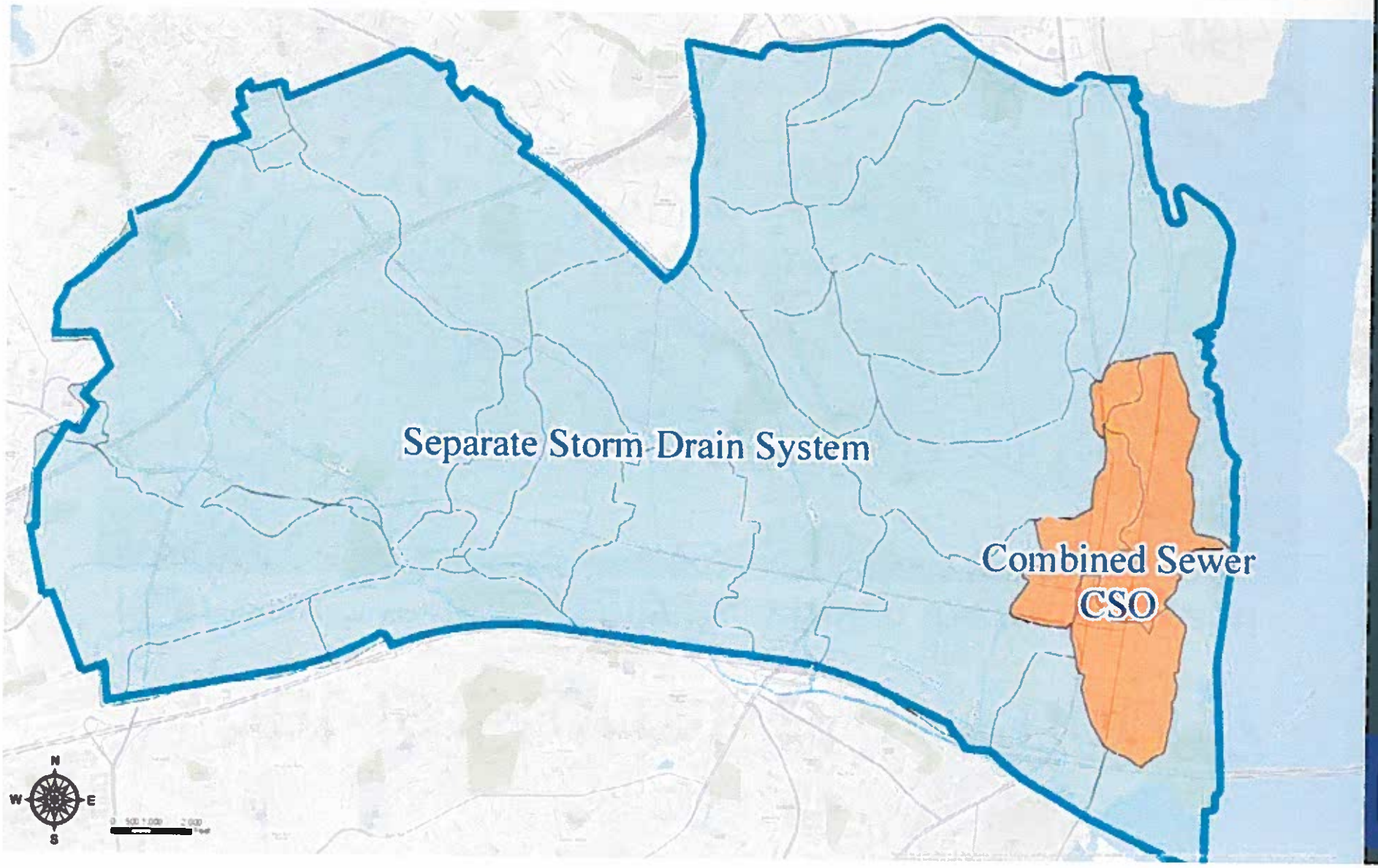
September 19, 2016

ECO-CITY ALEXANDRIA

Why Are We Here?

- Protect and improve the City's waterways and reduce flooding
  - Consistent with Eco-City Alexandria goals for stormwater management
- Address costly new unfunded state and federal stormwater mandates
- Explore stormwater funding alternative
- Staff received City Council direction to create recommendations for draft framework

Separate Sewer vs. Combined Sewer



What is Stormwater Runoff?

ECO-CITY ALEXANDRIA

Only Rain Down the Storm Drain!

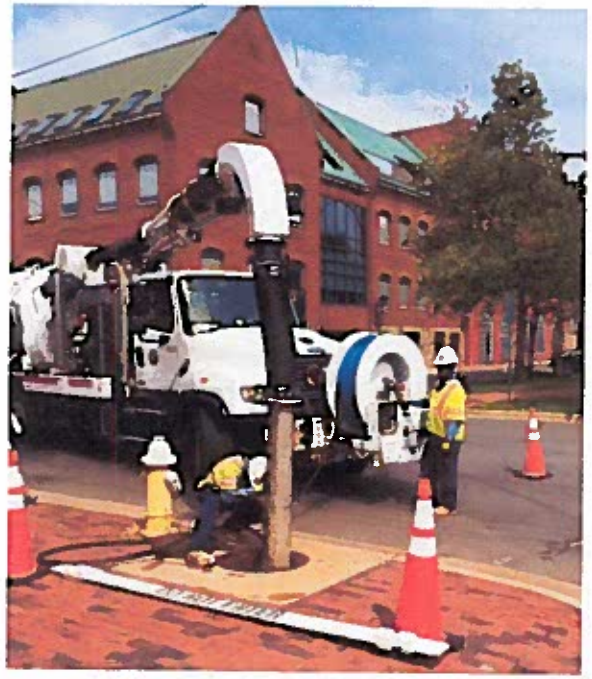
City's Stormwater Program Timeline

- 1970s – Stormwater detention required
- 1992 – Chesapeake Bay Act: required stormwater treatment
- 2003 – City's first Municipal Separate Storm Sewer System (MS4) permit
  - Regulates public infrastructure
- December 2010: Chesapeake Bay TMDL (Total Maximum Daily Load)
  - Set nutrient and sediment 'pollution budget' or 'clean up mandates'
- July 2013: Chesapeake Bay TMDL clean up mandates enforced in MS4 permit

City's Stormwater Management Program

- Stormwater Quality
- Flooding Protection and Drainage
- Chesapeake Bay TMDL Cleanup Mandates

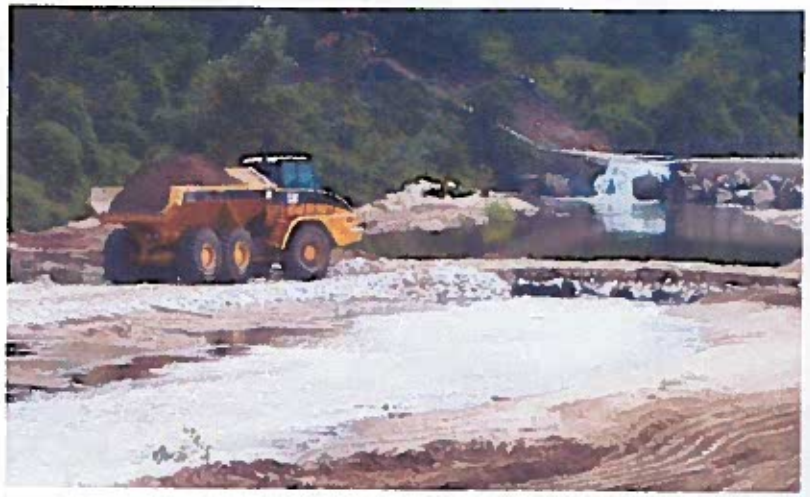
Stormwater Management Program



Catch basin cleaning, Prince Street

BMP Inspection, Fire Station 206

Plan Review



Channel maintenance, Cameron Run

Stormwater Management Program

Cameron Run flooding

Flood warning sign and lights

Improper concrete washout

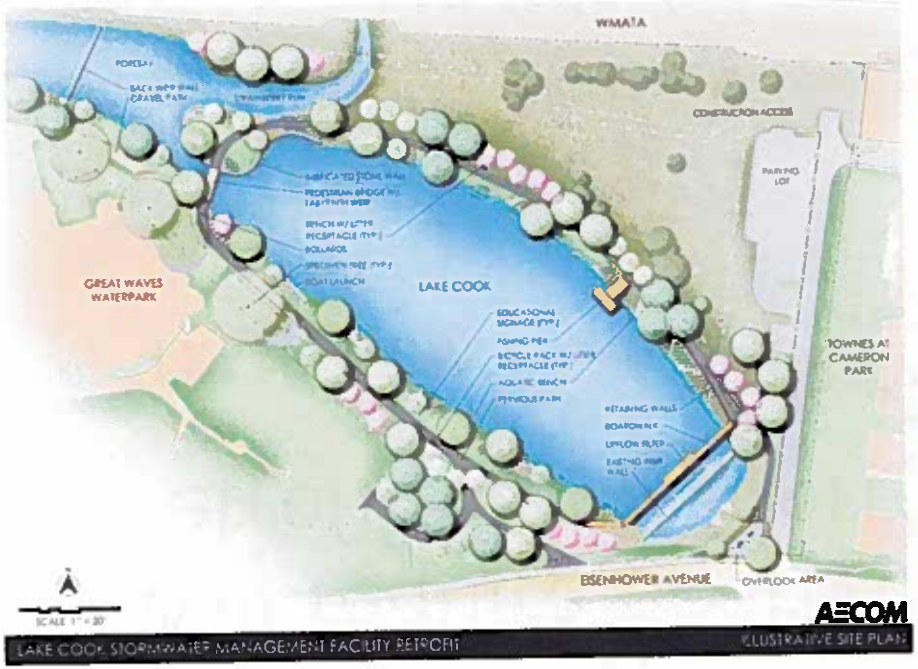
Chesapeake Bay TMDL Cleanup Mandates

- Will require nearly ¼ of the City to be retrofitted for stormwater treatment

MS4 Permit Cycle	**Portion of Total Reductions**	**Approx. Acres**
Phase I (2013 - 2018)	5%	120 - 130
Phase II (2018 - 2023)	35%	660
Phase III (2023 - 2028)	60%	1,450
Total All Phases	**100%**	**2,140**

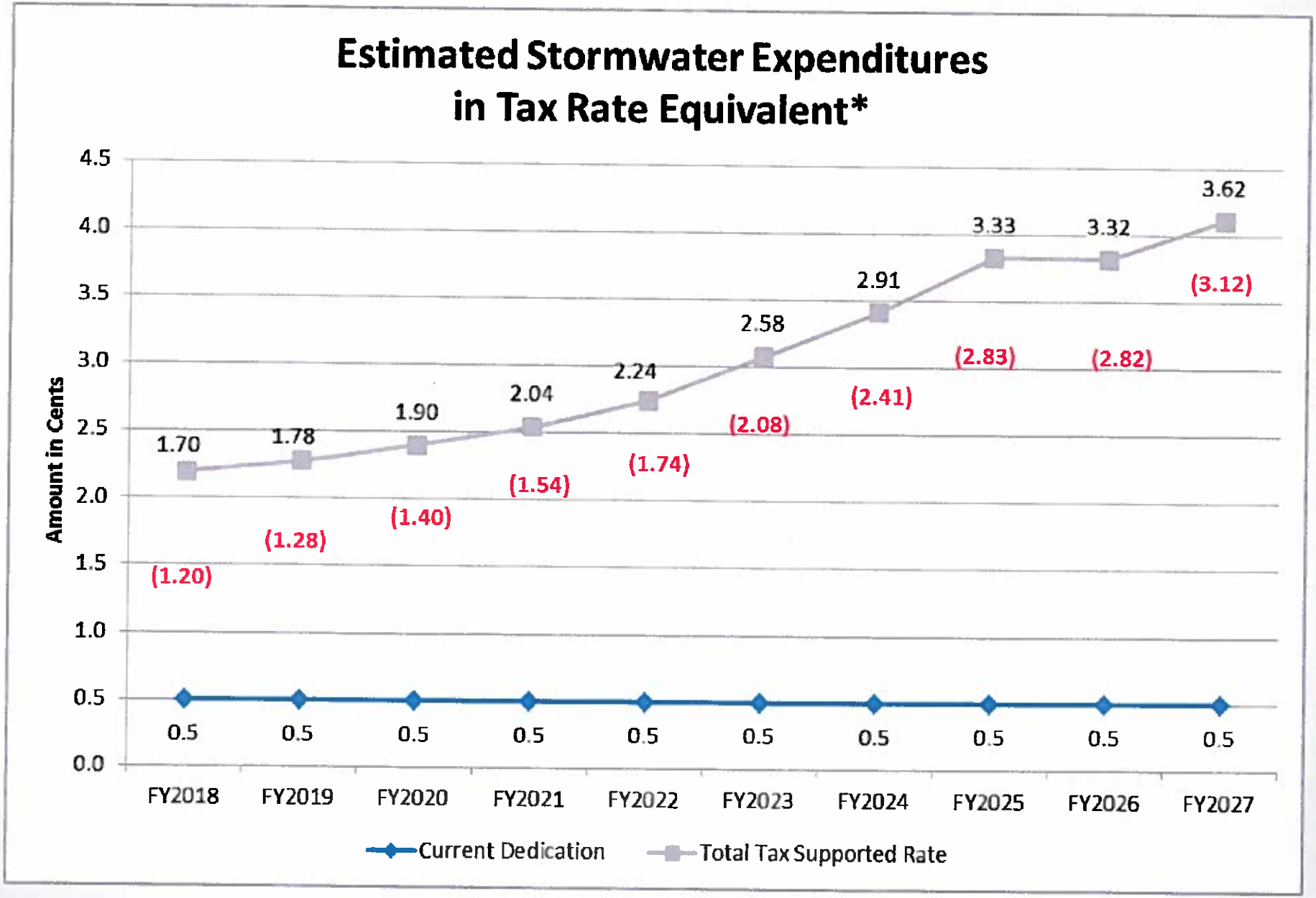
Stormwater Infrastructure Projects

Lake Cook Retrofit

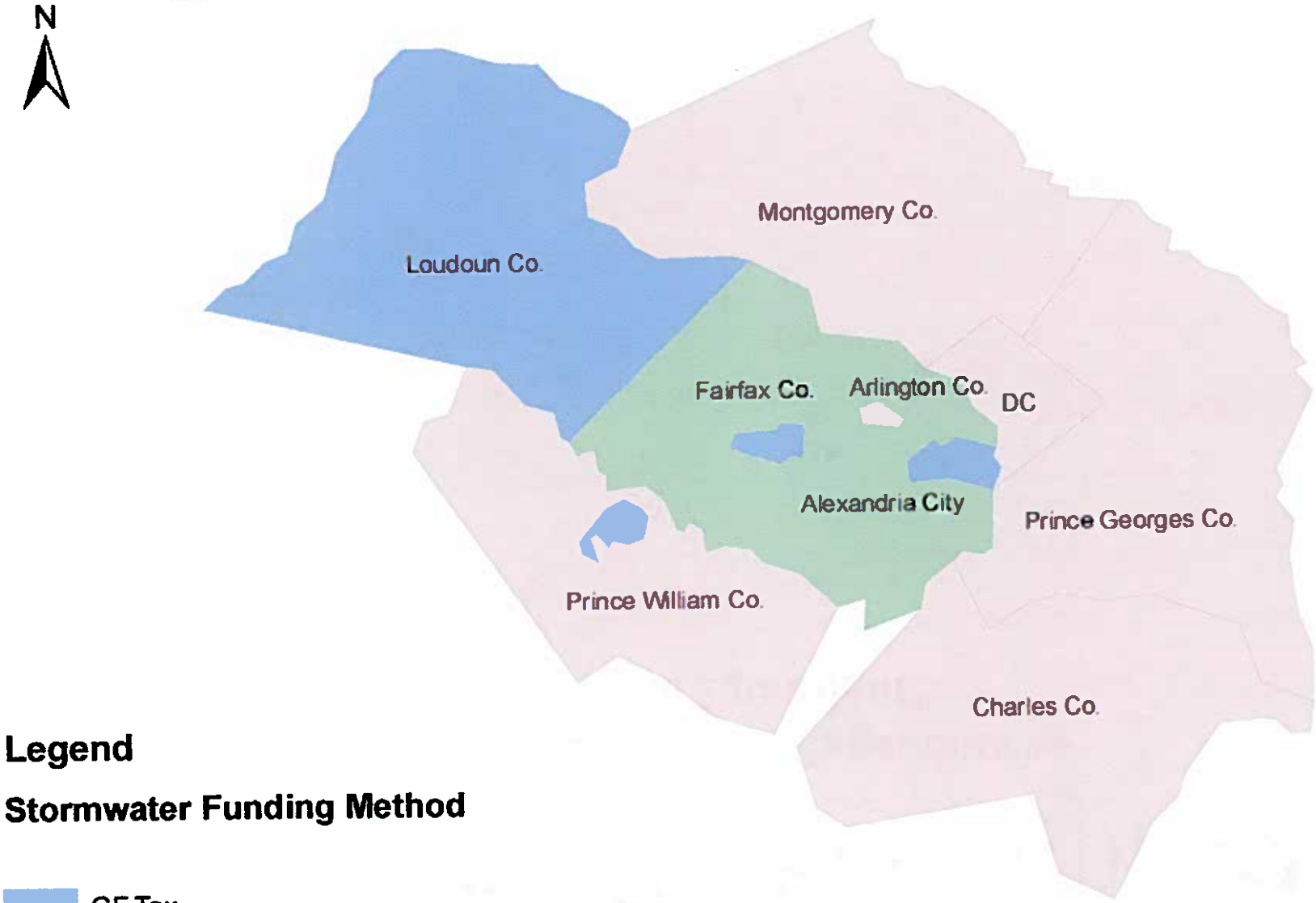


Ben Brenman Pond Retrofit

Estimated Tax Rate Impact



Regional Stormwater Funding



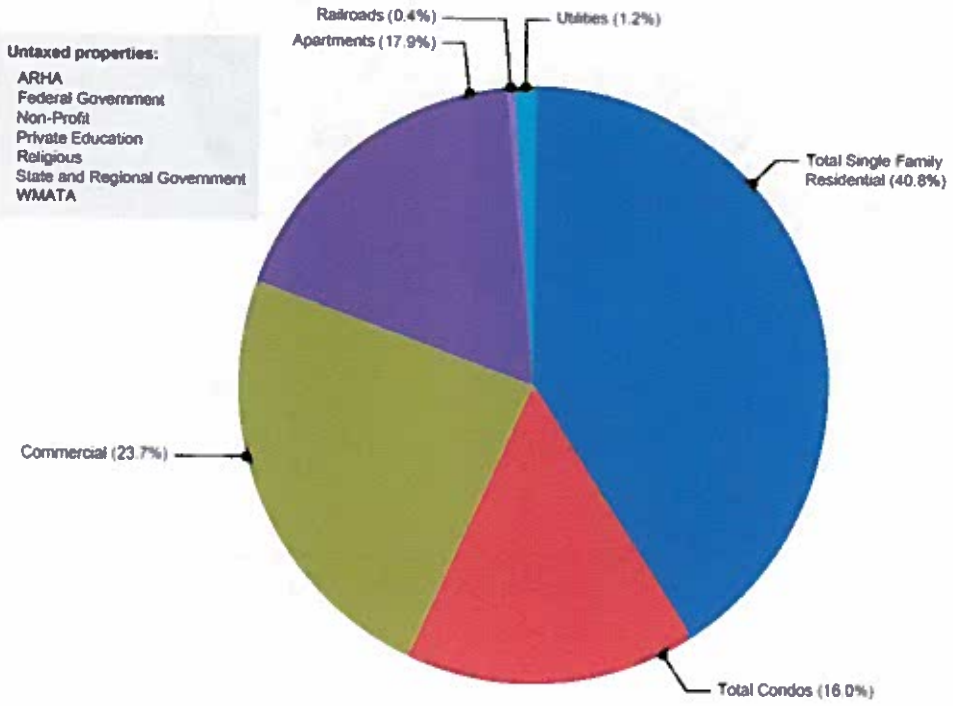
Legend

Stormwater Funding Method

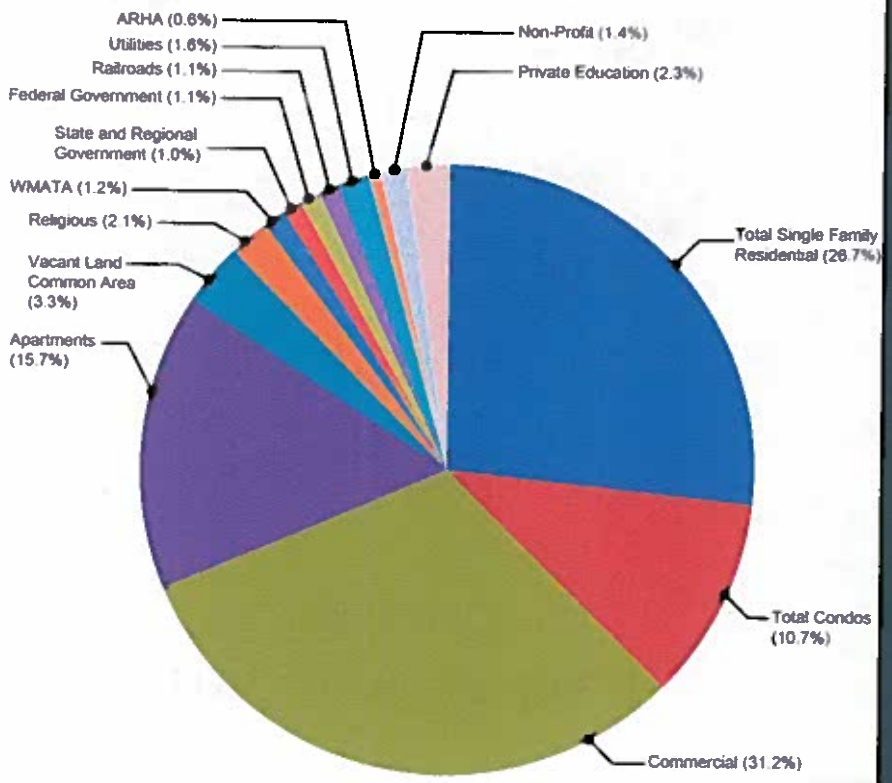
- GF Tax
- SW Utility
- Tax Distr.

Tax Rate vs. Impervious Contribution

Tax Rate Distribution

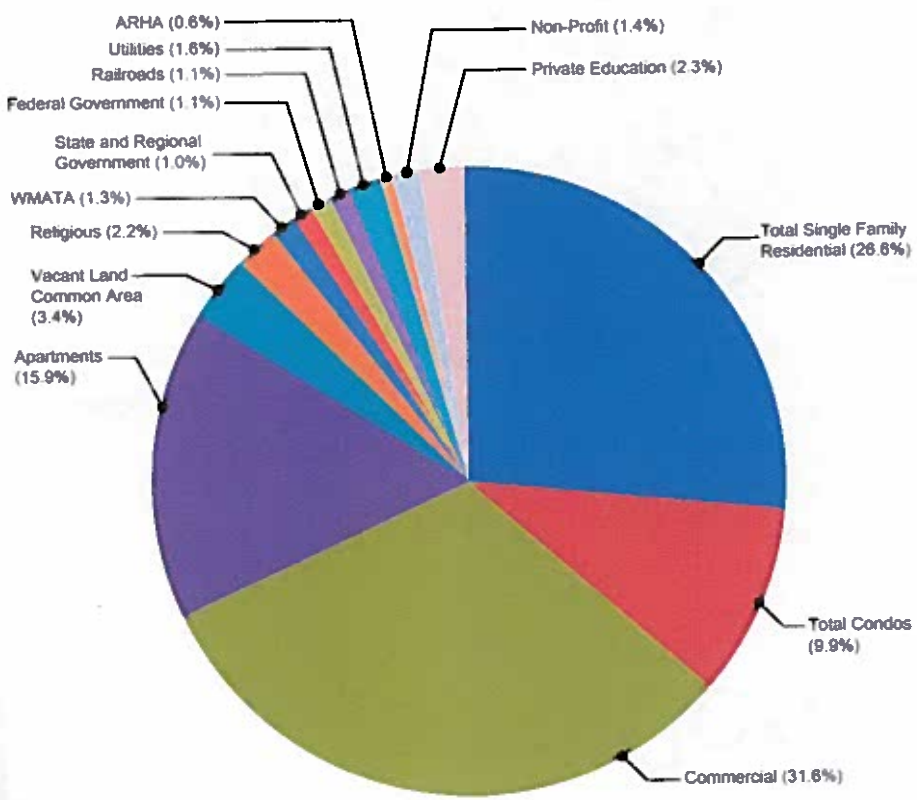


Impervious Surface Area Distribution

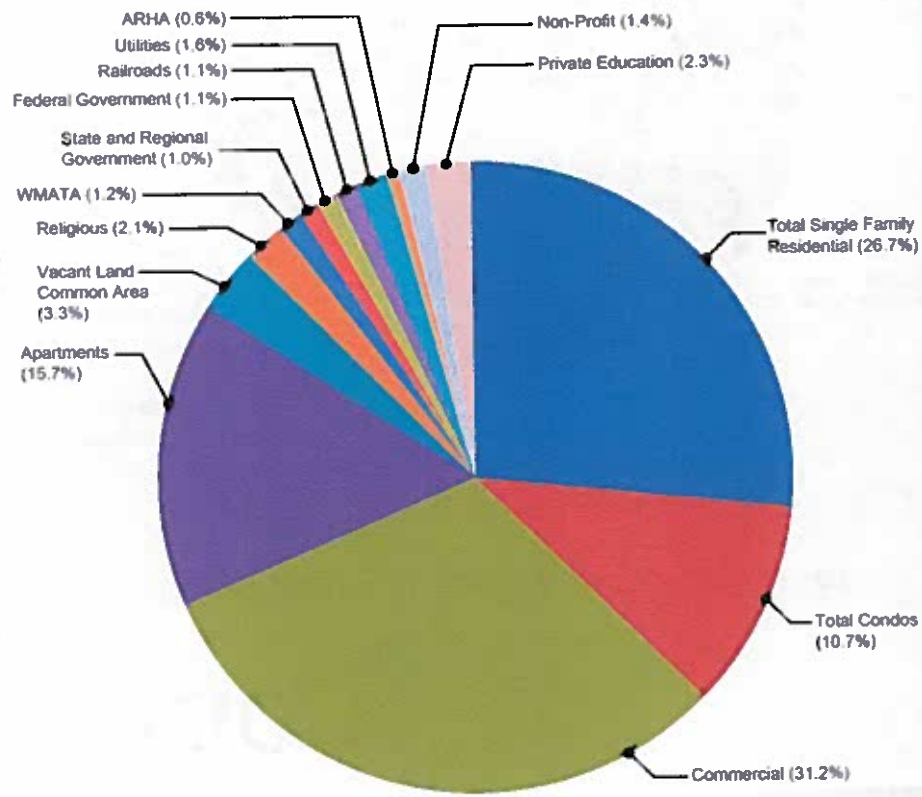


ERU and Impervious Area Distribution

ERU Distribution



Impervious Area Distribution



What is a Stormwater Utility?

- Virginia enabling legislation – 1992
- Fee for service, not a tax
- Dedicated funding source
- Based on a property's impervious area
- Revenue can only be used for stormwater
- Consistent with Eco-City goals

- **S**table
- **A**dequate
- **F**lexible
- **E**quitable

Focus of Staff Recommendations

- Council directed staff to create draft framework
- Capture stormwater program costs
- Create equitable stormwater funding
- Minimize administrative cost
- Maximize understandability

Proposed Fee Framework

- Fee Structure
- Billing Method
- Fee Reduction / Credit Policy

Fee Structure / Billing Units

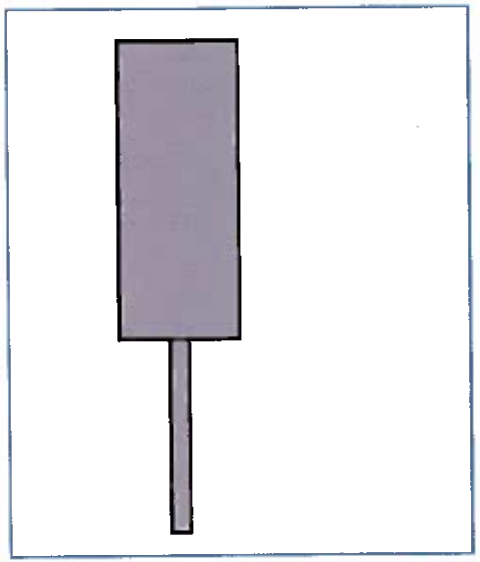
- Goals: Achieve equity, minimize administrative cost, maximize understandability

- Options Considered:
  - Variation of Single Family Residential (SFR) Tiered, Variable Non-Residential (NR)
  - Square Foot Ranges
  - Calculate Square Footage
  - Flat Fee (not calculated)

- Recommend: SFR Tiers, Variable NR
  - Median Single Family Detached at 2,062 s.f. = 1 Equivalent Residential Unit – ERU

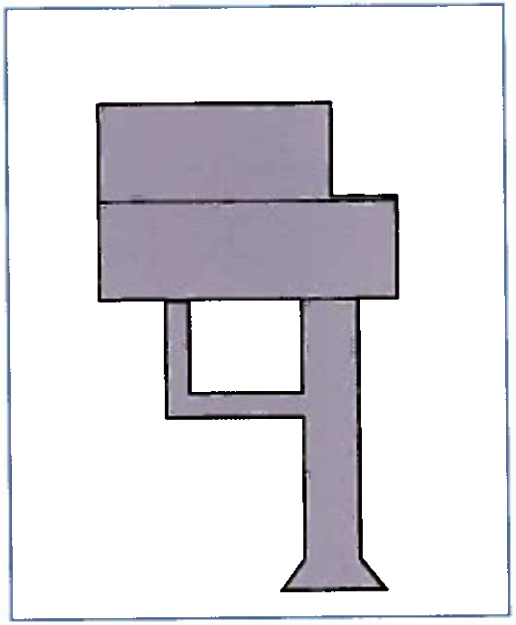
Recommended Fee Structure

Townhouse



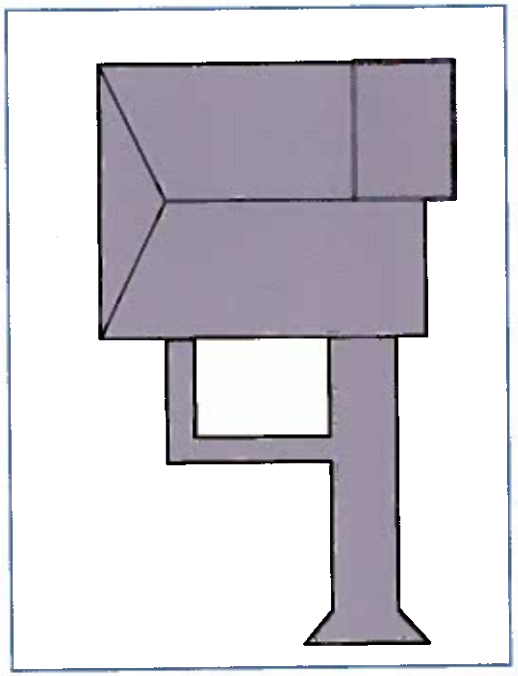
0.42 ERU = Single Family Attached and Semi-Detached

Typical Single Family Home



1 ERU = Single Family Detached

Large Single Family Home



1.67 ERU Single Family Detached > 2,800 s.f.

Proposed 1 Equivalent Residential Unit (ERU) = 2,062 s.f.

Preliminary Fee Estimates

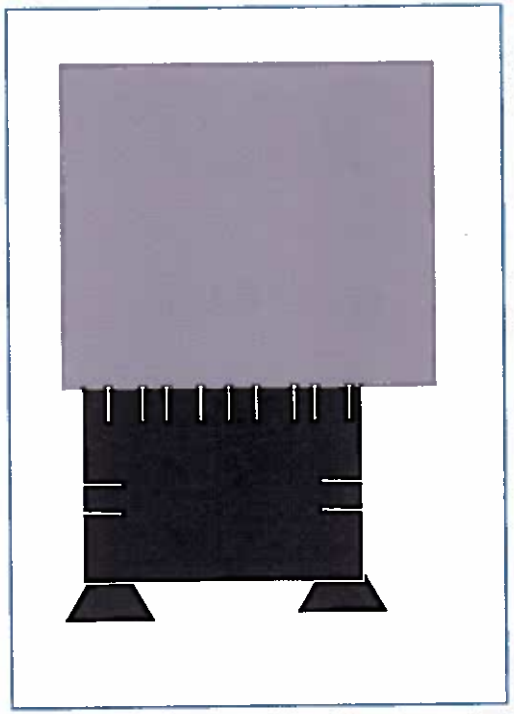
Tier	Property Type	ERU Portion (1 ERU= 2,062 sf)	Est. Rate Range (yr.)	Est. Rate Range (mo.)
1	Condos	0.28	$35-$40	$3
2	Townhome	0.42	$50-$60	$4-$5
3	Typical Single Family Home	1	$120-$145	$10-$12
4	Large Single Family Home	1.67	$200-$242	$18-$20

- Preliminary estimate will be further refined
- Billing Method recommendation: incorporate into the real estate bill

Proposed Non-Residential Sample Fee Calculation

Calculate variable fee:

- Building and parking lot impervious area = 6,168 s.f.
- 1 ERU = 2,062 s.f.
- Total ERUs = 6,168/2,062 = 3
- 3 x $120 to $145 per yr. = $360 to $435 per year or $30 to $37 per month



Impervious Area = 6,168 s.f.

Tax Rate Equivalent vs. Proposed SWU Range of Rates

Non-Residential (Annual)

Sample Property Description	Assessed Value ($millions)	Impervious Areas (ft^2)	Funds to SWM from Real Estate Tax	SWU Fee (at $120)	SWU Fee (at $145)
Large Apartment Building Complex	$140.00	962,831	$27,050	$56,033	$67,706
Small Apartment Building Complex	$17.52	106,521	$3,386	$6,199	$7,491
Restaurant and Parking Lot	$1.25	5,588	$242	$325	$393
Small Retail Building Complex	$8.49	38,231	$1,641	$2,225	$2,688
Large Retail Building Complex	$69.83	84,886	$13,493	$4,940	$5,969
Old Town Restaurant	$2.75	2,184	$532	$127	$154
Old Town Business	$1.47	2,754	$284	$160	$194
Single Commercial Building with Parking Lot	$0.88	12,673	$169	$737	$891

Tax Rate Equivalent vs. Proposed SWU Range of Rates

Non-Profit and Religious (Annual)

Sample Property	Assessed Value (millions $)	Imp. Area (ft^2)	SWU Fee (at $120)	SWU Fee (at $145)
Large Private Religious Affiliated School	$48.11	877,756	$51,082	$61,724
Railroad	N/A	1,291,285	$75,148	$90,803
Large Church	$22.31	222,032	$12,921	$15,613
Non-Profit Organization in Old Town	$1.53	4,079	$237	$287
Private Religious Affiliated School	$29.74	115,196	$6,704	$8,101
Church	$15.87	34,166	$1,988	$2,403
Church	$0.69	19,599	$1,141	$1,378
Non-Profit Organization	$1.69	5,800	$338	$408
Large Non-Profit Organization	$66.07	174,573	$10,159	$12,276

Billing Method

- Goals: Ease of implementation, minimize delinquency, keep administrative cost low, and fewer data needs

- Options Considered:
  - Virginia American Water
  - Alex Renew
  - Stand-alone

- Recommendation: Incorporate into the Real Estate Bill

Proposed Fee Reduction / Credit Policy

- Staff recommends two phases

- Phase 1 (Non-Residential)
  - Stormwater quality facility best management practices (BMPs)
  - Stormwater quantity flood control facilities
  - Non-structural BMPs
- Phase 2
  - Menu of Single-Family (Residential) BMPs
  - Voluntary BMPs per design standards

Types of Residential BMPs

Rain barrel

Rain garden

Vegetated green roof, City Hall

Permeable Pavement

Source: EPA

Public Outreach Framework

Council recommended Framework

- New dedicated webpages
- FAQs
- Social media
- Meetings
- EPC
- Targeted groups
  - Chamber of Commerce
  - Federation of Civic Associations, and individual
  - Non-profits and Religious
  - Large property owners
  - Large parcel owners
  - Residents

Next Steps

Sept.	Nov. 2016	May 2017	Fall 2017	May 2018
Staff Recommend Draft Stormwater Utility Framework Public Outreach	Propose SWU Framework during City Council Budget Process Refine the Draft Rate	City Council Consideration to Adopt SWU as part of the Budget Process (and Enabling City Ordinance)	Develop Administration Process	First Billing

EPC Role in the Process

- Help with Public outreach
  - Initial sounding board for materials
- Convener for one or two of the big public meetings
  - Public Hearings?
- Feedback on the Credit Program
- Seeking letter of support for Council

Questions

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T&ES, Stormwater Management
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jesse.maines@alexandriava.gov

Ben Brenman Pond

City of Alexandria, Virginia

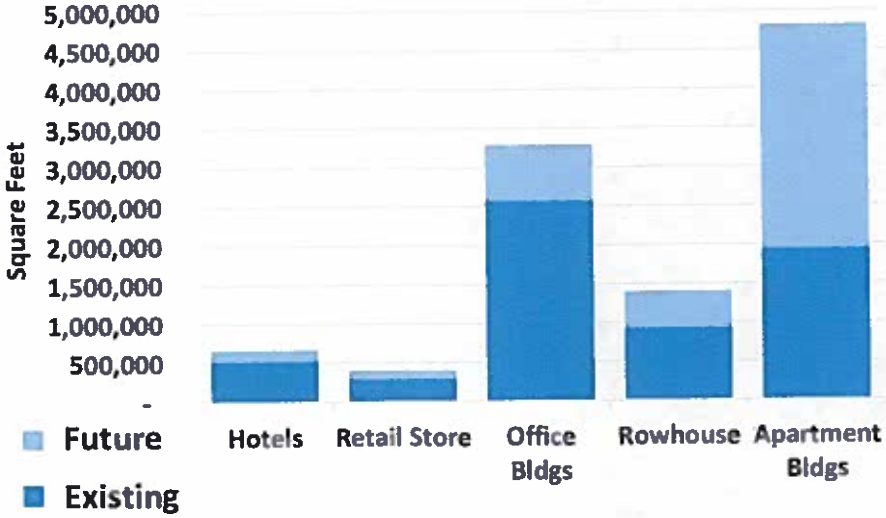
Old Town North Small Area Plan

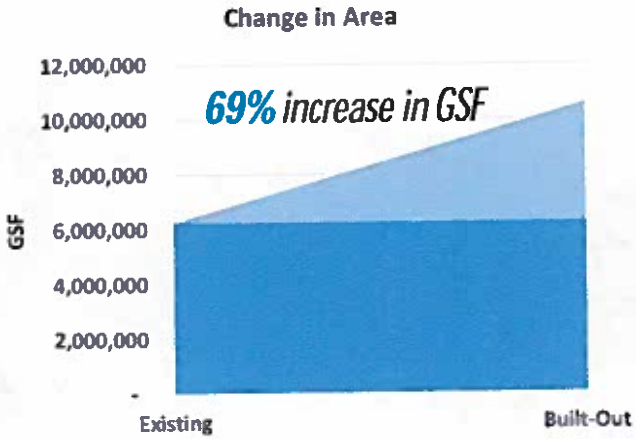
ECODISTRICT

Presentation to the
Environmental Policy Commission
September 19, 2016

SMITHGROUP JJR

Old Town North Small Area Plan EcoDistrict





Energy - Carbon + Renewables

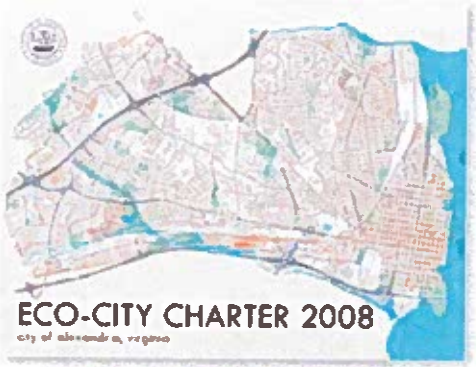
Water

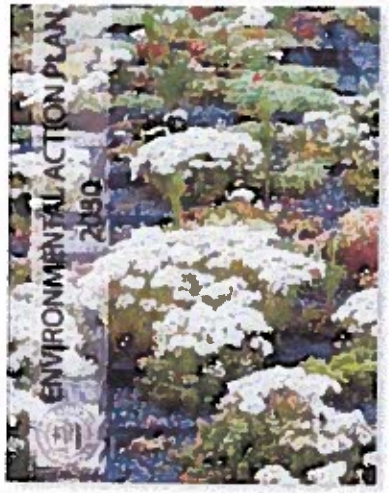
Stormwater

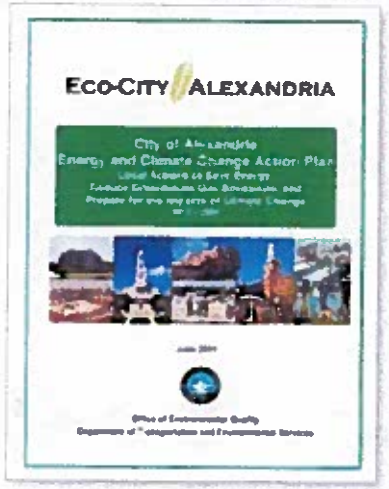
Tree Canopy + Habitat

Citywide Goals and Targets

ECO-CITY CHARTER GOALS	
Energy Carbon Renewables	• Reduce energy consumption through conservation. • Conserve energy and achieve carbon-neutrality. • Produce energy locally and sustainably, through installation and promotion of the use of renewable and efficient energy technologies. • Convert existing uses of fossil-fuel energy to renewable energy.
Water	• Promote public health by continuing to ensure safe and reliable drinking water • Advocate water conservation and reuse in order to preserve the quantity, not just the quality, of our water resources.
Stormwater	• Use environmentally responsible flood management, stormwater control, and wastewater treatment to protect the public's health and property. • Promote - through sustainable practices - safe, swimmable, and fishable waterways for its citizens and visitors, and enhance the ecological integrity of its downstream waters, by minimizing stormwater runoff and pollutants draining to the Potomac River and Chesapeake Bay. • Identify ways to reduce/eliminate nutrient loading to waterways.
Resilience/ Sea-Level Rise	• Make policy, infrastructure, and land use decisions that prepare for flooding, drought, disease, and other impacts to humans and wildlife from environmental threats such as climate change.
Urban Tree Canopy	• Be proactive in protecting public health and ecological quality by lowering the amount and number of sources of air, light, and noise pollution. • Enhance their ability to manage outdoor air quality from damaging pollutants in its jurisdiction and will consider emerging threats when establishing outdoor air quality goals and regulatory approaches. • Identify ways to reduce/eliminate nutrient loading to waterways.
Habitat	• Protect, enhance, and increase Alexandria's open space and green infrastructure including wildlife habitat, parks, trails, tree canopy, and watersheds.







Citywide Goals and Targets

ENVIRONMENTAL ACTION PLAN TARGETS	
Energy Carbon Renewables	• By 2010, the City will purchase 5% of electricity needs through green certificates. • By 2012, reduce Business As Usual (BAU) emissions by 10% below 2012 level. • By 2015, reduce the per capita energy use in Alexandria by 15%. • By 2015, track energy use of 30% of multi-family residence units. • **By 2020, reduce emissions by 20% below 2005 levels.** • By 2020, 25% of the City's energy portfolio will consist of clean, renewable energy sources. • **By 2020, all new buildings will achieve LEED Gold certification.** • **By 2020, 60% of all existing buildings will achieve a 20% energy consumption reduction** • By 2025, track energy use of 60% of multi-family residence units. • By 2025, existing City buildings in the aggregate are 25% more energy efficient. • **By 2025, all new buildings will achieve LEED Platinum standards.** • By 2030, 50% of the City's energy portfolio will consist of clean, renewable energy sources. • By 2030, track energy use of 100% of multi-family residence units. • **By 2030, all new buildings will be carbon neutral** • By 2050 at least an 80% reduction in emissions from 2005 levels.
Water	• By 2015, reduce per-capita water consumption by 10% • By 2020, all new buildings will achieve LEED Gold certification. • By 2025, all new buildings will achieve LEED Platinum standards
Stormwater	• By 2015, establish mechanism for long-term dedicated funding for maintaining and improving stormwater infrastructure by 2013. • By 2020, retrofit 70% of feasible City facilities with BMPs and explore water reuse operations. • By 2030, retrofit 100% of feasible City facilities with BMPs.
Urban Tree Canopy + Habitat	• By 2015, preserve and/or acquire the remaining 35 acres of open space to complete 100-acre goal of the Open Space Master Plan. • Ensure that all plantings on City property are non-invasive and incorporate native Plants. • By 2020, achieve 40% tree canopy coverage.

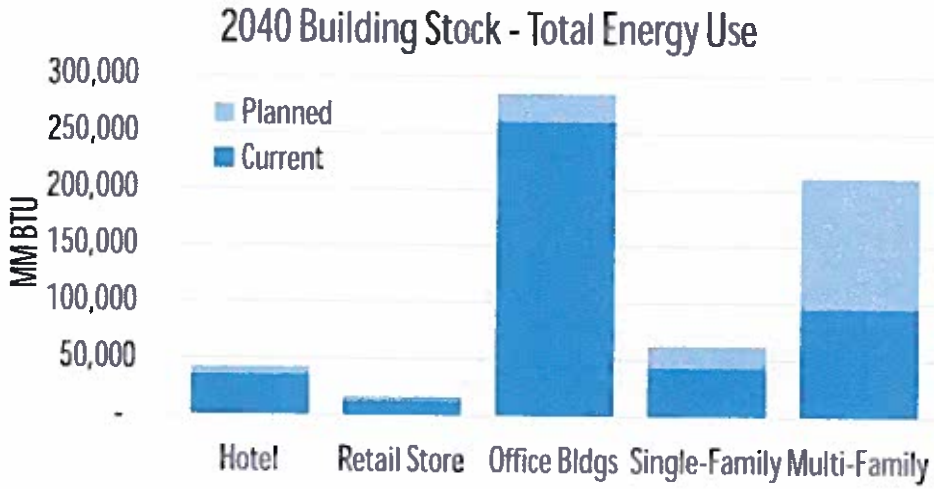
Analysis based on Existing and Potential Future Development, then . . .

TARGETS		
LOW	MEDIUM	HIGH
TIERED TO PROVIDE FLEXIBILITY		

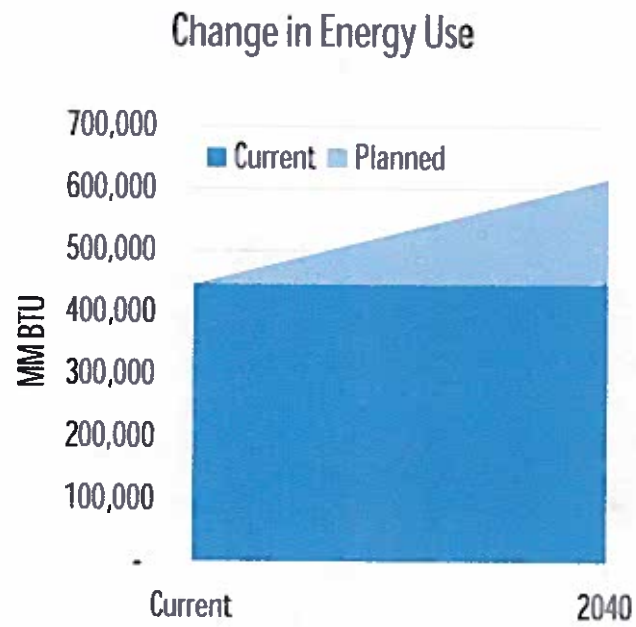
STRATEGIES		
LOW	MEDIUM	HIGH
RETURN ON INVESTMENT 0-5 YEARS	RETURN ON INVESTMENT 5-10 YEARS	RETURN ON INVESTMENT 10-20 YEARS

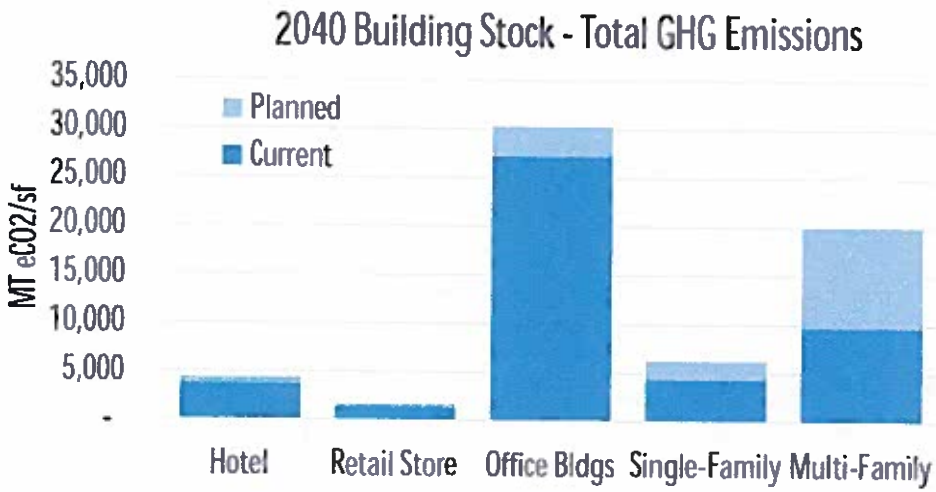
ENERGY/CARBON/RENEWABLES

Energy Use and GHG Emissions

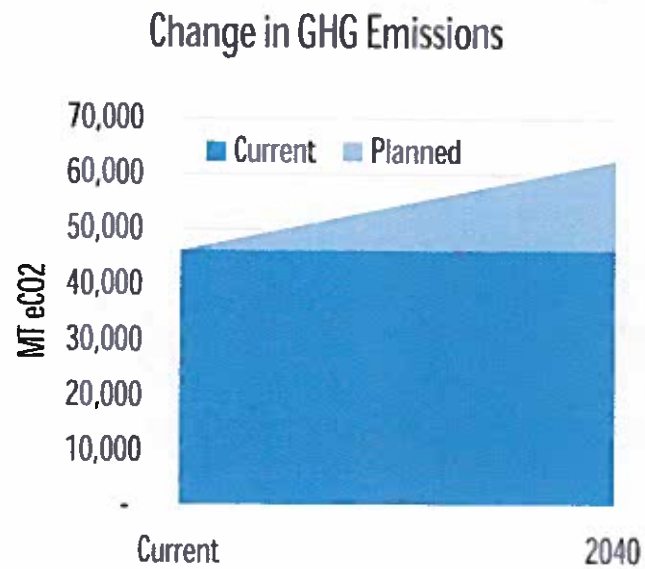


***38%** increase in Energy Use*





***35%** increase in GHG Emissions*



Energy Targets

	ENERGY TARGETS FOR EXISTING BUILDINGS		
	LOW	MEDIUM	HIGH
1	Provide incentives to encourage existing building owners to improve the energy consumption of their properties by X%.	By 2020, all existing commercial properties to disclose their energy use publically	By 2020, all existing commercial properties to disclose their energy use publically
		By 2030, all commercial properties reduce their energy use by X% over 2020 levels.	By 2030, all commercial properties reduce their energy use by X% over 2020 levels.
2	Require that all existing buildings when they change hands, are renovated to current code.	Require that all existing buildings when they change hands, are renovated to exceed current energy code by X%.	Require that all existing buildings when they change hands, are renovated to exceed current energy code by X%.
3	When seeking to replace existing roofs, property owners must ensure that each rooftop maximizes its productive space.	Provide a City-Wide Solar Co-Op that existing home owners can take advantage of.	Require that all existing roofs when buildings change hands, incorporate photovoltaics.

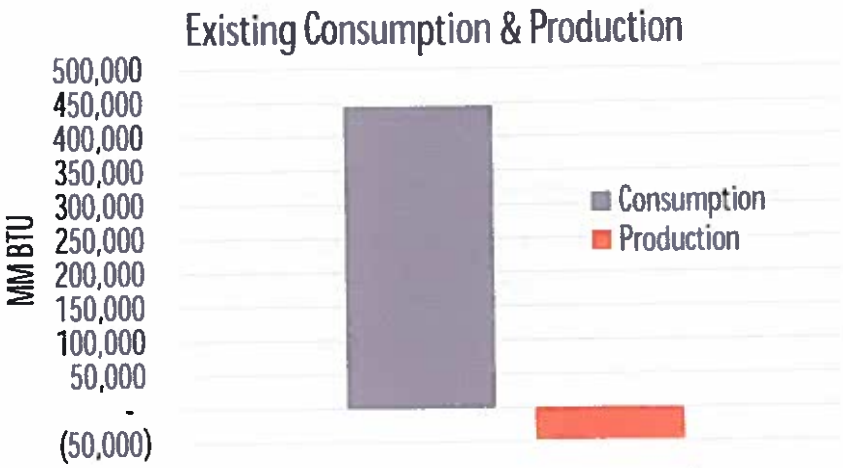
	ENERGY TARGETS FOR FUTURE PLANNED BUILDINGS		
	LOW	MEDIUM	HIGH
4	Between now and 2025, all new projects and major renovations achieve an energy consumption that is X% better than current code (assumed IECC 2015)	Between now and 2025, all new projects and major renovations achieve an energy consumption that is X% better than current code (assumed IECC 2015)	Between now and 2025, all new projects and major renovations achieve an energy consumption that is X% better than current code (assumed IECC 2015)
5	Planned development and major renovations constructed after 2025 achieve an energy consumption that is X% better than CBECS 2003 Average	Planned development and major renovations constructed after 2025 achieve an energy consumption that is X% better than CBECS 2003 Average	Planned development and major renovations constructed after 2025 are X.
6	All planned development must ensure that each rooftop is designed to accommodate photovoltaics, and provide X% of available roof with photovoltaics.	All planned development must ensure that each rooftop is designed to accommodate photovoltaics, and provide X% of available roof with photovoltaics.	Planned development to provide X% of available roof with photovoltaics
7	All planned development must purchase Green Power to provide X% of total energy use.	All planned development must purchase Green Power to provide X% of total energy use.	All planned development must purchase Green Power to provide X% of total energy use.

Energy Reduction Strategies

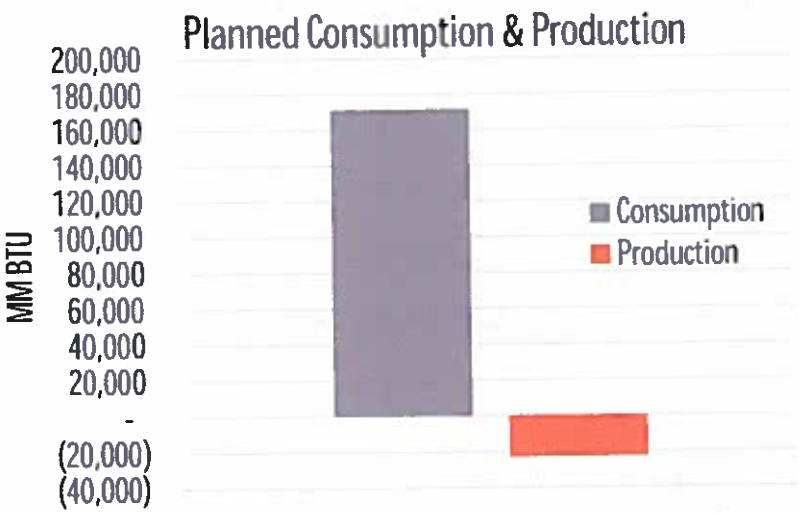
ENERGY STRATEGIES FOR EXISTING BUILDINGS		
LOW	MEDIUM	HIGH
Lamp replacements	Items from "Low Column" +	Items from "Medium Column" +
Energy Audits	Envelope Improvements	Window replacements
Equipment replacements	Light fixture and ballast replacements	HVAC equipment upgrades
Showerhead replacements		
Programmable Thermostats		

ENERGY STRATEGIES FOR FUTURE PLANNED BUILDINGS		
LOW	MEDIUM	HIGH
Exterior sun-shading	Items from "Low Column" +	Items from "Medium Column" +
Optimized window-to-wall ratio	Thermally-improved glazing	Radiant Conditioning with DOAS
Infiltration barriers and envelope commissioning	Optimized wall insulation	Natural Ventilation
Optimized roof insulation	Daylighting controls on lighting	Solar Domestic Hot Water
High-performance lighting	Plug-load controls	Photovoltaics
Energy Star equipment	Total Energy Recovery	HVAC upgrades
Demand Controlled Ventilation	Drain Heat Recovery	Ground Source Heat Pumps
Hot Water Demand Reduction	Co-generation / District Energy	

Solar Photovoltaics

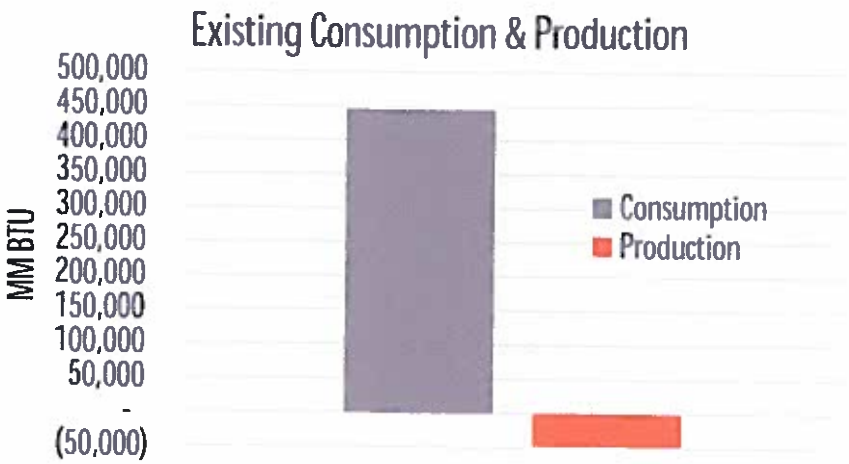


PVs can supply 10.6% of demand

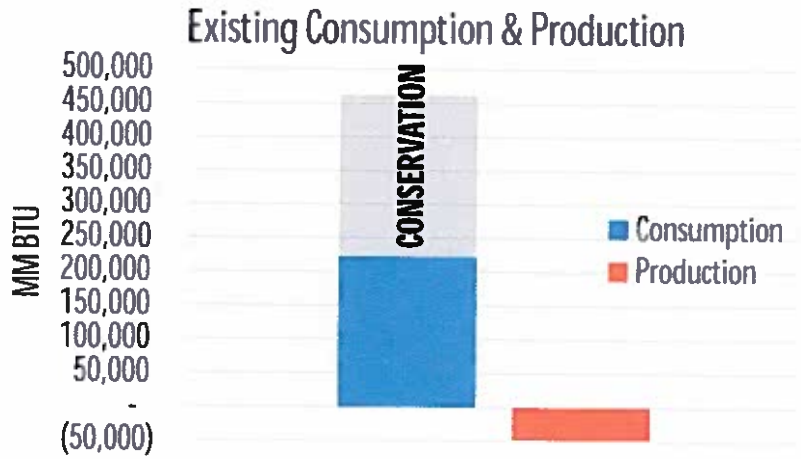


PVs can supply 13.2% of demand

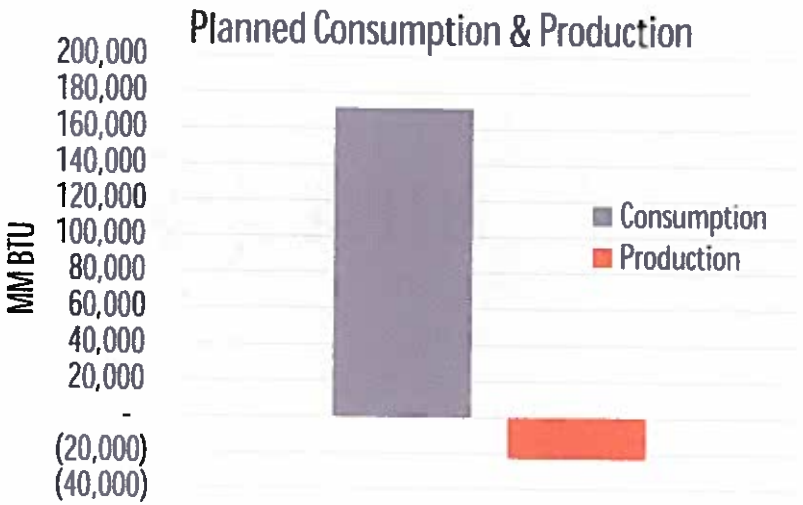
Solar Photovoltaics



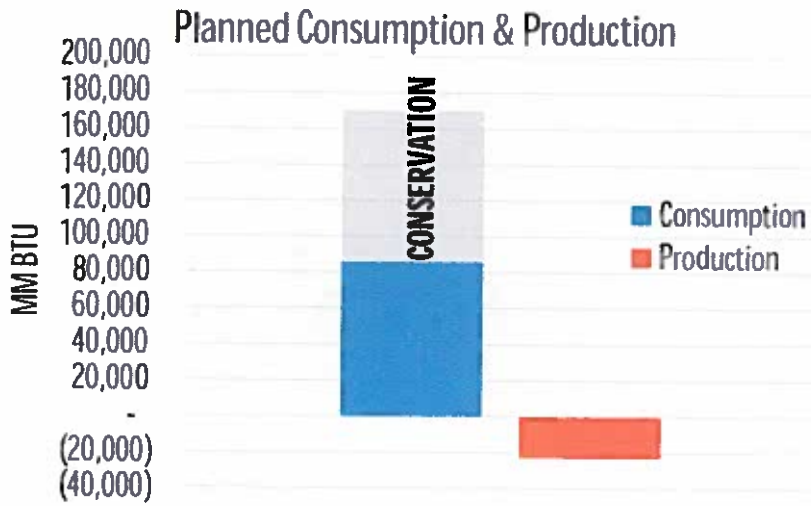
PVs can supply 10.6% of demand



PVs can supply 21.1% of demand



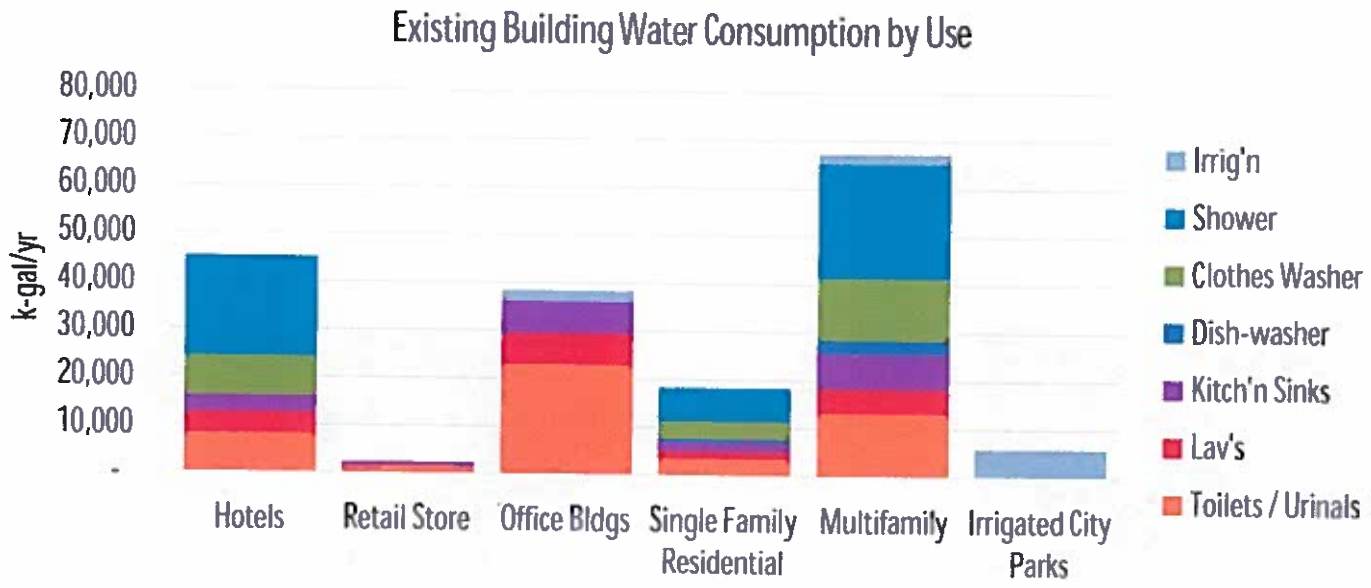
PVs can supply 13.2% of demand

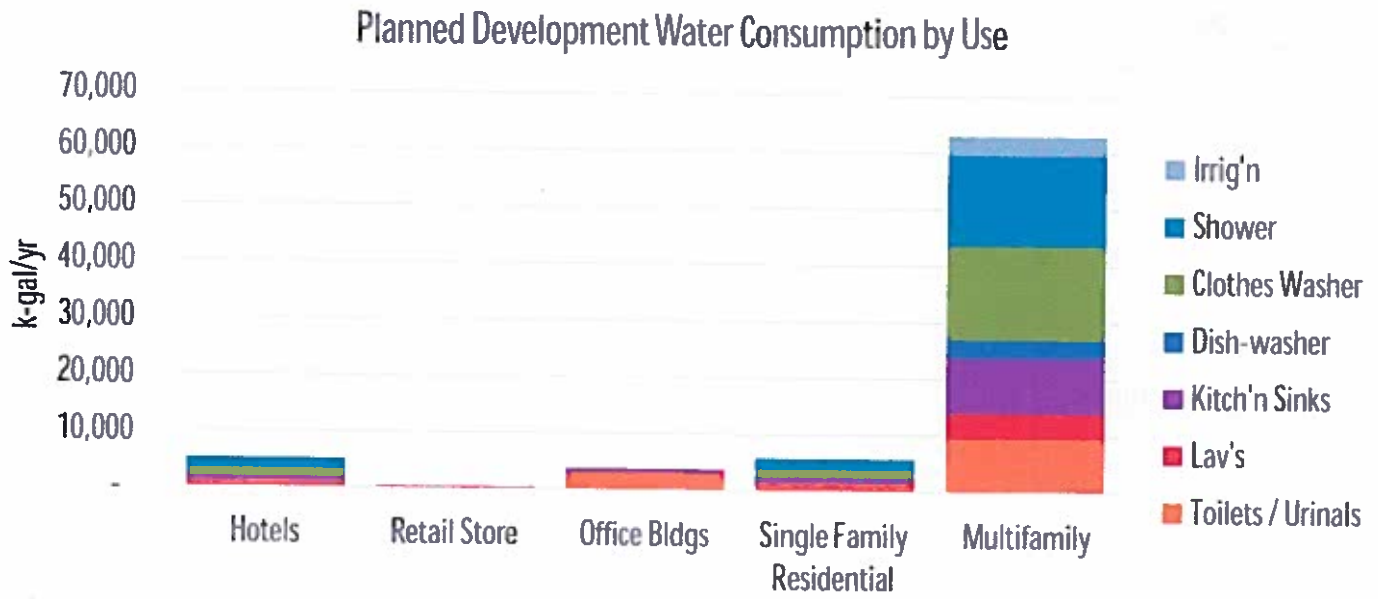


PVs can supply 26.4% of demand

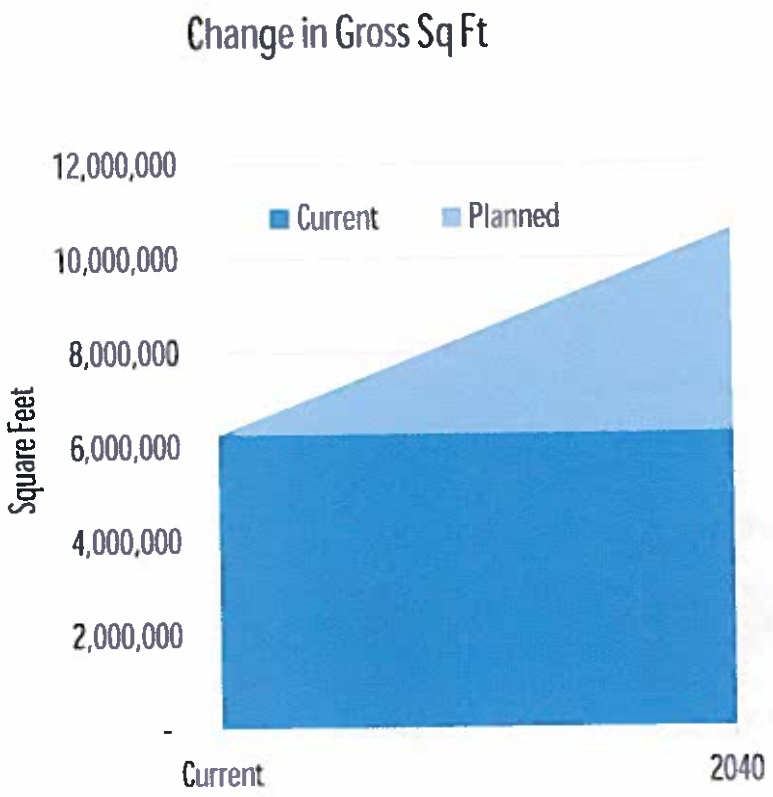
WATER

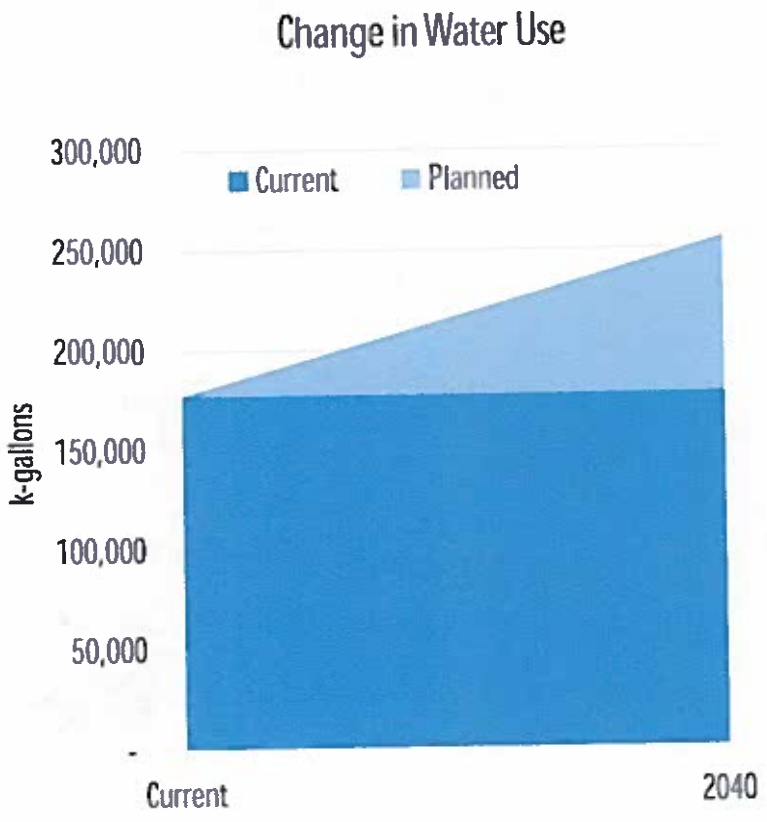
Water Consumption





Water Consumption





***69%** increase in Gross Square Footage*

***30.5%** increase in Water Use*

Water Conservation Targets

	WATER TARGETS FOR EXISTING BUILDINGS AND GREEN SPACE		
	LOW	MEDIUM	HIGH
1	Provide incentives to encourage existing building owners to reduce the water consumption of their properties by X%.	By 2020, require all existing properties to install the latest smart metering technology. Provide incentives to encourage existing building owners to reduce the water consumption of their properties by X%.	Require that all existing buildings when they change hands, are renovated to replace all toilets, urinals, faucets, and showers with fixtures meeting the WaterSense label.
2	Reduce potable water to irrigate City parks by X%.	Require that all existing buildings when they change hands, are renovated to exceed current energy code by X%.	Eliminate potable water used to irrigate City parks
	WATER TARGETS FOR FUTURE BUILDINGS AND GREEN SPACE		
	LOW	MEDIUM	HIGH
3	All new projects and major renovations (except single family residential) must achieve a X% reduction in regulated water use.	All new projects and major renovations (except single family residential) must achieve a X% reduction in regulated water use.	All new projects and major renovations (except single family residential) must achieve a X% reduction in regulated water use.
4	If irrigation is used in all planned development, it must use a WaterSense labeled irrigation controller.	Reduce potable water use for irrigation in all new development except single-family homes by X%.	Eliminate potable water use for irrigation in all new development except single-family homes.

Water Conservation Strategies

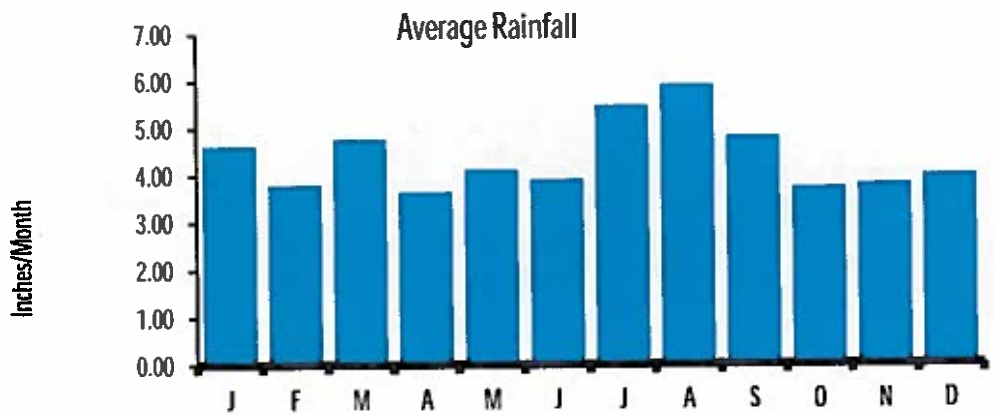
	WATER CONSERVATION STRATEGIES FOR EXISTING BUILDINGS AND PARKS		
	LOW	MEDIUM	HIGH
BUILDINGS	Add Aerators to Existing Faucets	Items from "Low Column" +	Items from "Medium Column" +
	Low Flow Showerheads	Flush Valve/Fixture Retrofit	Rainwater Harvesting
	Water Conservation Kits	Smart Metering Technology	
PARKS AND GREEN SPACES	Water Sense labeled irrigation controller	Landscape Selection Tuning	Rainwater Harvesting for Irrigation

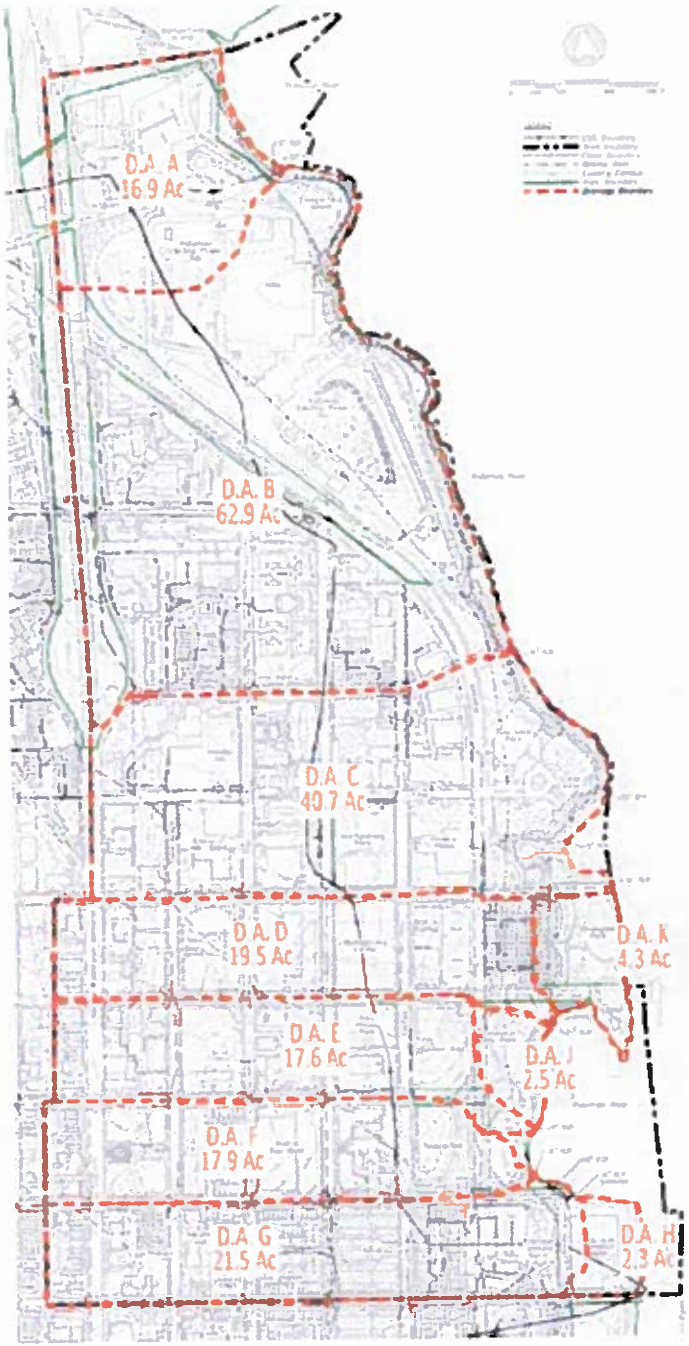
	WATER CONSERVATION STRATEGIES FOR FUTURE PLANNED BUILDINGS AND PARKS		
	LOW	MEDIUM	HIGH
BUILDINGS	High Efficiency Plumbing Fixtures	Items from "Low Column" +	Items from "Medium Column" +
	Smart Metering Technology	Purple Pipe for District Scaled development	Rainwater Harvesting
PARKS AND GREEN SPACES	Water Sense labeled irrigation controller	Drought Tolerant Landscapes	Rainwater Harvesting for Irrigation

STORMWATER

Stormwater Conditions

- 39.4 inches average yearly rainfall
- 17 acre-feet of stormwater to be managed
- Majority currently managed through existing closed-pipe system
- 78% of storm drains and sewers are combined
- 60-70 combined sewer overflows per year



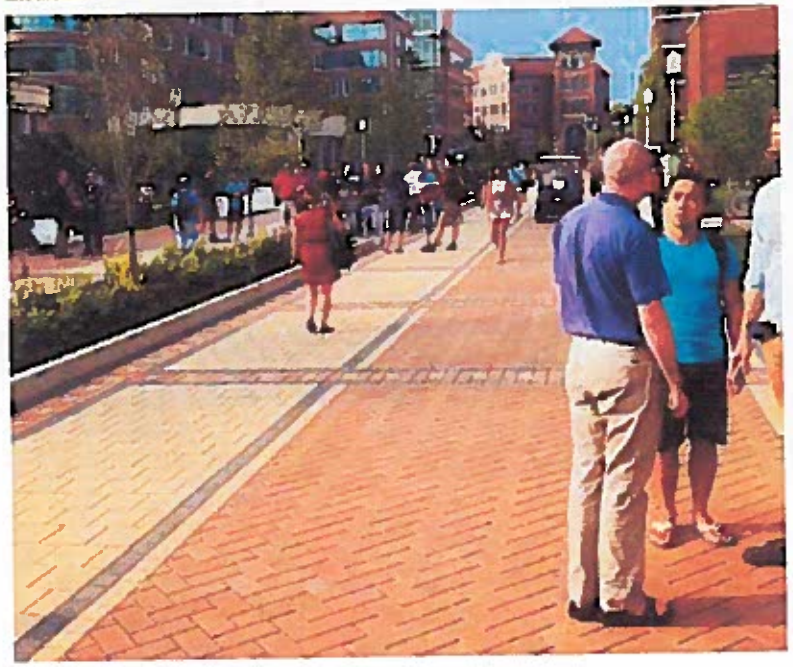


Stormwater Targets

STORMWATER TARGETS		
LOW	MEDIUM	HIGH
Reduce impervious ratio by X%	Reduce impervious ratio by an additional X% (X% total)	Reduce impervious ratio by an additional X% (X% total)
Potential run-off retention of X% over entire OTN area: Approx. X acre ft. or X gallons	Potential run-off retention of additional X% over entire OTN area: Approx. X acre ft. or X gallons	Potential run-off retention of additional X% over entire OTN area: Approx. X acre ft. or X gallons
By the year 2025, all new development to have SWM in place to meet compliance based on the standard X" storm.	By the year 2025, all new development to have SWM in place to exceed compliance by X% based on the Xth percentile X" storm.	By the year 2025, all new development to have SWM in place to exceed compliance by X% based on the Xth percentile X" storm.

Stormwater Strategies

STORMWATER STRATEGIES FOR EXISTING BUILDINGS/PROPERTIES		
LOW	MEDIUM	HIGH
Tree Planting		
Rain Barrels/Rainwater Harvesting		
Rain Gardens, Bayscaping		
Removal of Impervious Pavement and Revegetation with Native Plants		



Stormwater Strategies

STORMWATER STRATEGIES		
LOW	MEDIUM	HIGH
Impervious surface removal or conversion of impermeable to pervious pavement	In addition to Low improvements	In addition to Medium improvements
	Micro-Bioretention planter boxes	Green Roof / Rooftop Garden
Residential scale Rain Gardens or Bioretention Facilities	Turf removal with conversion to native plant beds	Cisterns for irrigation storage, graywater or purple pipe systems, water feature
Light rainwater harvesting, i.e. rain barrels	Drainage system improvements – pipes, inlets, culverts, streams	Permeable Systems - pavers, concrete, asphalt, other materials
Tree preservation and planting	Cisterns for rain capture and reuse	Large scale Bioretention Facilities
Bio-Swales or Dry Swales	Streetside Tree Trenches	
Infiltration Trenches		

Stormwater Strategies

STORMWATER STRATEGIES FOR STREETS/RIGHTS-OF-WAY		
LOW	MEDIUM	HIGH
Tree Planting		
Bioretention		
Removal of Pervious Pavement and Revegetation		
LID Retrofits / Green Infrastructure		
Permeable Pavers, Permeable Concrete, Permeable Asphalt		
Water Features that Capture and Reuse Rainwater		
Drainage System Improvements		
Vegetated Infiltration Trenches		
Infiltration Tree Pits		
Storm-Sewer Pipe Separation		

Stormwater Strategies

- Potential locations for Stormwater Management strategies including LID, Green Infrastructure, and BMPs
- To be studied further

- Bioretention Facility
- Permeable Paver System
- Pervious Concrete System
- Tree Trench
- Micro-bio-planter box
- Infiltration Trench
- Bioswale
- Cistern
- Green Roof/Garden

TREE CANOPY AND HABITAT

Tree Canopy & Habitat

- Enhance Tree Canopy and Habitat Areas including
- Strengthen Habitat Corridors within OTN between Daingerfield Island and Jones Point Park

LOCATION	USE TYPE	MANAGING AGENCY	AREA (acres)
George Washington School	Active	ACPS	19.25
Jefferson Houston School	Active	ACPS	6.05
Cora Kelly Elementary School	Passive	ACPS	8.18
Jones Point Park	Active	NPS	63.86
Daingerfield Island	Natural Area	NPS	166.59
Simpson Stadium Park	Active	RPCA	16.49
Nannie J Lee Center	Active	RPCA	9.04
Four Mile Run Park	Mixed-Use	RPCA	49.49
Potomac Yard Park	Mixed-Use	RPCA	20.45
Windmill Hill/Potomac View Park	Mixed-Use	RPCA	6.32
Mt. Vernon Rec Center	Mixed-Use	RPCA	5.52
Potomac Greens Park	Passive	RPCA	17.40
Mt. Jefferson Park & Greenway	Passive	RPCA	6.91
African American Heritage Park	Passive	RPCA	6.40
Oronoco Bay Park	Passive	RPCA	5.45
Braddock Field	Area	RPCA	5.36

Tree Canopy & Habitat

EXISTING TREE CANOPY
26.5 ACRES
12.8% OF LAND AREA
SMALL AREA PLAN INCREASE TO **18.9%**

EXISTING HABITAT AREAS	
Natural Area (ac.)	11.35
Other Open Space (ac.)	16.17
Total Open Space (ac.)	**27.52**
Natural Area/ Open Space	***41.2%***

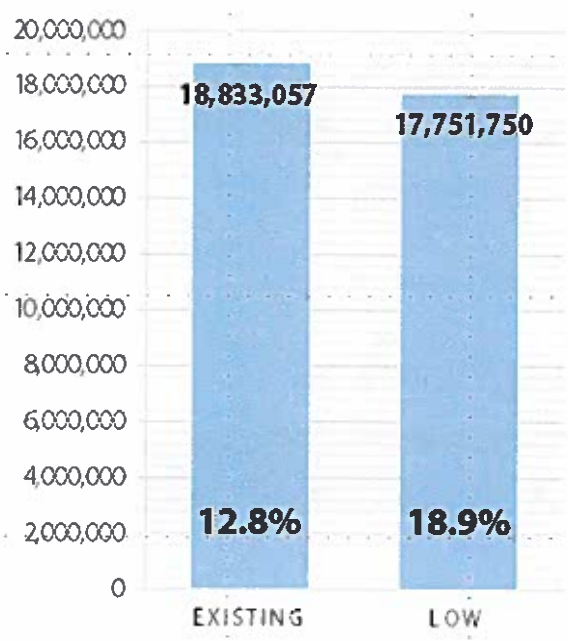
Total EcoDistrict Area (ac.)	**206.00**
Natural Area/ District Total	***5.5%***

Tree Canopy & Habitat

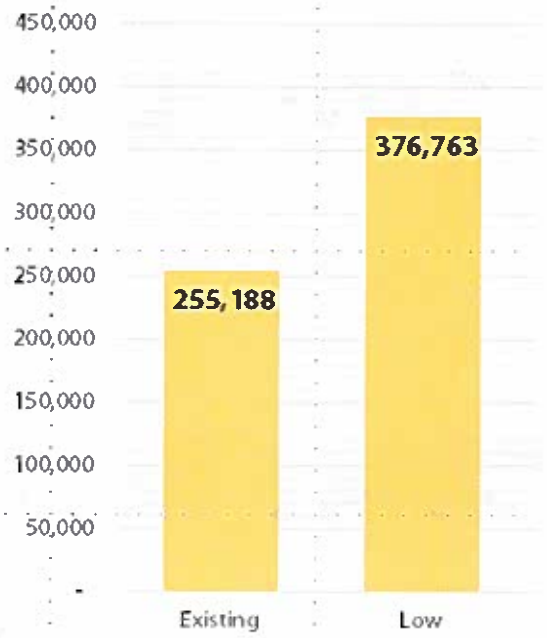
Tree Canopy Benefits:

- Stormwater Runoff Reductions
- C02 Sequestered
- Pollutant Removal – CO, NO2, Ozone, Particulates, Sulfur Dioxide

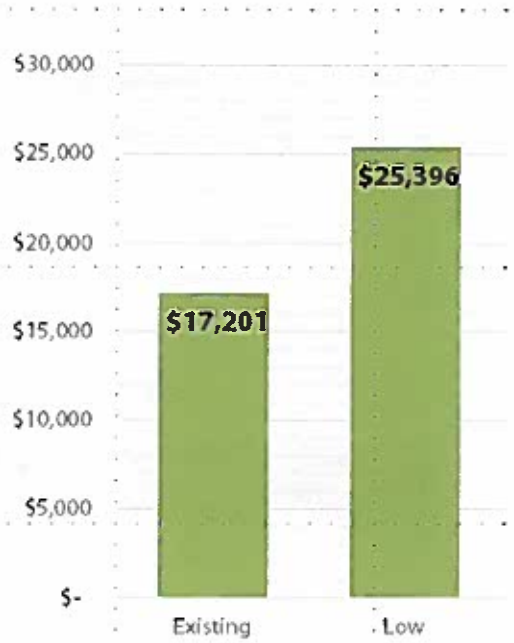
Stormwater Runoff Reductions – Cu. Ft./Year



Pollutant Removal benefits – Lbs./Year



Pollutant Removal benefits – $/Year



Tree Canopy & Habitat

HABITAT TARGETS
INCREASE NATURAL HABITATS
INCREASE NATURAL LANDSCAPES
PROVIDE GREEN ROOFS

HABITAT STRATEGIES
INCREASE RPA BUFFER BEYOND REQUIRED 100 FT.
NO NEW CONSTRUCTION IN RPA/RIPARIAN BUFFER
CONVERT OPEN SPACE TO NATURAL LANDSCAPE
ADD NATURAL LANDSCAPE TO RPA BUFFERS
GREEN ROOFS

TREE CANOPY TARGETS
INCREASE TREE CANOPY

TREE CANOPY STRATEGIES
IMPLEMENT SAP STREETSCAPE IMPROVEMENTS
SELECTIVELY ADD TREES TO CITY PARKS
ADD TREES TO PRIVATE PARKS AND GREEN SPACES

Tree Canopy & Habitat

HABITAT TARGETS			
	LOW	MEDIUM	HIGH
INCREASE NATURAL HABITATS	Increase natural habitats to X% of OTN total area.	Increase natural habitats to X% of OTN total area.	Increase natural habitats to X.5% of OTN total area
INCREASE NATURAL LANDSCAPES	Increase natural landscapes within OTN to X% of the total area.	Increase natural landscape within OTN to X% of the total area.	Increase natural landscape within OTN to X% of the total area.
PROVIDE GREEN ROOFS	Provide green roof totaling X% of OTN total area.	Provide green roofs totaling X% of OTN total area.	Provide green roofs totaling X% of OTN total area.

HABITAT STRATEGIES			
	LOW	MEDIUM	HIGH
RPA BUFFER	Maintain existing RPA buffer at X' from the Potomac.	Increase riparian buffer to X' from the Potomac.	increase riparian buffer to X' from the Potomac.
NEW CONSTRUCTION IN RPA/IPARIAN BUFFER	No new construction within the buffer, including on previously built areas.	No new construction within the buffer, including on previously built areas.	No new construction within the buffer, including on previously built areas.
CONVERSION OF OPEN SPACE TO NATURAL LANDSCAPE	Convert X% of existing open space outside the RPA to natural landscape.	Convert X% of existing open space outside the RPA to natural landscape.	Convert X% of existing open space outside the RPA to natural landscape.
NATURAL LANDSCAPE AS PERCENT OF BUFFER	Provide natural landscape totaling X% of total buffer area.	Provide natural landscape totaling X% of total buffer area.	Provide natural landscape totaling X% of total buffer area.
GREEN ROOFS	% of all new construction must provide green roofs.	X% of all new construction must provide green roofs.	X% of all new construction must provide green roofs.

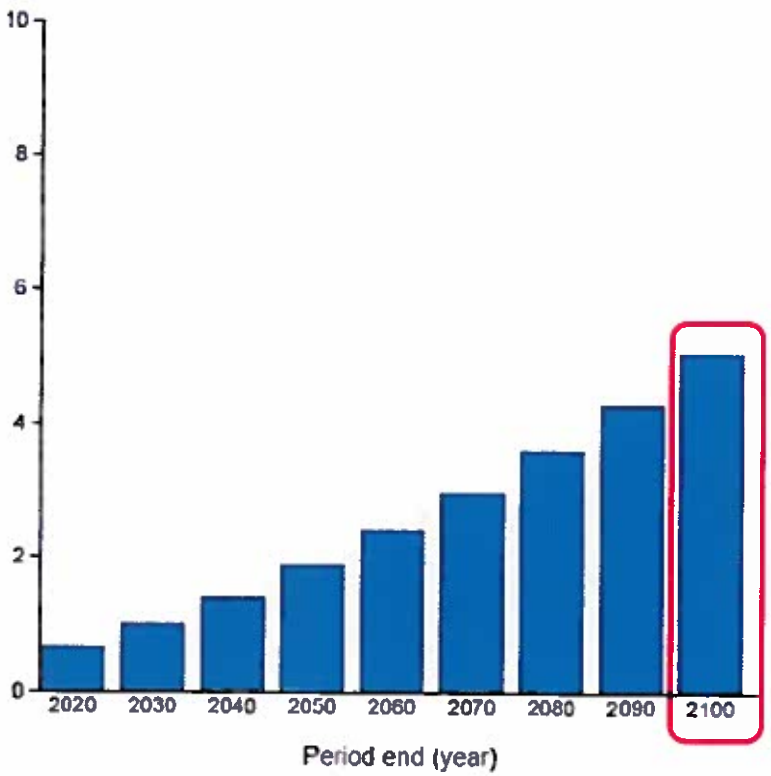
Tree Canopy & Habitat

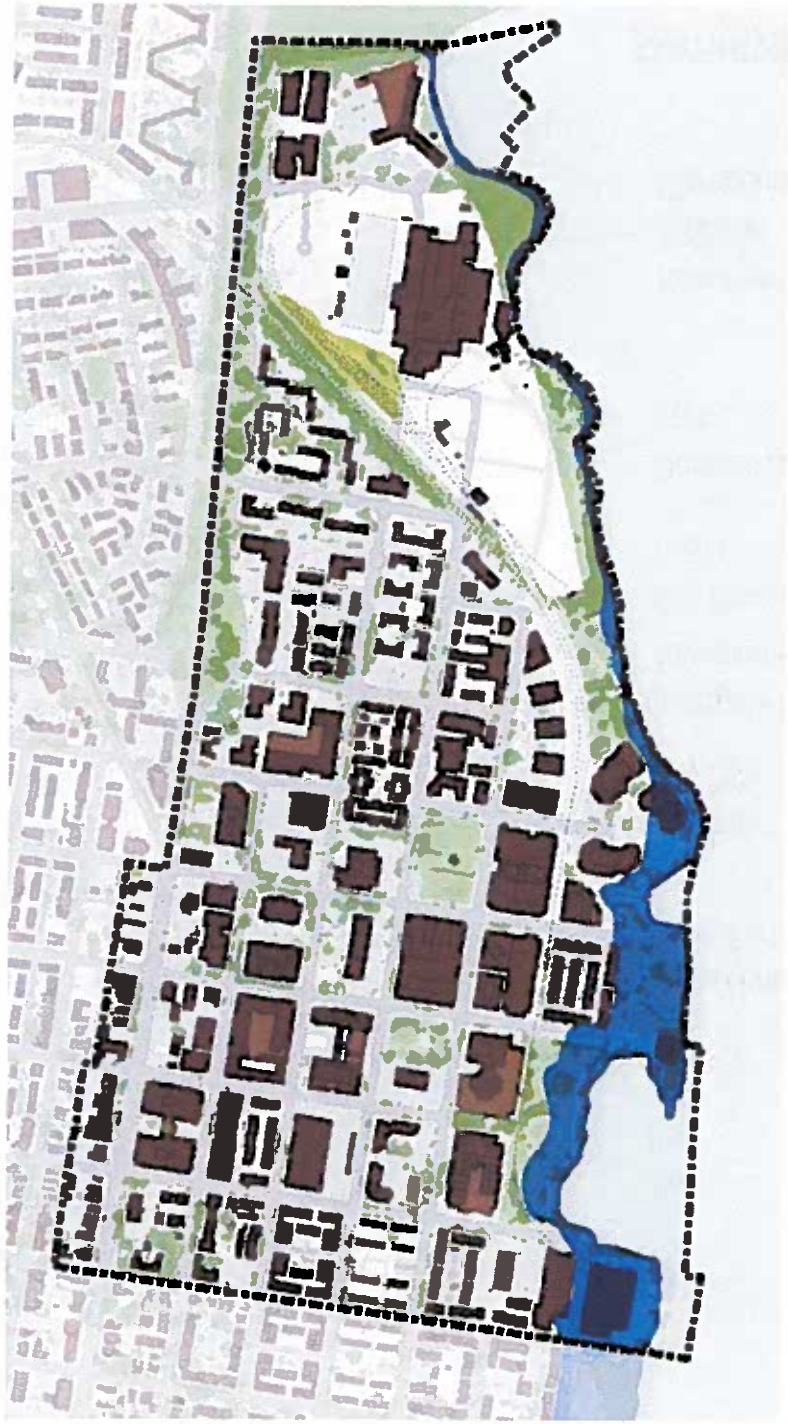
TREE CANOPY TARGETS			
	LOW	MEDIUM	HIGH
INCREASE TREE CANOPY	Increase the total tree canopy from 12.8% to **18.9%** of total area	Increase the total tree canopy from X% to **X%** of total area	Increase the total tree canopy from X% to **X%** of total area

TREE CANOPY STRATEGIES			
	LOW	MEDIUM	HIGH
PUBLIC RIGHT-OF-WAY	Implement streetscape improvements as described in the OTN Small Area Plan.	Implement streetscape improvements as described in the OTN Small Area Plan.	Implement streetscape improvements as described in the OTN Small Area Plan
CITY PARKS*		Add tree canopy to **X%** of the total land area of each of the City Parks within the Old Town North area.	Add tree canopy to **X%** of the total land area of each of the City Parks within the Old Town North area.
TIDE LOCK PARK		Add tree canopy to **X%** of Tide Lock Park	Add tree canopy to **X%** of Tide Lock Park

Tree Canopy & Habitat

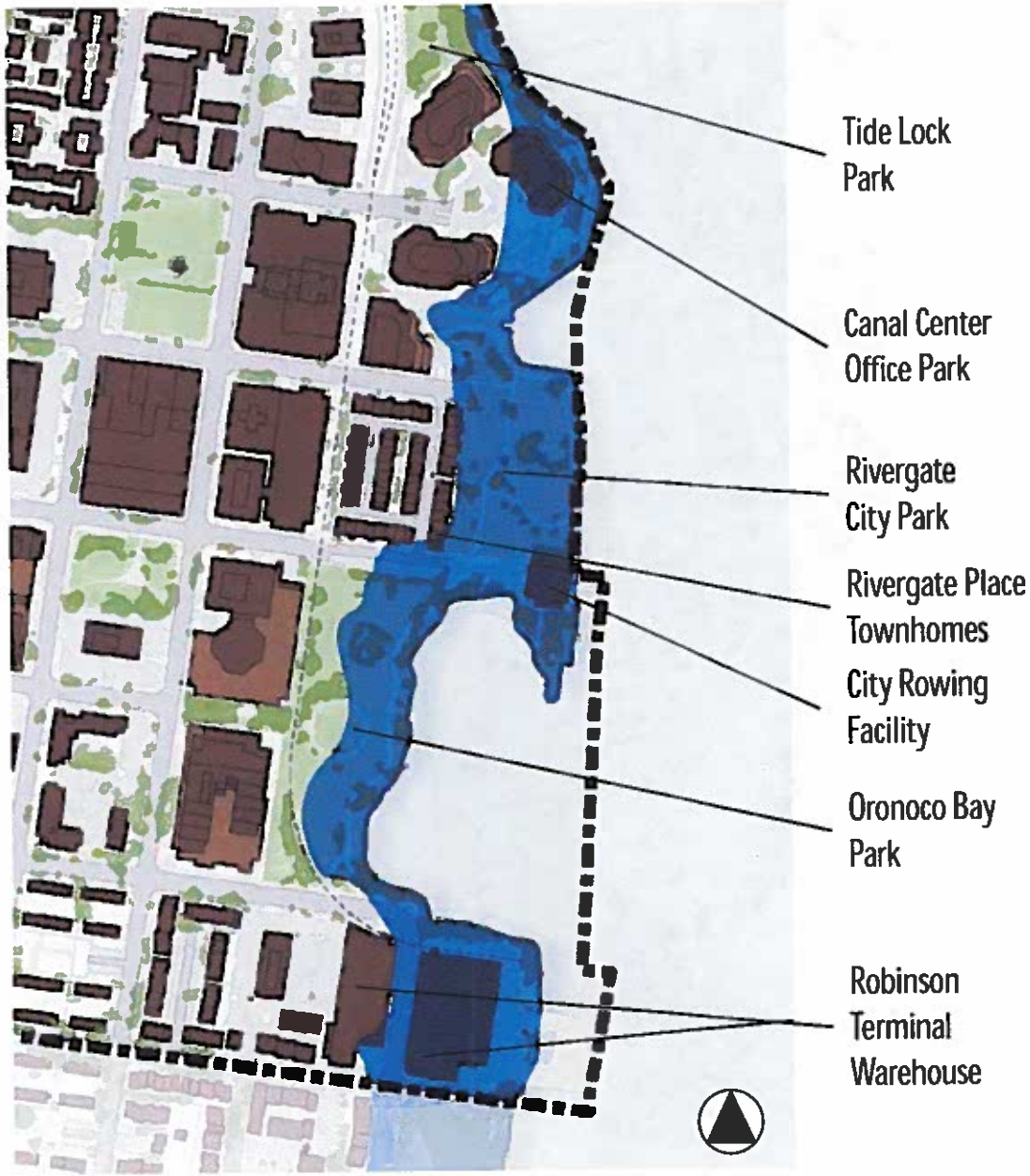
A Note about Sea Level Rise…





Tree Canopy & Habitat

Approximately 17 acres of land area could be impacted by a 5-foot sea level rise, including approximately 11 acres of park space.



Next Steps…

- Quantify Targets (in progress…)
- Quantify Strategies (in progress…)
- Meet with Development Community for Feedback
- Meet with OTN SAP Advisory Group for Feedback
- Issue Draft Report
- Finalize Draft Report
- Discuss Implementation Strategy