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WATER SAVING SOLUTIONS

Global Water Partnership Caribbean

Caribbean Science Symposium on Water

#CSSW2023

Conservation and Innovation: Changing the Regional Water Paradigm

Assessment of Potential Water Savings for Kingston, Jamaica

Using demand-side water management strategies and the creation of a shared savings model for medium-large commercial facilities

Leanne Spence and Richard Coutou

Caribbean Science Symposium on Water
March 21st – 22nd, 2023

Introduction

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Instant-Save Conservation Solutions Jamaica Limited

Water Saving Solutions

Water Conservation Professionals

(i) Supply and installation of indoor water efficient fixtures
(ii) Leak detection
(iii) Water use assessment
(iv) Water management systems
(v) Rainwater harvesting for potable and non-potable uses
(vi) Public education

EPA WaterSense PARTNER

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Background

- Kingston and St. Andrew (KSA) experiencing decline in rainfall, increase in drought conditions
- KSA generally has a water deficit
- NWC unable to supply this demand from resources within the KSA
- Resulting in lock offs and scheduled restrictions
- Increasing water storage capacity (tanks)

NEWS

50,000 'black tanks' for needy J'cans over next five years

BY ARTHUR HALL Editor-at-Large
halla@jamaicaobserver.com |
Mar 17, 2023 12:26 am 6 comments · Make a comment

New Water Treatment Plant to be Constructed at Content, St. Catherine

WATER NOVEMBER 23, 2022 WRITTEN BY: CHANEL SPENCE

A new water treatment plant will be constructed in Content, St. Catherine to better meet the demand for water in the Kingston Metropolitan Area (KMA), Portmore and Spanish Town.

Issue

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Overuse of Water in Residential and Non Residential Properties across KSA

- Toilets generally use more than 1.6 GPF
- Faucets generally use more than 2.2 GPM
- Showerheads generally use more than 2.5 GPM
- Generally, leaks account for more than 10% of water consumed
- Potable Water Use for landscaping, water cars and other.

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Methodology

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Water Audits & Assessments

- Review historical water consumption
- Use other demographic data to benchmark water use per person
- Review inventory to make recommendations for retrofit or replacement of inefficient fixtures with efficient ones
- Leak Assessment
- Recommendations for rainwater harvesting, water reuse and recycling

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Methodology

For residential developments, the nominal/ expected water consumption is assumed to be 230 Litres per person per day or 60 US Gallons

Table 3. Water Use by Facility Type[1]

Type of Facility	Water Use per Day		
	Litres	*US Gal*	Capita
Bar/Cocktail Lounge	55 – 75	14.5 – 20	Per Seat
Hotel – Resort	190 – 225	50 – 60	Per Guest
Hotel – Non Resort	150 – 190	40 – 50	Per Guest
Industrial Building (employees only)	55	15	Per Employee
Office Building	55	15	Per Employee
Hospital	750 – 900	200 – 240	Per Bed
Restaurant	100	26	Per Seat
	10	2.5	Per Meal Served
Theatre/Assembly Hall	10	2.5	Per Seat
Church			
Service Station	20 – 40	5 - 10.5	Per Vehicle Served
School w/cafeteria	55 – 80	14.5 – 21	Per Student

[1] *adapted from Metcalf/Eddy Wastewater, Treatment and Disposal, 3rd edition (pg. 28 - 29)*

Reference: Ministry of Health, Environmental Health Unit, Minimum Requirements, Section 4 Minimum Requirements for Wastewater Treatment Systems and Excreta Management in Jamaica

Results

Our Assessment of **Residential** Properties

- Over the past two years approx. 200 residential units in KSA
- Water Use Assessment indicates that some residential owners use up 20% more than expected consumption from EMU/NWC.
    - inefficient toilets, leaking fixtures, using potable water for landscaping, poor water use habits, unaware of inefficiency, not conservation minded …

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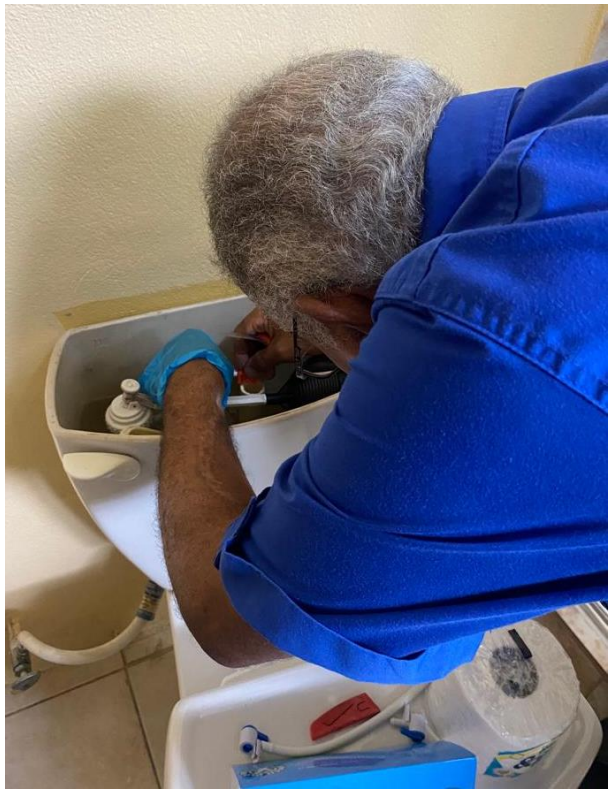
Results

Our Assessment of **Commercial** Properties

- Over the past two years approx. 350 commercial units in KSA
- Water Use Assessment indicates that some commercial facilities use up 20% more than expected consumption from EMU/NWC.
    - Inefficient toilets, leaking fixtures, using potable water for landscaping, unaware of inefficiency, unplanned water user/s, occupancy changes, etc.
    - Generally, spikes in water consumption creates an alarm.



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Results

Following our water use assessment:

Residential:

(i) Retrofit of indoor water efficient fixtures
(ii) Leak detection and repair
(iii) Education

We usually see a 10-30% reduction in consumption

Commercial:

(i) Replacement of indoor water efficient fixtures
(ii) Leak detection and repair
(iii) Rainwater harvesting for potable and non-potable uses
(iv) Education

We usually see up to 40% reduction in consumption

And we've seen up to 70%...

Results

Residential Properties

Type of Entity	Average Water Use Before 000’	Average Water Use After 000’	Project Cost (USD)	Savings	ROI
Residential #1	546.88	404.60	$1,270.00	26%	9 years
Residential #2	1,933.33	1,265.88	$2,308.00	35%	3 years
Residential #3	900	533.84	$1,953.00	41%	16 years

Results

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Commercial Properties

Type of Entity	Average Water Use Before 000’	Average Water Use After 000’	Project Cost (USD)	Savings	ROI
Commercial Restaurant	483	395	$1,673.00	18%	4 months
Commercial Hotel	9,756	6,371	$16,670.00	35%	6 months
School/ Institution	431	99	$8,140.00	77%	5 months

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Discussion / Recommendations

Is it possible that these drips and leaks are happening everywhere?

- Inefficient flush and flow rates
- Leaks
- No/low conservation culture

Can we translate this saving across KSA?

- 20% average is easily achievable
  - Less demand means more water available!
  - Energy savings!

Discussion / Recommendations

Challenges in demand-side water efficiency

- Water users generally do not understand their consumption trends/ patterns.
- Little knowledge of high-water use areas.
- Water cost/ price is generally low compared to other utility cost, unless a major spike occurs.
- General cost for retrofit/ repair appears to be high in relation to water cost.

ISC - Shared Savings Programme

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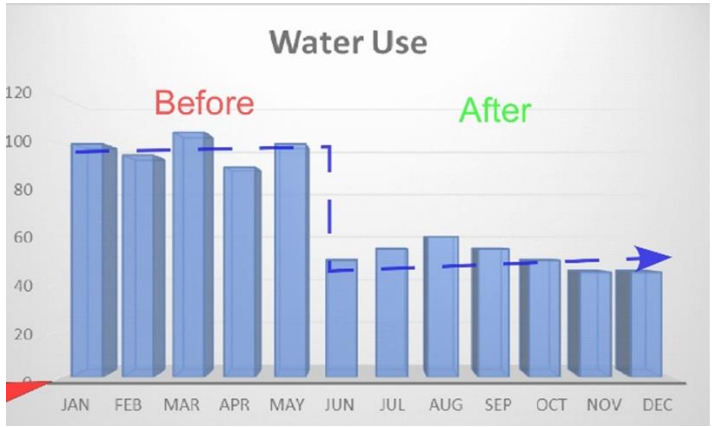
How does it work?

- ISC conducts water user assessment (including leak assessment of the property).
- Using your past water bills, a baseline consumption from which to calculate your future water savings is determined.
- ISC conducts leak detection, leak repair and retrofit/ adjustment of fixtures on the facility for water use efficiency without compromising user's comfort. At no cost to the facility/ owner.
- Water user can expect reduction in water consumption after assessments and retrofit. This translates into immediate savings on monthly water bill.
- ISC is paid based on a percentage of user's monthly savings for a defined period. Therefore, we only get paid when you save.



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ISC - Shared Savings Programme

CASE STUDY: Condominium Housing Complex, Jamaica

- 31 Condominiums generally used for vacation homes, summer rentals, Air BnB
- Facility had a generally low resident occupancy (2022 Covid Period)
- Average Monthly Consumption of 871,500 litres per month (215,828.56 US Gallons) prior to water efficiency interventions.
- ISC conducted leak detection and repair, retrofitted and modified water saving fixtures throughout the property
- Average 64% reduction in water consumption over the following six months.

ISC - Shared Savings Programme

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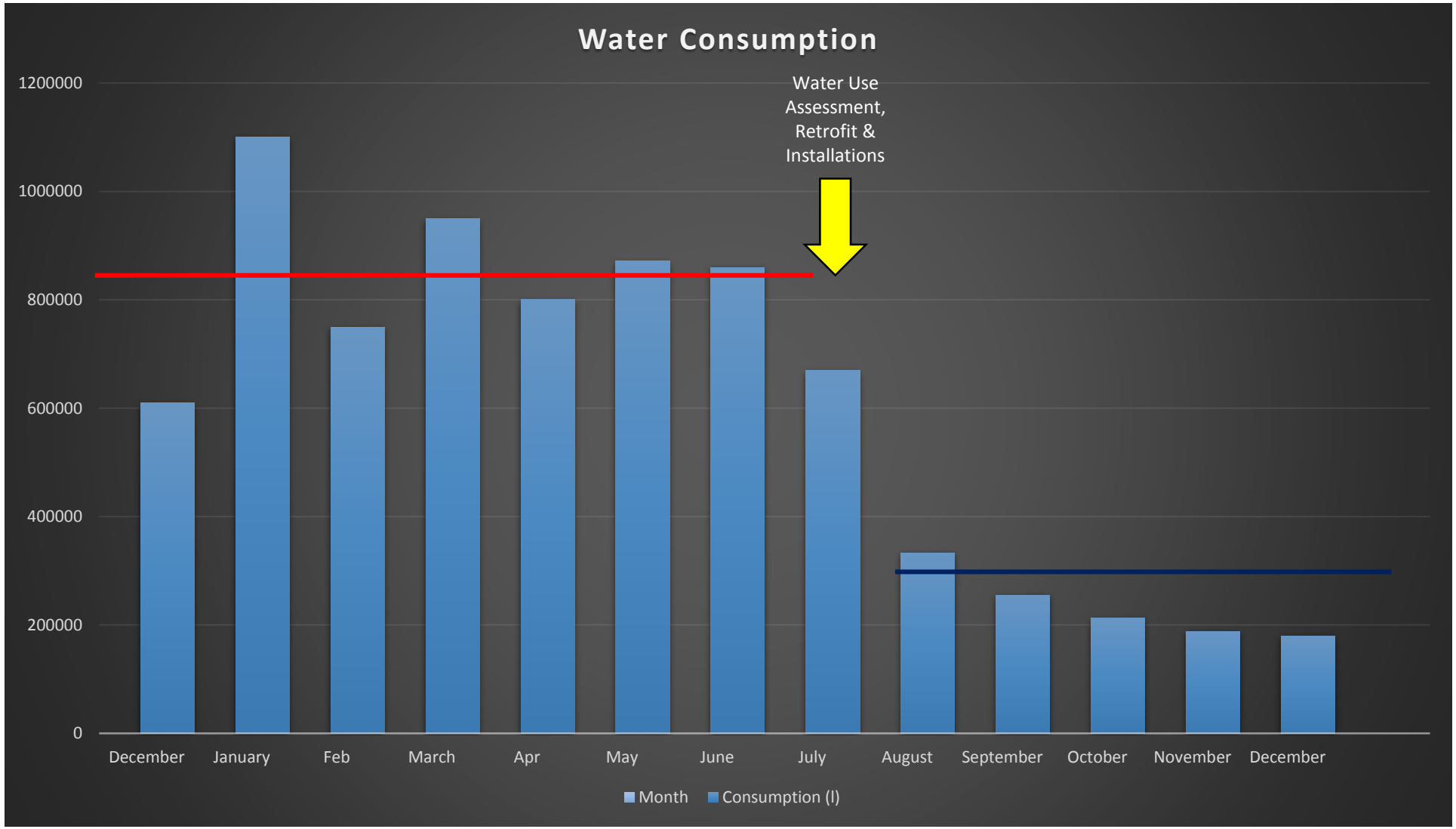
CASE STUDY



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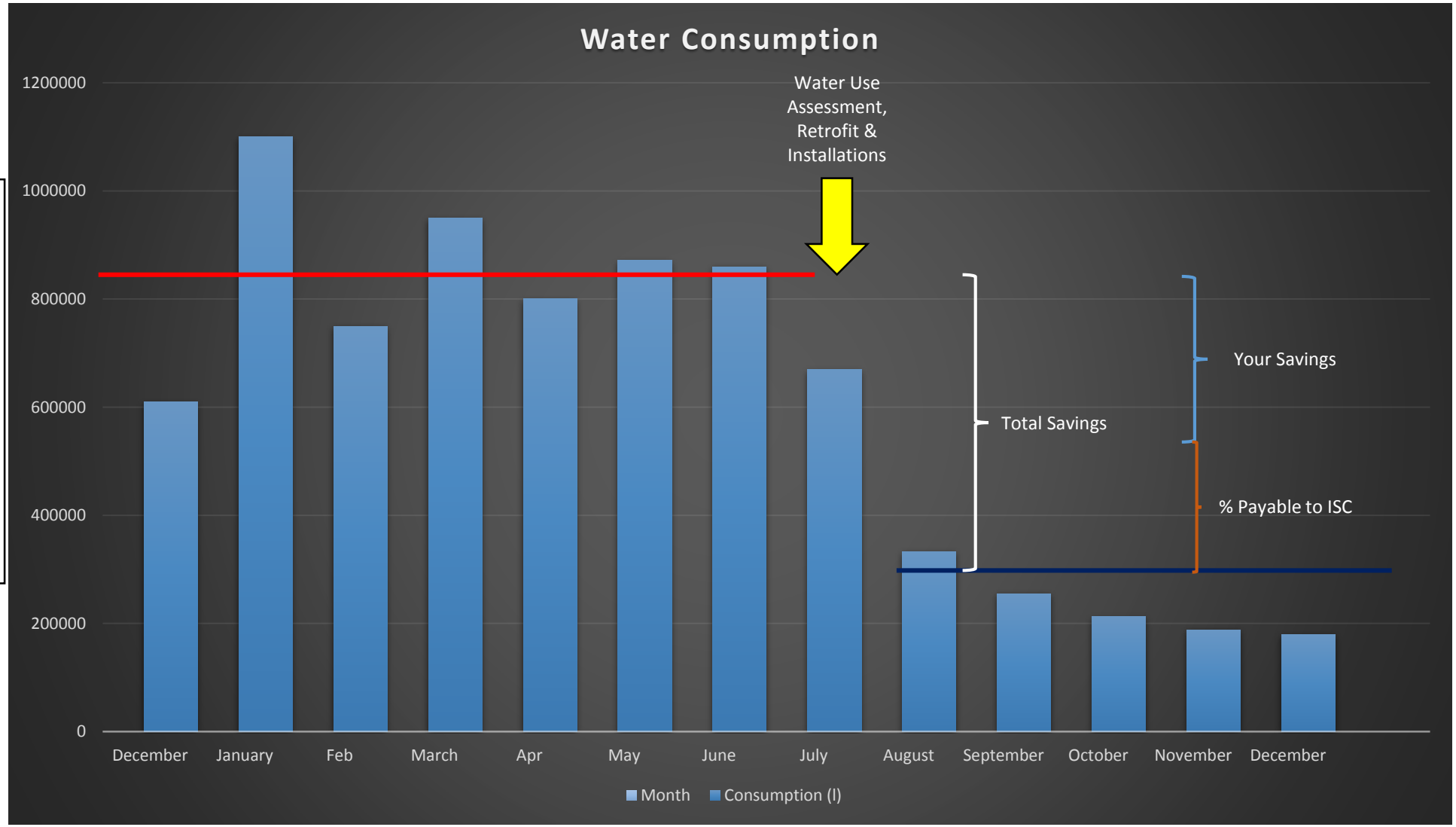
CASE STUDY

Average Monthly Cost: USD$1,878

August Water Bill: USD$748.79

Saved: USD$1,129.73

40% Fees: USD$451.89



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Conclusion

- Usually an underestimation of water consumption and usage both in residential and commercial facilities.
- Residential and non-residential facilities can decrease water consumption by 20-40% using water efficient fixtures, leak repairs and retrofits.
- Demand-side management strategies can have significant impact on overall water demand and consumption.
- Demand-side management strategies can be implemented quickly with immediate impact on water consumption.

Acknowledgements

Global Water Partnership

Jamaica National Water Project

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