



CARIBBEAN WATER AND  
WASTEWATER ASSOCIATION

Volume 1 Issue 1  
March 2017

# The CWWA InfoStructure

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### Message from the President



Dear CWWA Members, Colleagues and Supporters  
I am pleased to extend greetings to you on behalf of the Board of the CWWA via this medium of our re-vamped newsletter which will be issued on a quarterly basis. In addition to our other social media and our soon to be launched new website, our newsletter offers a place for providers in water, wastewater and waste management to highlight their products, technology and services. We see this as a key interface with our members and our constituency generally.

I am proud to re-state that the CWWA comprises the largest pool of expertise, experience and knowledge in the Caribbean. Our membership covers water utility and waste management agencies, the corporate sector, researchers, experts, practitioners and students. Our network extends to international, regional and national development partners and as such this newsletter provides a medium for interaction among our various publics.

We plan to highlight the work of our members, news from the sector, technical developments which need to be shared and a general place to provide relevant information. We urge you to subscribe to our Members Spotlight feature, to submit technical articles, notices of events and to advertise your products.

I take this opportunity to advise that our 26th Conference and Exhibition takes place in Georgetown, Guyana from the 16th to 20th October 2017. Guyana is awaking to become the economic “giant” in the Caribbean and when it was selected as our location, for the first time in the history of the CWWA, it was with the intention of encouraging our Exhibitors, participants and other supporters to experience Guyana. Our host Guyana Water Incorporated (GWI) will tell you that Guyana is “open for business. We urge you to attend and to experience the warmth and hospitality of the Guyanese people.

Happy reading!

Yours Sincerely,  
Alphonsus Daniel  
President

# 2017 Conference & Exhibition: GUYANA



**The perfect Amazonian location** – nestled between the Caribbean and South America. The home of the majestic Kaieteur Falls – the world’s largest single-drop waterfall, the most pristine rainforest and countless rapids, rivers and waterfalls throughout the country. A nature lover’s paradise – Guyana - where the excitement is this year as the Caribbean Water and Wastewater Association (CWWA) collaborates with Guyana’s “water guardian”, the Guyana Water Incorporated (GWI) to host the 26th Annual Conference and Exhibition from the 16 to 20th October at the Marriott Hotel, Georgetown, Guyana.

“Guyana” is the Amerindian word for “land of many waters” or “water people”, making this year’s host to over 400 persons, including experts, industry professional and service providers in the water and waste management sectors from across the globe, the most appropriate choice.

Come and participate in this high level event and enjoy the engaging presentations by experts from the Caribbean, North America, Latin America and Europe while experiencing the warmth and hospitality of the land of six peoples, indulge in the unique blends of food, world renowned rum and rich cultural diversity and heritage, under the theme, “Promoting Innovation and Creativity in Water, Wastewater and Waste Management”.



Left: Patricia Aquing & Alphonse Daniels, of the CWWA, with Ton Vlugman, PAHO Advisor & President, meet at PAHO Caribbean Office in Barbados to discuss collaboration efforts with CWWA.



Meeting the Chief Executive Officer of Guyana Water Inc, Dr. Richard Van West Charles, Patricia Aquing CWWA Executive Director and Marlon Daniels of GWI.

*Platinum Sponsor*  
**DIEHL**  
Metering

Thank you to Diehl Metering for supporting the CWWA Conference as the Platinum Sponsor for the second year in a row!

*We look forward to your continued enthusiasm for the event! We welcome all returning and NEW sponsors and exhibitors!*

**Sponsorship, Exhibiting and Advertising opportunities coming VERY soon!**  
All exhibitor/sponsor/advertising inquiries should be directed to:  
[conference@cwwa.net](mailto:conference@cwwa.net)






Above: Marlon Daniels, GWI and Patricia Aquing, CWWA, meeting with Minister Dawn Hastings-Williams, Minister of Housing and Water of Guyana



Above Patricia Aquing & Marlon Daniels meet with Lelon Saul, CEO of the Central Housing and Planning Authority of Guyana to discuss collaboration on CWWA Conference.



Above: Marlon Daniels and fellow GWI staff strategise at the 2017 CWWA Conference kick-off meeting in Guyana.



## 2017 Conference & Exhibition

# SPONSORSHIP PACKAGES

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**PLATINUM—\$US 37,000.00**  
**SOLD!**

**BENEFITS:**

- Speaking opportunity at Opening Ceremony (5 minutes) for first signed Platinum Sponsor;
- Speaking opportunity at Opening of the Plenary Sessions (5 minutes) for second signed Platinum Sponsor;
- Recognition for Platinum sponsors from the Conference Chair during the Opening Ceremony and other Conference Events;
- Placement of first signed Platinum Sponsor logo on name badges;
- Company's name and logo appear with other Conference sponsors (but emboldened) in the Conference magazine guide and on the CWWA website with a link to your company's website and on all major Conference materials including advertising;
- Complimentary promotional inserts (to be provided by sponsor) in Conference bags;
- Logo on main banners; signage at the sponsor events and the main conference venue recognizing your company's sponsorship; welcome banner at airport;
- Free colored full-page advertisement in the Conference magazine plus a full one page article in the magazine;
- Placement of your company's signage will be allowed in high traffic area of Conference Hall. Specific location to be determined by Planning Committee on site. More information available upon request.
- Conference-produced short promotional video to be played periodically in Exhibition area;
- Two Free Premium Exhibitor's Booths;
- Passes for six (6) persons to attend all Conference events.

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**GOLD**  
**(2 SPONSORS @ US\$27,00 EACH)**

**BENEFITS:**

- Sponsorship for one of the main social and cultural events, and a speaking opportunity;
- Recognition from the Conference Chair during the Opening Ceremony and other Conference Events;
- Company's name and logo appear with other Conference sponsors in the Conference magazine guide and on the CWWA website with a link to your company's website and all major Conference materials including advertising;
- Complimentary promotional inserts (to be provided by sponsor) in Conference bags;
- Logo on main banners; signage at the sponsor events and the main Conference venue;
- Free colored full-page advertisement in the Conference magazine;
- Placement of your company's signage will be allowed in high traffic area of Conference Hall. Specific location to be determined by Planning Committee on site. More information available upon request.
- Conference-produced short promotional video to be played periodically in Exhibition area
- Two Free Exhibitor's Booths;
- Passes for four (4) persons to attend all the Conference events.

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**SILVER**  
**(3 SPONSORS @ US\$9,500 EACH)**

**BENEFITS:**

- Recognition from the Conference Chair during the Opening Ceremony and other Conference Events;
- Company's name and logo appear alongside other Conference sponsors in the Conference magazine guide and on the CWWA website with a link to your company's website and all Conference materials and advertising;
- Logo appears along CWWA Conference logo on the padfolio distributed to all attendees;
- Complimentary promotional inserts (to be provided by sponsor) in Conference bags;
- Free half page color advertisement in the Conference magazine;
- Placement of your company's signage will be allowed in high traffic area of Conference Hall. Specific location to be determined by Planning Committee on site. More information available upon request.
- Conference-produced short promotional video on your company to be played periodically in Exhibition area
- Pass for three (3) persons to attend Conference events.

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**BRONZE - PLENARY SESSION**  
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**BENEFITS:**

- Recognition from the Conference Chair during the Opening Ceremony and other Conference events;
- Company's name and logo appear alongside other Conference sponsors in the Conference magazine guide and on the CWWA website with a link to your company website;
- Logo appears on the Conference USB Flash Drive distributed to all attendees;
- Complimentary promotional inserts (to be provided by sponsor) in Conference bags;
- Free colored half page advertisement in the Conference magazine;
- Placement of your company's signage will be allowed in high traffic area of Conference Hall. Specific location to be determined by Planning Committee on site. More information available upon request
- Pass for two (2) persons to attend Conference events.

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**COPPER**  
**(4 SPONSORS @US\$5,000 EACH)**

**BENEFITS:**

- Recognition from the Conference Chair during the Opening Ceremony and other Conference Events;
- Company's name and logo appear alongside other Conference sponsors in the Conference magazine guide and on the CWWA website with a link to your company's website;
- Complimentary promotional inserts (to be provided by sponsor) in Conference bags;
- Placement of your company's signage will be allowed in high traffic area of Conference Hall. Specific location to be determined by Planning Committee on site. More information available upon request
- Free quarter-page colored advertisement in the Conference magazine;
- Pass for two persons to attend Conference events.

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**CONFERENCE TECHNICAL TOURS & TRANSPORTATION**  
**(3 SPONSORS @US\$2,500 EACH)**

**BENEFITS:**

- Your company's signage will be placed in the interior of each technical tour bus;
- Company's name and logo appear alongside other Conference sponsors in the Conference magazine guide and on the CWWA website with a link to your company's website;
- Complimentary promotional inserts (to be provided by sponsor) in Conference bags;
- Free business-card sized colored advertisement in the Conference magazine;
- Pass for one person to attend Conference events.

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**CONFERENCE BAGS**  
**(4 SPONSORS @US\$3,000 EACH)**

**BENEFITS:**

- Recognition from the Conference Chair during the Opening Ceremony and other Conference Events;
- Your company's name and logo alongside other Conference sponsors in the Conference magazine guide and on the CWWA website with a link to your company website;
- Your company's name and logo will appear prominently on the Conference bag;
- Complimentary promotional inserts (to be provided by sponsor) in Conference bags;
- Free quarter-page colored advertisement in the Conference magazine;
- Pass for one person to attend Conference events.

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**PRIZES/AWARDS**  
**(3 SPONSORS @US\$2,000 EACH)**

**BENEFITS:**

- Your company's name and logo appear alongside other Conference sponsors in the Conference magazine guide and on the CWWA website with a link to your company's website;
- Complimentary promotional inserts in Conference bags (to be provided by sponsor);
- Free business card sized colored advertisement in the Conference magazine;
- Pass for one person to attend Conference events.

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**PROMOTIONAL INSERTS**  
**US\$1,000.00 PER SET (500)**

Get your promotional materials (brochure, calendar, key chains, pens, etc) in the hands of every Conference attendee. You provide the materials and we will insert it in each attendee's registration bag.

**GUYANA 2017**



# Think Inside the Box

## Containerized Solutions for the Caribbean

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## Hot off the Press!

### Exxon Mobile Could be First To Start Pumping Oil In Guyana Waters

March 16, 2017 Source: Caribbean 360



GEORGETOWN, Guyana, Thursday March 16, 2017 – American oil giant Exxon Mobil Corporation is moving full steam ahead with plans to transform Guyana into a major oil producer.

In what industry experts call a rare occurrence in the industry, Exxon Mobil has asked the David Granger administration for a production licence to start

pumping oil from the country's seabed, less than five years after it discovered major oil finds.

Guyana Geology and Mines Commissioner Newell Dennison yesterday confirmed the application to the Associated Press, saying it would be the first time the small South American country has issued an oil and gas licence.

Last year, Exxon Mobil announced the successful drilling of a deep water exploration well that it said positioned the Guyana seafloor as one of the richest oil and natural gas discoveries in decades.

The company estimated that one of its offshore fields, known as Liza, could contain 1.4 billion barrels of oils mixed with natural gas.

Dennison said the company has also submitted its general production plan alongside its application for a production permit. The firm has so far drilled five wells and is currently completing work on a sixth. Only one has come up dry so far.

"I can confirm that they have applied for the permit," Dennison revealed, saying it would allow operations by late 2019.

Minister of Natural Resources Raphael Trotman has said that government is planning to contract international firms to help it in negotiations with Exxon Mobil because the country has no expertise in this area. He did not identify any of the firms.

Just last Friday, the government appointed Dr Jan Mangal, an expert in offshore and civil engineering, as the country's petroleum advisor in the Ministry of the Presidency.

His first task will be to engage with officials of Exxon Mobil to get a full understanding of their development plans.

Dr Mangal said he will be looking at the issue of energy generation in a holistic manner in keeping with the country's "green agenda".

"It's not only the power sector and the green agenda, but it's also about infrastructure, the revenue from the petroleum and the needs of the sector as whole...The power sector in Guyana also needs to be looked at in terms of how natural gas can be used instead of diesel or wh

Read more: [http://www.caribbean360.com/news/guyana\\_news/exxon-mobil-first-start-pumping-oil-guyana-waters#ixzz4cdFL6Dax](http://www.caribbean360.com/news/guyana_news/exxon-mobil-first-start-pumping-oil-guyana-waters#ixzz4cdFL6Dax)



Think forward...

## Member Spotlight! Kamstrup

Kamstrup is a world-leading supplier of intelligent energy and water metering solutions.

At Kamstrup, we define success by the progress we create for others. Our superior technology and expertise have been the foundation from which to transform businesses and markets, by creating more efficient ways of working, ever since the company was founded by Olaf Kamstrup in Denmark in 1946.

A hunger to always search for a better way of doing things has put us at the cutting edge of the technological advancement of electricity, heat, cooling and water solutions. We work with energy and water companies, utilities and submetering businesses to protect their reputations, create new opportunities for growth and inspire smarter, more responsible solutions for the communities they serve.

Putting our customers at the heart of everything we do, listening to their needs and anticipating the challenges they will face in the future, enables us to consistently create innovative product ranges of hardware, software and services, including; consumption meters, communication infrastructure, meter data management systems, smart grid applications, hosted solutions and tools for data analysis.

Owned by the Danish company OK, we have employees in more than 25 countries around the world, with the number of territories in which we operate continually increasing as part of a global expansion.

Every day around the world, Kamstrup smart meters, installed in households and commercial buildings, enable the delivery of more intelligent, reliable and cost-effective ways to measure and manage the supply of energy and water.



## TRINIDAD CHAPTER WWD PHOTO CONTEST



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Khadija Robert

to more innovative smart  
water metering.

[kamstrup.com](http://kamstrup.com)



**kamstrup**

## GWI to employ new well drilling technologies

February 13, 2017 GINA- Guyana Government Information Agency



The Guyana Water Incorporated (GWI) will be advancing new methodologies for well drilling, this year. The new drilling technologies would significantly increase the wells' efficiency.

Additionally, they would reduce considerably, the water company's expenditure in undertaking such infrastructural and operational works across the regions, GWI's Planning and Implementation Director, Ramchand Jailall told the Government Information Agency (GINA).

The water company will be employing new drill mediums such as air, to complete their wells, Jailall explained. He said that staff has already been trained in utilising the new technologies.

Last year, a number of engineers from GWI had visited the United States of America (USA) and received training in fundamentals of resource drilling. The training exercise captured the drilling of new wells, the geology of well development, and air drilling rudiments, in addition to several other areas, Jailall explained.

GWI had been utilising mud rotary drilling methods, predominantly on the coastland, Jailall said. This form of drilling involves pumping a pre-made mixture of mud through the drill bit while drilling. This helps the process proceed smoothly, as the mud reinforces the borehole, while cooling the drill bit. The mud is then recycled from the drill cuttings into a mud pit and used again in the borehole, creating a constant source of mud.

Mud rotary drilling offers some substantial benefits. However, there are some disadvantages to using this method. Jailall explained that it is slower than some other techniques, include the air rotary drilling, which will now be utilised by GWI.

The water yield in a well, constructed by employing the mud rotary drilling, may not be as high or clean as one constructed through air drilling technologies, Jailall said, "Because you use mud to drill the well, and in your development you have to get the mud out, and so the mud that is within the well and behind the screen of the well in which the water passes through has to be clean,... you will get maximum efficiency in the production of the well once you clean it, but if you do not clean it properly, then your well yield will be lower," he explained.

Since no fluid is introduced into the borehole formation in the air drilling technology, samples are not washed away or altered by the drilling fluid. Further, less well development time is required since the borehole walls are damaged less than with fluid -based technologies, Jailall explained.

GWI will target the construction of over 20 wells, across the country, in all the Regions, this year.

Wells are to be completed in Oronoque and Yarakita in Region One, Lima in Region Two, Wakenaam, Vergenoegen, Pouderoyen and Westminster in Region Three, Diamond and Sparendaam in Region Four, at Central Ruimveldt in Georgetown, Rose Hall and New Amsterdam in Region Six, Bartica, Tasserene, Wayeleng, Chinoweing and Karrau in Region Seven, Chenapou and Campbelltown in Region Eight and at Rupertee, Aranaputa, Wowetta, Marcanata and Kwaimatta in Region Nine.

## *Member Spotlight!* Integrated Sustainability

Integrated Sustainability is an award-winning engineering and consulting company. We bring sustainable solutions to the management of water, waste, and energy.

We've brought together a unique blend of engineers and scientists to push the boundaries of conventional solutions. This blend of science and engineering enables us to provide consulting services at the front end of projects through to final completion and construction with full engineering, procurement, and construction management (EPCM) services. We help customers improve their outcomes by advancing how they find water, apply to regulatory agencies, and design, build and manage infrastructure. We provide guidance on the use of water in industrial and municipal processes, recycle or dispose of wastewater, through to residual management of recycle waste, and landfills. Civil and mechanical engineers work alongside water chemists, water treatment specialists, hydrogeologists and water regulatory experts, all seamlessly developing a solution and executing a project.

In addition to our water and wastewater services, we provide cutting edge renewable energy solutions, specializing in solar, wind, and geothermal energy. We are innovators in the areas of data management, and have several proprietary and sophisticated data management and visualization tools to help manage and leverage large amounts of industry data.

### Local Presence & International Experience

Our team is currently providing services in Trinidad, Dominica, St. Kitts, and Belize for the University of West Indies Open Campus. Many of our specialists have vast international experience throughout the Caribbean which has allowed us to form valuable and strategic partnerships with local engineering and consulting firms. With our local presence throughout the Caribbean and our expert knowledge of the area, we are the right choice to solve your water, waste, and energy challenges.

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We deliver full life-cycle projects using a flexible project delivery system tailored to the needs of the project, large or small. This agile tailoring maximizes responsiveness while minimizing costs by avoiding processes that are deemed unnecessary. Integrated Sustainability project managers are empowered to make decisions and find solutions.







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## **GWI to construct new waste water plant in Georgetown**

By News Source Guyana on February 13, 2017



The Guyana Water Incorporated (GWI) will advance the design and construction of the facility within the next five years, Planning and Implementation Director, Ramchand Jailall explained in an interview with the Government Information Agency (GINA). Jailall said that the water company has already commenced increasing its technical capacity to deliver on this objective.

A wastewater treatment plant is to be constructed in the city, to provide the necessary capacity to address residential and commercial growth.

The Guyana Water Incorporated (GWI) will advance the design and construction of the facility within the next five years, Planning and Implementation Director, Ramchand Jailall explained in an interview with the Government Information Agency (GINA). Jailall said that the water company has already commenced increasing its technical capacity to deliver on this objective.

“Last month we had a professor from the United Nations Educational, Scientific and Cultural Organisation (UNESCO) here in Guyana, who delivered wastewater training to more than 20 engineers. The engineers were not only from GWI, but from agencies such as the Central Housing and Planning Authority (CH&PA,) the Georgetown Mayor and City Council, the Environmental Protection Agency (EPA) and the Ministry of Communities,” Jailall explained. The engineers were trained in the design and assessment of wastewater treatment plants, he said.

The design of the new plant would address the increased demands being placed on the existing Georgetown sewerage system. Jailall explained that the current system is unable to process the increased amount of effluent and wastewater from the city. The Georgetown sewerage takes wastewater from to the Atlantic Ocean through an outfall in the Demerara River. Jailall explained that when the city’s system was designed, there was very high dilution and easy dissipation of the wastewater into the river. The increase in restaurants, hotels and the transient population going in and around Georgetown has created greater demand on the system, Jailall further explained.

GWI is also examining the construction of wastewater treatment systems for the new government housing schemes.

“We are looking at designing small systems, which they can connect to instead of them having the septic tanks, and having the water go into the drains, and breeding mosquitoes,” Jailall explained.

Wastewater is the water that goes down sinks, toilets and drains. Wastewater treatment plants treat wastewater before it is discharged into rivers or oceans. The process safeguards the water quality of the channels into which the water is discharged.



We asked, and you answered!  
How did your company celebrate  
World Water Day 2017?



**Water Authority – Cayman** celebrated World Water Day and the theme of “Wastewater” with a series of events between 20 – 24 March. In addition to an interactive display in its lobby, the Authority also aired a public screening of the animated movie “Flushed Away”, and representatives appeared throughout the week on tv and radio to spread awareness of World Water Day.



**The Guyana Water Incorporated** on March 22 collaborated with the Ministries of Communities & Public Health to host a conference in observance of World Water Day 2017. The event was held in the presence of staff members & media personnel in GWI’s boardroom.

## TRINIDAD CHAPTER WWD PHOTO CONTEST

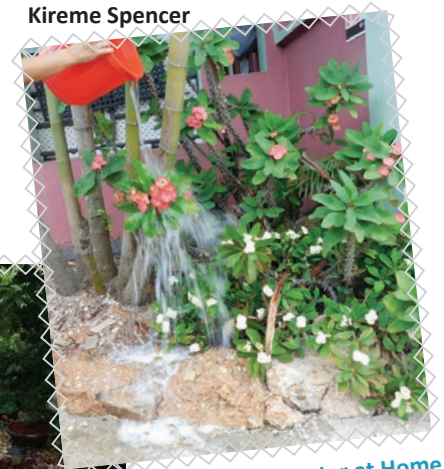


**Grey Water and Nature**  
Kireme Spencer



**Seven Seas Water** celebrated World Water Day, March 22, 2017 by visiting schools in Exuma, Bahamas and offering tours of the desalination plant in Paraquita Bay in the British Virgin Islands. Interacting with students in the communities where we operate water treatment facilities and teaching them about desalination and conservation is always interactive and engaging. A fun-filled day for all!

**Beauty in Wastewater**  
Starsha Ramroop



**Reusing Wastewater at Home**  
Samanth Rufus

**RESOURCES FOR YOU! KEY WASTEWATER PUBLICATIONS - Click to Link!**  
Links provided by the UN Environment GPA, Global Wastewater Initiative (GW2I).  
The CWWA is the Caribbean Platform for the (GW2I).

[Wastewater Analytical Brief \(2015\)](#)

[Sick Water Report \(2010\)](#)

[Economic Valuation of Wastewater \(2015\)](#)

[Good Practices for regulating Wastewater Treatment \(2015\)](#)

[Wastewater Technology Matrix \(2015\)](#)

[Sanitation, Wastewater Management and Sustainability - From waste disposal to resource recovery. \(2016\)](#)

[Harnessing opportunity Wastewater as a managed resource](#)





**The CWWA celebrated World Water Day, March 22, 2017 by partnering with Arthur Lok Jack Graduate School of Business, Trinidad, to host a panel discussion on “Why Wastewater.”**



In commemoration of World Water Day 2017, the Caribbean Water and Wastewater Association (CWWA) partnered with Arthur Lok Jack Graduate School of Business (ALJGSB) to host a panel discussion on this year’s theme “Why Wastewater”. This discussion forum which was held at the Yara Auditorium, ALJGSB on Wednesday 22nd March 2017, comprised of the following panelists:

1. Mr. Bhushan Singh – Lecturer, Arthur Lok Jack Graduate School of Business
2. Mrs. Denise Lee Singh-Perreira – Head, Programmes and Change Management, Water and Sewerage Authority
3. Mr. Wayne Williams - Senior Manager Water/Wastewater Construction & Operations, Housing Development Corporation
4. Ms. Vidjaya Ramkhalawan – Assistant Manager, Technical Services, Environmental Management Authority

The panel moderated, CWWA’s Executive Director Ms. Patricia Aquing, discussed the

barriers that exist with managing wastewater and utilizing it as a resource, requirements to fostering innovation and leadership within the sector and finally organizational partnerships and wastewater management. Some keys messages highlighted included:

- The unrealistically low price paid by customers in Trinidad and Tobago for the receipt of wastewater services. A restructuring of the Tariff system grossly overdue. Increases in Tariffs should be equivalent to improvements in the quality of service
- The need for greater public education to change public perception on wastewater
- Innovations within the sector should be synonymous with reductions in the operational and maintenance costs
- The absence of legislation for wastewater reuse
- The untapped economic potential for viewing wastewater as a resource. The limitless business opportunities that can be derived through investments in the downstream industries that can be created from the byproducts of the treatment process

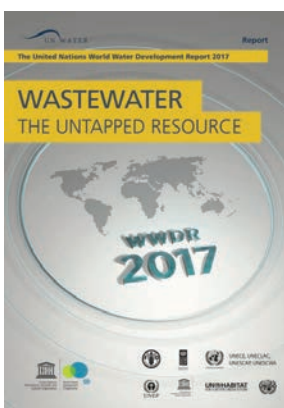
It should be noted that this event was streamed live on CWWA’s facebook page. As such, persons that were unable to attend in person were able to fully participate in the session.

## World Water Development Report 2017- AVAILABLE NOW!

Source: [UNWater.org](http://UNWater.org)

What if we were to consider the vast quantities of domestic, agricultural and industrial wastewater discharged into the environment everyday as a valuable resource rather than costly problem? This is the paradigm shift advocated in the United Nations World Water Development Report, Wastewater: the Untapped Resource, launched 22 March 2017 on the occasion of World Water Day.

A large proportion of wastewater is still released into the environment without being either collected or treated. This is particularly true in low-income countries, which on average only treat 8 % of domestic and industrial wastewater, compared to 70% in high-income countries. As a result, in many regions of the world, water contaminated by bacteria, nitrates, phosphates and solvents is discharged into rivers and lakes ending up in the oceans, with negative consequences for the environment and public health. The volume of wastewater to be treated will rise considerably in the near future especially in cities in developing countries with rapidly growing populations. “Wastewater generation is one of the biggest challenges associated with the growth of informal settlements (slums) in the developing world.



[CLICK TO DOWNLOAD](#)



## Let's think about renewable energy to power desalination plants

Candice Santana



Over the last decade the Caribbean experienced, several extremely dry, dry seasons and unusually drier and warmer wet seasons and a hydrological drought in 2010. Most recently in 2015/2016, the El Niño phenomenon severely impacted the region resulting in critically low surface water sources and diminishing groundwater reserves.

Many Caribbean countries utilize desalinated water to augment limited and vulnerable surface water and groundwater supplies. This trend is expected to continue throughout the region. Consequently, stakeholders are exploring different options to reduce the much-debated economic and environmental impacts of desalination to make it a more attractive option.

The desalination process is an energy consumption “monster”, it takes approximately 15,000 kilowatt hours of power to treat 1 million gallons of sea water. This makes energy one of the

biggest operating cost of a desalination plant and it also makes plant operation vulnerable to spikes in energy prices. An efficient reverse osmosis process driven by solar, wind, wave and or heat energy can enable affordable and reliable fresh water supplies.

The Arabic region is already employing solar energy to power smaller desalination plants. In the British Virgin Island, in 2015 a private house owner established a solar driven desalination plant for the production of drinking and irrigation water. The installation has a capacity of 12,500 liter per day. The Caribbean region can build on the experience and lesson learnt from these projects. Research and investment to improve on it and further modify it for larger plants in the Caribbean region is the way forward. Furthermore employing renewable energy in desalination plants in the Caribbean is definitely an option for the future.



# ENVIRONMENTAL PRODUCTS CARIBBEAN



# Envirosight





## Food for Thought: Advancing the Mission of the CWWA

Daniel Cummings, Former President of the CWWA and CWWA Trustee



Over the 26 years of its formal existence, the CWWA has been largely a volunteer organization. For this and a few other reasons, the Association has not been able to achieve its full potential and to reach its noble ideals. From the Water Engineers Conference that preceded it, professionals have been yearning to make a positive impact on the lives of ordinary Caribbean people. We meet year after year and share experiences and express a desire to do great things.

I am pleased to note the efforts made by the CWWA in 2015 to strengthen its institutional capacity starting with recruitment of an Executive Director to implement its Strategic Plan and to anchor the work of the Secretariat. We are now in a better position to expand our network and avail ourselves of opportunities to be heard on a world stage; more importantly to work together on the implementation of on the ground actions for the benefit of members but just as important, to improve the life of Caribbean people through our work in the water, wastewater and waste management sectors.

### *Our Voice Within the Region*

I wish to highlight what I consider to one of the most important advances made by the CWWA.

In February of 2016, the CWWA was given afforded a place by CARICOM to sit on its relevant councils and to speak on behalf of its members on the matter of water, wastewater and waste management. This means that CWWA can participate in the Council for Trade and Economic Development (COTED) and the Council for Human and Social Development (COHSOD) and other relevant bodies. Our position and our concerns for the sector have the potential for moving the agenda for the sectors to the level of Heads of Government. We are now able to bridge the gap between our technical work as an association and to link to the political and policy levels of Government where far reaching decisions are taken.

As a long standing member of the CWWA, I am excited to see our growing partnerships with UN Environment, Pan American Health Organisation (PAHO), the Inter-American Development Bank (IDB), the Caribbean Development Bank (CDB) and regional bodies such as the Caribbean Tourism Organisation (CTO), the Caribbean Institute of Meteorology and Hydrology (CIMH) and CERMES at the UWI.

Successive CWWA presidents have been able to draw on valuable resources from their organizations to augment the resources available on a yearly basis. Similarly, we have been able to assist in certification and training. This is largely how much we have achieved outside of our Annual Conference. The time is ripe for us to pool together to see how collectively we can take the institution to a new height, so that young professionals would rush to be members The result would be that the man on the street would come to feel the actions of our members in a positive way.

- We need to create a professional status for practising engineers in the respective fields that have a regional rank. “Member of the Caribbean Institute of Water Engineers” for example. Please note that many other professionals or subgroups can be created as needed.

To do this, each country or region must have its functioning chapter. Engineers and other professionals must gain merit not just from years of experience but from performance of merit, from presenting research and other papers, by continuing education, by training other colleagues and yes by regular attendance at the technical sessions of our annual conferences.

- We need to create a committee of prominent professionals called the “Expert Ambassadors” or something similar. This “council of the wise “ must play a key role in regional decision making by governments and agencies in the related fields(water and sanitation) when a regional government is about to embark on a project that has a significant bearing on the use of or impact on our resources . This team in conjunction with such other experts as may be necessary, must be invited to advise the particular government and this is where our voice at CARICOM is important.

Engineers and other professionals are often placed in compromising position when they see flawed projects proposed by their government and attempt to make their professional views be known. In such cases, they can communicate without prejudice to the principals, in strict confidence and invite their judicious intervention. Indeed the average Caribbean citizen or an environmental group must feel it can appeal to a this body. There must obviously be safeguards against pranks and requests with ulterior motives. The region stands to benefit from possible best use of our resources and timely professional non confrontational support mechanisms for the governments and local professional staff.

Our voices must extend beyond our conferences to reach the population through various mechanisms and means. I would welcome any comment or further suggestions from you, our Members.

## Navigating the Challenges of Wastewater in the Caribbean

The following article was produced for the Trinidad & Tobago Chamber of Industry & Commerce quarterly business magazine, Q4. An interview with Mr. Alphonsus Daniel, President CWWA

‘Water is Life and Sanitation is Dignity,’ these are the watchwords of the Caribbean Water and Wastewater Association (CWWA). Established in 1991 as a regional non-governmental organisation, the CWWA brings together water and sanitation stakeholders to advocate for the protection of public health and the promotion of sustainable development. A 2016 presentation by Dr. Justin Ram, Economics Director of the Caribbean Development Bank (CDB), stated that an average of 47.5 Million Litres per Day (MLD) of potable water is consumed across the Region, with an average of 92% of the population having access to water. Trinidad and Tobago has the highest regional consumption rate 1,025 MLD, followed by Jamaica at 137MLD. Poor regional infrastructure and high levels of inefficiency account for Non-revenue Water (NRW) averages of 40 to 50% of the total water generated.



According to Alphonsus Daniel, President, CWWA, “World Bank statistics show that approximately 32 Billion M3 of water is lost annually to leakage, and 16 Billion M3 as a result of non-revenue water losses due to theft and poor metering. In fact, globally as much as 35 to 60% of the water produced daily is wasted, resulting in an estimated US\$14.6 Billion loss, in developing countries the level of NRW is much higher, averaging at 60%. Therefore, the principal challenges facing the regional water and wastewater sector are an ageing infrastructure coupled with a sustained lack of public sector investment. In Grenada, for example, there are existing pipelines which date as far back as 100 years old. Guyana, Jamaica and the British Virgin Islands all average above 60% NRW, this is treated water which is lost as a result of leaks and ‘potholes’, the surface depressions on roads and highways. Inaccurate billing systems and corruption and theft are often cited as the second most important factors affecting the sector.”

“Climate change impact has emerged as one of the region’s major long-term challenges as small island states are the most vulnerable and least able to adapt to these changes. Key regional water sector concerns are sea level rises which can result in saline intrusion of underground freshwater aquifers and divergent rainfall patterns leading to increased drought conditions or heavy precipitation. In Saint Kitts and Nevis which sources approximately 69% of its water underground, when it experiences severe drought due to a reduction in rainfall, it has to undertake load shedding to manage its limited supply. Alternatively, the challenge faced by Dominica is increased rainfall resulting in flooding and landslides which has washed out critical water infrastructure.”

“Worldwide 80 to 90% of water used daily converts into wastewater which includes water used for the flushing of toilets, cooking, showers and the washing of clothes. There is a lack of sustainable wastewater technology in the Region, and as much as 90% of our mechanised sewage systems do not work. In fact, the Caribbean only treats 25 to 30% of its wastewater, and the rest goes into the rivers and seas.”

But it’s not all doom and gloom in the water sector, Daniel shared his insights on regional projects, “Opportunities in the water sector abound as there are a lot of multi-lateral grants available for feasibility studies and conceptualisation of new projects. The sector requires extensive leak detection and mapping, pipeline replacement, upgrading of current infrastructure, investment in new systems and a renewed thrust for water management efficiency projects. The CDB is currently funding a study to design methods to de-silt the John Compton (Roseau) Dam in Saint Lucia. The Bahamas also recently undertook a NRW project with a goal of achieving 40% reduction over 10 years. When this project was signed in 2012, The Bahamas was experiencing a 58% NRW and losing 6.87 Million Gallons of Water per Day, within the first two years of implementation its Daily Water Loss was reduced by half. In addition, Belize has successfully invested in pipeline replacement and pressure management, and Jamaica received an Inter-American Development Bank grant to improve water supply sanitation across 18 communities. There are also a number of studies being developed under the United Nation’s Green Climate Fund for water supply and sewerage, sea level rises and the protection of plants from flooding.”

“Green projects to build resilience against extreme weather events caused by climate change, such as the harvesting of rainwater and increased focus on water conservation, will begin to innovate the sector, and funding can be sought from the Caribbean Community Climate Change Centre in Belize and the OECS Secretariat. In Saint Kitts and Nevis retro-fitting is already taking place, as well as the advancement of ‘green’ projects to recycle wastewater. Consumers can get involved by re-engineering their homes through the installation of low-flush toilets, low-usage shower heads, installation of water sensitive fixtures and solar pumps to name a few. There is an ongoing EU project incorporating the use of solar water heaters and waste sensitisation education for schools and other social infrastructure. The private sector should become more involved in these partnerships to retrofit and upgrade public spaces, and even industries.”

On the future of the Caribbean’s water and wastewater sector, Daniel says, “The CWWA wants to work with regional stakeholders to ensure the sustainability of the sector. There are a number of recommendations we would like implemented including increased regional cooperation with respect to the building of dams and other large scale infrastructure, reduction of NRW which can be considered a ‘new’ water source, and the adoption of sustainable technology which local operators are trained to maintain. In addition, the CWWA wants regional utilities to increase knowledge sharing and transfer, and opportunities for shared training and development. We are developing this experience through the Water Operators’ Partnerships (WOP), and are undertaking our first initiative in Haiti, where we have already identified the areas for development and approached the CDB for funding. Most importantly, the Caribbean Region needs a CARICOM water and wastewater sector policy, and the CWWA has been actively lobbying and advocating for this to become a realisation, it is through these shared interests and experiences, we will then be better positioned to collectively mitigate our current challenges.”





## Wastewater - Today's Waste, Tomorrow's Treasure

Vincent Sweeney, Head Caribbean Sub-Regional Office UN Environment

Every day, you generate wastewater. When you brush your teeth, flush the toilet, wash, cook or clean your house; the clear water that flowed from the tap, becomes discoloured with contaminants. In the Caribbean, it is now "dirty water" (or some other name) and the typical response is to pour it down the sink, into the gully, or into the backyard.

Often times, because of improper wastewater management techniques, this "dirty water" flows into our clean water sources. This problem is not unique to the Caribbean; wastewater is a huge problem globally. Every year, two million tonnes of sewage, industrial, agricultural and household waste is discharged into the world's waterways.

Why is this so? 2.5 billion people (imagine 1000 times the entire population of Jamaica) are without access to proper toilet and sanitation facilities and 1.2 billion people globally, have no such facilities at all...Closer to home there are similar situations.

As much as 85% of untreated wastewater (from toilets, kitchen sinks, factories, hospitals, agriculture and hotels) enters the Caribbean Sea. Often, less than 2% of our sewage from the city areas is treated before disposal, and in rural communities this percentage is lower. Many of our Caribbean households are not connected to a proper sewer system.

Untreated wastewater seeping underground or flowing into clean water sources can cause various health problems (including cholera, gastroenteritis and hepatitis), harm animals and plants, and decrease our food supply, our economy and our recreational opportunities

Many of the issues with wastewater arise from a lack of proper waste management facilities which include a process for removing the contamination from the water and returning it treated to the environment's cycle.

Imagine then, how dirty our water sources will become if this continues. One of these days we could very well be waking up and not being able to swim at our favourite beach.

"One man's trash is another man's treasure" is a proverb applicable to wastewater management. Wastewater is a most valuable resource which can be reduced or reused.

If it is reused, it will reduce the amount of untreated water contaminating our clean water sources, and increase our clean water supply. It also contains nutrients which help certain crops grow better, with the need for as much fertilizer. A double savings. Everyone can make this dream a reality; governments can participate and so can farmers, the hotel industry, factories and even your household.

UN Environment's Global Initiatives - UN Environment recognizes the need for a shift in perspective as it pertains to wastewater issues and has been leading various activities in this regard. The Global Wastewater initiative led by UN Environment's Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) promotes good wastewater management practices, seeking to have persons view waste water as a valuable resource instead of waste. It's alternative views include using wastewater as a source of water and nutrients in crop production, reducing the need for scarce freshwater and expensive fertilizers.

Wastewater sludge can also be used to manufacture construction materials and to generate energy (biogas and biofuel), providing opportunities for green jobs and ensuring sustainable development and social well-being.

UN Environment's Caribbean Projects - The Caribbean Regional Fund for Wastewater Management, funded by the Global Environment Facility (GEF) and better known as the GEF-CREW project has also been making strides in promoting and enhancing better management of wastewater in the Caribbean.

Under its management, for example, Jamaica established a Credit Enhancement Facility, a reserve of money that can be used as collateral when acquiring financing to implement or invest in waste water projects.

The National Water Commission in Jamaica, through this funding and the collection of a special monthly utility surcharge called "K-factor", was able to execute several waste-water projects and upgrade several waste-water treatment plants, ensuring cleaner water supply for Jamaica's citizens. In addition, in 2015 through the CREW project, the government of Jamaica became a part of the Land-Based Sources of Marine Pollution (LBS) protocol, an agreement which encourages protecting the seas and health of citizens from wastewater and other land-based pollution. The LBS Protocol is part of a Caribbean agreement and is promoted through the existence of the Regional Seas Programme for the Caribbean, hosted by UN Environment.

The UN Environment Wastewater Vision - The United Nations Environment Assembly (UNEA 3) is the major UN meeting on the environment, and is convened by UN Environment. The focus this year is on pollution. The Caribbean is positioned to benefit from UN Environment's focus on pollution through various projects and initiatives. One such initiative is a Caribbean Waste Management Conference which will be convened in July, in collaboration with the CWWA, and which will help to build an action plan for the Caribbean. Other UN Environment projects include a Trash Free Waters project, a Plastic Waste Project and the continuation of the CREW project as CREW+

Wastewater management will need everyone's support so get on board! There are several things you can do including safely reusing waste water as a resource (such as for irrigating certain crops, flushing toilets) and educating yourself and others. For more information, please contact the Caribbean Office for UN Environment at [unep.caribbean@pnuma.org](mailto:unep.caribbean@pnuma.org)



# SAVE THE DATE

**Training Workshop  
ON-SITE WASTEWATER TREATMENT AND DISPOSAL**

**Date**  
25th to 28th April 2017

**Location**  
Antigua

**Organisers**  
The Caribbean Water and Wastewater Association (CWWA)  
Antigua Public Utilities Authority (APUA)  
UN Environment Global Programme of Action  
Global Wastewater Initiative (GPA-GW2I) Caribbean Platform

*More information coming soon!*



# CIMH

Caribbean Institute for Meteorology & Hydrology

For Information on 2017 Training Courses

**CLICK HERE!**



## CaribDA 2018 Conference & Exposition

"New Initiatives on Integrated Water Resource Management"

29th May – 1st June 2018

A celebration of the 90th Anniversary of Desalination in Curacao recognizing the construction of the Riffort Plant in 1928 as well as the CaribDA's 8th Anniversary as an Association organized in Curacao

### Call for Abstracts – Presentations

Deadline for submission of abstracts is 30th November 2017

**SUBMISSION OF ABSTRACTS**

Call for Abstracts: CaribDA will coordinate a three-day program of technical presentations and posters. We invite you to submit abstracts on the subjects of desalination and waste water reuse and related topics listed below (please use these reference numbers in your submission):

1. **Technology & Innovations**
2. **Planning & Management**
3. **Finance & Economics**
4. **Regulations & the Environment**
5. **Seawater RO Applications**
6. **Desalination using Green Energy**
7. **Thermal Desalination**
8. **Other**

All abstracts must be submitted using the Required Abstract Submission Form found at [www.caribda.com](http://www.caribda.com)

## 10TH CARIBBEAN CONFERENCE ON COMPREHENSIVE DISASTER MANAGEMENT (CDM)

# SAVE THE DATE

**DECEMBER 4-8, 2017**      **NASSAU THE BAHAMAS**

**CDM: The Road to Resilience  
Check Point 2017 - Building Resilience through Partnerships**



Email: [conferencecoordinator@cdema.org](mailto:conferencecoordinator@cdema.org)      Tel: (246) 434-4880



## Operation, Control Monitoring and Maintenance of Seawater RO Systems (HANDS ON)

Grand Cayman, Cayman Islands  
2017 May 1 - 3

This seminar consists of three days of classroom and hands-on training covering proper operation, control, monitoring and troubleshooting of RO systems. This is essential information for anyone who works with, designs, services, installs, operates, maintains and/or troubleshoots RO systems.

During this seminar you will learn how to effectively:

- Evaluate the pretreatment
- Understand the operation of an RO unit
- Load/unload membrane elements
- Monitor an RO unit
- Troubleshoot an RO unit

**Click Here To Register Now!**



## LEAVE NO OPERATOR BEHIND

### 4th Global Water Operators' Partnerships Congress & GWOPA General Assembly

4-6 October 2017  
Sant Pau Art Nouveau Site, Barcelona

"Leave no one behind" has become a rallying cry for inclusiveness and solidarity in an increasingly inequitable world. The Sustainable Development Goals use this slogan at least seven times, as a reminder that only together will development be sustainable.

Sanitation and Water utilities around the world are grappling with many of the same challenges, although some are faring better than others. There is not only a need, but a huge opportunity for operators to share their knowledge and solutions with one another for the benefit of the billions of people worldwide that these essential local institutions are meant to serve.

The Global WOPs Congresses, held every two years in Barcelona, are gatherings of the growing global community of WOPs practitioners and supporters. The Congress is an opportunity for operators and those government, financial, academic, NGO, worker and others working with them to come together, share ideas, elaborate their knowledge, and develop solidarity-based collaboration.



More about Global WOPs Congresses [here](#)  
More about the Global Water Operators Partnerships' Alliance [here](#)  
More about Wops [here](#)

Help us design the congress

GWOPA is now calling for your session proposals. Session themes should address at least one of the three following areas:

- Operators' technical, managerial, social, financial topics – What is new to share?
- Water Operators Partnerships – Where and how are WOPs working? What has been learned about effective practice?
- Operators and global development goals – How are utilities contributing to the achievement of the SDGs, the Human Right to Water, and others?

**Submit Your Proposal Now**

## SAVE THE DATE

### CAWASA 5th Caribbean Water Operators Conference

June 29-30, 2017 - Roseau, Commonwealth of Dominica

## "Water supply in a changing environment"

### 10th Pacific Water Conference & Expo

Apia, Samoa  
7-11 AUGUST 2017

### 3RD PACIFIC WATER MINISTERIAL FORUM

Pacific Water & Wastewater Association      Venue: Sheraton Samoa Aggie's Hotel & Bungalows      Samoa Water Authority

## Introduction to WASH for Development Online Training Course

8 week course, begins 2 May 2017  
Delivered by Edith Kamundi, International WaterCentre

**REGISTER NOW**

More information:  
[training@watercentre.org](mailto:training@watercentre.org)  
T +61 7 3028 7690

About the Course:  
Designed to empower practitioners with an understanding of the fundamentals of the WASH sector. This course introduces students to the core principles for planning, designing and implementing activities to improve sustainable and equitable access to domestic water supply and sanitation facilities and improve hygiene behaviours.







Congratulations to CWWA Past President Ana Treasure on receiving an award from Juan Orlando Hernandez Alvarado, President of Honduras, for her service in the sector.

**ANNUAL ENVIRONMENTAL CELEBRATIONS 2017**

**February**

World Wetlands Day

**March**

International Day of Forest and the Tree – 21st

World Water Day – 22nd

**April**

Earth Day – 22nd

**May**

International Day for Biological Diversity - 22nd

**June**

World Environment Day- 5th

World Ocean Day - 8th

World Day to Combat Desertification – 17th

**September**

International day for the preservation of the Ozone Layer- 16th

**October**

World Food Day – 16th



On January 23rd, 2017 **Emefcy** inaugurated its first MABR-based wastewater treatment facility in St Thomas US Virgin Islands. The ceremony, held on site, was attended by dignitaries from the Caribbean Islands, USA and Israel. During the ceremony, the Chief Engineer of VIWMA, expressed his satisfaction of the MABR solution, and noted that besides meeting every original requirement, Emefcy's solution has a range of unmatched key benefits, including lower commissioning costs, low maintenance, superior environmental performance, low energy, as well as being neighborhood friendly. [Click here](#) for the original Press Release.

*Welcome New Members!*

- Tracia Gopie, Staff Assistant Water & Sewerage Authority - Trinidad
- Rashida Williams-Castillo, Chief Financial Officer Belize Water Services, Ltd. - Belize
- Dave Fitzgerald Pascascio, Operations Manager Belize Water Services, Ltd. - Belize
- Water Office of Martinique - Martinique
- Sharlene Beharry, Student University of the West Indies - Trinidad
- Caribbean Industrial Research Institute, Research Institute University of the West Indies - Trinidad

## Member Spotlight! Caribbean Civil Group Limited

### PROJECT COORDINATION SERVICES

The CCG team is well versed and experienced with advancing major public or private capital works (including CDB/IDB/WB/EU funded projects) or small projects in an efficient and effective manner.

### WATER DISTRIBUTION AND SANITARY SEWER SYSTEMS DESIGN

CCG has a proven track record designing major public and private capital infrastructure works, which include potable/reuse water distribution and complete sanitary sewer system works. The CCG team works closely with our client at every stage providing value engineering, contract documents, approval and permitting coordination to move public and private infrastructural development projects through the approval and permitting process efficiently and effectively.

### TOPOGRAPHICAL SURVEYS

CCG has quality experience in collecting and processing topographical survey data. Our Engineers and Technicians are well versed with data collection using a total station or GPS RTK systems. CCG has a full complement of total stations and GPS System for field data collection.

### TENDER AND CONSTRUCTION DOCUMENTS

CCG has extensive experience in the delivery of public and private works tender (Bid) and construction documents including contract documents and specifications. CCG has represented public, private and quasi-public clients with coordination and oversight of the tender process, delivery of construction and contract documents resulting in quality projects whilst minimizing the potential for claims.

### CONSTRUCTION SUPERVISION AND CONTRACT ADMINISTRATION

CCG has a proven track record in providing comprehensive construction supervision and contract administration services as the owner's representative on a wide range of public and private civil engineering projects (Including CDB/IDB Funded Projects). CCG's specialists are well versed with North American, European, and Caribbean contract documents format used for procurement of contracting services for minor and substantial works. The CCG Team is well versed with FIDIC, AIA, EJDC and other contract documents, quality assurance and control methodologies and requirements. The CCG Team is Green Advantage, Storm Water Pollution Plan Preparation certified and FIDIC contracts trained.



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Topographical & Site Engineering | Construction Supervision & Construction Administration



# CWWA Executive Council 2016/2017



From Left to Right: Past President - Jason Johnson; Ordinary Member - Marissa McMillan; Secretary - Candice Santana; Vice President - Noel Whyte; President - Alphonsus Daniel; Vice President - Ivan Rodrigues; Treasurer - Winston Jailal; Public Relations Officer - Sara-Jade Govia; Ordinary Member - Marlon Daniels



**ABOUT US**

The Caribbean Water and Wastewater Association (CWWA) is a regional non-governmental organization established by an Act of Parliament in Trinidad & Tobago in 1991. The CWWA is a grouping of water, wastewater and solid waste professionals in the public and private sectors.

**VISION**

The preeminent Association of professionals, practitioners for water and waste sectors in the Caribbean

**MISSION**

CWWA brings together the water and sanitation community in the Caribbean towards the protection of public health and the promotion of sustainable development. Through collective leadership, CWWA positively influences advancements in technology, education, science, management, and country and regional policies in the water and sanitation field

**AIMS AND OBJECTIVES**

- To promote education and training in water supply, wastewater and solid waste disposal to ensure an adequacy of trained manpower and well-informed members of the public.
- To encourage the study, research and development in water supply, wastewater and solid waste disposal, and the publication of the results of such work, so as to provide for appropriate and dynamic technological advances in the Caribbean.

**BENEFITS & ACTIVITIES**

- **Our annual Conference and Exhibition** - rotates in a different Caribbean Island and promotes:
  - Technical Paper Presentations
  - Regional Water Ministerial Forum
  - Technical Training Sessions
  - Exhibition of new technology and systems

- Venue for meeting of regional bodies such as CEHI, CAWASA, IWCAM and GWP-C

- Award Ceremony where individuals are recognized for:
  - o prolonged and outstanding service to the sector and
  - o for overall excellence in the presentation of technical papers

**Inter-sector collaboration and technical co-operation partners:**

- **AIDIS** - Inter-American Association of Sanitary and Environmental Engineering
- **PAHO** - Pan American Health Organization
- **CReW** - Caribbean Regional Fund for Wastewater Management
- **CARIWOP**- Water Operators Partnership for the Caribbean
- **UN-HABITAT** - United Nations Human Settlements Program
- **IADB**-Inter-American Development Bank
- **CDB** - Caribbean Development Bank
- **UNEP** - United Nations Environment Program
- **CWWA-Canada** Water and Wastewater Association
- **CEHI**-Caribbean Environmental Health Institute
- **CAWASA**- Caribbean Water and Sewerage Authority
- **GWP -C** Global Water Partnership- Caribbean
- **CaribDA**-Caribbean Desalination Association

**CWWA Newsletter and News in the Sector**

Members receive an electronic copy of the CWWA 'INFOstructure' Newsletter, and receive online Sector News which keeps them informed on current regional and international developments.

- **Training and Development**  
Promote new developments in water supply and waste disposal through seminars & workshops.

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Quarter Page Horizontal	\$175	\$330	\$475	\$600
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Submit your NEWS, editorial or technical case study for consideration!

*(informative and non-sales related content only please!)*



**CARIBBEAN WATER AND WASTEWATER ASSOCIATION**