Office of Utilities Regulation

National Water Commission

Interim Tariff Review 2019 - 2021

Determination Notice

OFFICE OF UTILITIES REGULATION

2019 December 09

DOCUMENT TITLE AND APPROVAL PAGE

DOCUMENT NUMBER: 2019/WAS/007/DET.003

DOCUMENT TITLE: National Water Commission Interim Tariff Review 2019-2021

Determination Notice

PURPOSE OF DOCUMENT:

This document sets out the Office's decisions on the rates to be charged by the National Water Commission for the provision of water and sewerage services.

ANTECEDENT DOCUMENTS:

Document Number	Document Title	Publication Date
2013/WAS/004/DET.003	National Water Commission Review of Rates- Determination Notice	2013 October 01
2014/WAS/004/RCN.001	Reconsideration of the Office's Decision: Determination Notice (Document No. 2013/WAS/004/DET.003) on "National Water Commission Review of Rates"	2014 July 24
2015/WAS/002/RFW.001	Regulatory Framework for the National Water Commission (October 2013-September 2018)	2015 April 20
2016/WAS/003/DET.001	Determination Notice - National Water Commission Mid-Tariff Review 2016	2016 December 5

APPROVAL:

This document is approved by the Office of Utilities Regulation and the decisions therein becomes effective as of 2019 December 09.

On behalf of the Office:

Ansord E. Hewitt

Director-General

CONTENTS

Abstract

On 2018 October 02, the National Water Commission (NWC/Commission) submitted a request to the Office of Utilities Regulation (Office/OUR) for a review of its tariffs and service standards (Tariff Application). In the Tariff Application, the NWC, among other things, requested a reduction in the price cap tariff period from five (5) years to three (3) years (January 2019 to December 2021) and a total revenue requirement of J$33.9 billion, excluding a return on equity.

The Tariff Application was deficient in many respects, and in particular, a cost of service study was not included. In light of this, the Office concluded that it would not accord with good regulatory practice to put in place a five (5) year tariff. Consequently, the Office has approved an interim tariff for a twenty four (24) month period.

The approved interim tariff is conditioned on the NWC's undertaking to carry out specific studies and to provide key inputs in a new tariff application. The inputs include the following:

a) A cost of service study (based on criteria set by the OUR);
b) An asset re-valuation study (based on criteria set by the OUR, if a study conducted by NWC's consultants, Ernst & Young, proves to be unsatisfactory);
c) A credible five (5) year financial plan; and
d) A corporate governance plan.

Definitions, Abbreviations and Acronyms

2013-2018 Determination Notice	National Water Commission Review of Rates - Determination Notice (Document No. 2013/WAS/004/DET.003) dated 2013 October 01
2016 Mid-Tariff Determination Notice	Determination Notice - National Water Commission Mid-Tariff Review 2016 (Document No. 2016/WAS/003/DET.001) dated 2016 December 5
Tariff Application	National Water Commission Tariff Submission for the Period January 2019 to December 2021 dated 2018 October
Revised Tariff Proposal	National Water Commission Proposed Adjustments to Draft Determination Notice for Interim Tariff 2019 -2021 dated 2019 June National Water Commission K-Factor Programme 2019 -2024 dated 2019 June

ANPAM	-	Annual Reset for Price Adjustment Mechanism
BOJ	-	Bank of Jamaica
B	-	Billion
CAPM	-	Capital Asset Pricing Model
CIS	-	Customer Information System
Commission/NWC	-	National Water Commission
CPI	-	Consumer Price Index
CREW Project	-	Caribbean Regional Fund for Wastewater Management
CRP	-	Country Risk Premium
CWIP	-	Construction Work in Progress
CWTC	-	Central Wastewater Treatment Company Limited
EDWT	-	interim
EMP	-	Energy Management Plan
EPI	-	Early Payment Incentive

FE	-	Foreign Exchange
FIS	-	Financial Information System
FY	-	Financial Year
GCT	-	General Consumption Tax
GDP	-	Gross Domestic Product
Government/GOJ	-	Government of Jamaica
IDB	-	Inter-American Development Bank
IFRS	-	International Financial Reporting Standards
IG	-	Imperial Gallon
JMD or J$	-	Jamaican Dollars
KMA	-	Kingston Metropolitan Area
KSA	-	Kingston and St. Andrew
KWh	-	Kilowatt-hours
lpcd	-	litres per capita per day
LPF	-	Late Payment Fee
M	-	Million
Migd	-	Million Imperial Gallons Daily
m^3	-	Meter Cube
MMRP	-	Mature Market Risk Premium
MTAOP	-	Meter Testing Administrative and Operational Protocol for the Electricity and Water Sectors in Jamaica (Document No. 2016/GEN/004/RUL.001) dated 2017 October 3
NBV	-	Net Book Value
NEPA	-	National Environment and Planning Agency
NRW	-	Non-Revenue Water
NWC	-	National Water Commission
NWC Act	-	National Water Commission Act
NWC Regulations	-	Regulations promulgated under the National Water Commission Act

O&M	-	Operating and Maintenance
Office/OUR	-	Office of Utilities Regulation
OPEX	-	Operating expenditure
OUR Act	-	Office of Utilities Regulation Act
PAM	-	Price Adjustment Mechanism
PPE	-	Property Plant and Equipment
S&P	-	Standard and Poor
SCADA	-	Supervisory Control and Data Acquisition
UDC	-	Urban Development Corporation
USA	-	United States of America
USD	-	United States of America Dollars
VFDs	-	Variable Frequency Drives
WACC	-	Weighted Average Cost of Capital
WTP	-	Water Treatment Plant
WWTP	-	Wastewater Treatment Plant
YTM	-	Year to Maturity

EXECUTIVE SUMMARY

1. NWC's Tariff Application

1.1. On 2018 October 02, the National Water Commission (NWC) applied to the Office of Utilities Regulation (OUR/Office), for a review of its rates and service standards (Tariff Application). In its Tariff Application, the NWC stated that its submissions supported the following objectives:

- Improving and expanding potable water and sewerage services;
- Encouraging and improving operating efficiencies; and
- Creating the financial viability necessary to sustain its day-to-day operations.

1.2. The NWC argued that its request for a rate increase took into account the affordability of the service to its 'poor or middle class customers', and was also designed to keep its large customers on the system.

1.3. NWC proposed a reduction in the rate review period from five (5) years to three (3) years. The Commission indicated that it was currently 'exploring new governance, business model, and Public-Private-Partnership (PPP) options' which would heighten efficiency levels. However, these initiatives would 'take about 3 years to roll out'. Accordingly, it argued that it would be more appropriate to capture the expected cost reductions from these initiatives in the new tariffs three (3) years after the 2018 Tariff Review.

1.4. The proposed tariff was predicated on a revenue requirement of $33.9 B. This translated to an average increase of 23% for revenue from water charges and 38% for revenue from sewerage charges, relative to NWC's 2017 test-year revenues. The overall requested increase for the 2017 test-year revenues were 26%. Having seen the OUR's draft Determination Notice on its Tariff Application, which was premised on the approval of a 16% K-Factor, the NWC in 2019 July, submitted a Revised Tariff Proposal which was centered on an accelerated capital programme to reduce non-revenue water (NRW). The revised proposal renewed the request for a 20% K-Factor. The Revised Tariff Proposal made no other change to the original Tariff Application except that the NWC indicated a willingness to accept a lower increase in its basic tariff in exchange for a 20% K-Factor.

1.5. As reflected in its original Tariff Application NWC proposed the following changes to its existing rate structure:

i. The consolidation of its residential tariff structure to three (3) blocks from the existing six (6) blocks.

ii. The implementation of a decreasing block tariff structure for commercial customers with consumption above two (2) million IG/month (i.e. 9.1 million litres/month).

iii. Increase in its commercial (first block), condominiums and schools rate categories by 36% for water and 46% for sewerage.

iv. The introduction of a 'standby charge' for major commercial customers that retain NWC's service connection only as a backup supply.

v. The introduction of a sewerage service charge to reflect the NWC's fixed cost of providing customers with sewerage services.

The K- Factor and X-Factor

1.6. To finance its expenditure on the OUR's approved capital projects, the NWC originally proposed that the K-Factor be kept at the level of 16%. However, as indicated above, the Commission later requested that it be set at 20%. Additionally, NWC proposed that the deemed revenue from its billing to the K-Factor Fund be increased from 88% to 90%. It predicated the 90% K-Factor inflow on an average forty-five (45) days' collection period after billing.

1.7. NWC requested that the X-Factor be set at 0% until 2021. In making the request, NWC suggested that the 0% was not unreasonable since it had not applied for a return on equity.

The Z-Factor

1.8. NWC proposed a Z-Factor to account for exogenous events that affect its operational costs. The Z-Factor was to be treated as a component in the Price Adjustment Mechanism (PAM) and would be triggered if such events:

- affect NWC's costs
- are not due to NWC's managerial decisions
- are not captured by the other elements of the price cap regime.

Price Adjustment Mechanism (PAM)

1.9. The NWC has requested the retention of the monthly PAM that allows for the indexation of its tariff to input prices. The PAM adjusts the base rates for changes in the Consumer Price Index (CPI), electricity costs, and foreign exchange movements (United States Dollar (USD) against the Jamaican Dollar (JMD).

Purchase Water Service Charge

1.10. In its Tariff Application, the Commission proposed that the charges for contracted services to customers be treated as a pass-through of "purchase water service", provided the supply contracts are approved by the OUR. These third party services include bulk water supply, wastewater collection and Non-Revenue Water (NRW) reduction services.

Economic Development Wastewater Tariff (EDWT)

1.11. The NWC proposed the elimination of the Economic Development Wastewater Tariff (EDWT). The EDWT is a reduced wastewater tariff for commercial consumers that are deemed to have lower volumes of wastewater outflow than water inflow. This circumstance would arise when water is a significant input in the product being produced by the commercial customer. Under the proposed arrangement, all commercial customers would be charged the same sewerage rates. However, the NWC would apply normal commercial sewerage rates to reduced volumes, provided the commercial entity can prove that its sewerage volume is less than the water volume consumed.

Estimated Sewerage Service Bills

1.12. The NWC requested that it be allowed to issue estimated sewerage service bills to customers with disconnected water supply service for non-payment of water bills. This is because these customers would continue to benefit from the Commission's sewerage services, since even with the disconnection of water services the customer would still be connected to the sewerage network.

Late Payment Interest Charge and Early Payment Incentive /Late Payment Fee

1.13. The NWC proposed the introduction of an interest charge for late payments by commercial customers. This would be applied to balances that remain unpaid for seven (7) days after the due date. In addition, it proposed that the existing late payment fee (LPF) and early payment incentive (EPI) of $250 each for residential customers remain unchanged.

Guaranteed Standards Scheme

1.14. NWC requested the retention of the existing Guaranteed Standards Scheme.

2. PROCEDURAL ASSESSMENT & ANALYSIS OF THE APPLICATION

2.1. Given that the NWC's previous tariff period was set for 2013 October 01 to 2018 September 30, NWC was expected to submit its tariff application for a Rate Review by 2018 June 01. This would have allowed sufficient time for the required regulatory assessment, all other things being equal, and for the implementation of new rates on 2018 October 01. In the months prior to 2018 June, the NWC engaged the OUR to discuss the requisite information for the conduct of the Rate Review. There was an understanding that as part of the Rate Review exercise, the NWC would include in its application, among other things, a Cost of Service study and an Asset Revaluation Report.

2.2. Upon submission and consequent on its initial review of the Tariff Application, the OUR made further enquiries about the information presented and requested additional information to aid the Rate Review. Arising from its enquires and the NWC's response the OUR concluded that:

1) In the absence of the cost of service study, the OUR was unable to arrive at a new tariff structure that is cost reflective.
2) The asset valuation report appeared not to have been completed in time for the submission and hence its exclusion from the Tariff Application.
3) The NWC relied on its 2013 asset valuation performed by its consultants Castalia, and subsequently approved by its auditors. This resulted in 2012 fixed assets of $37.3 billion revalued to $65.2 billion.
4) Due to the asset revaluation exercise conducted in 2013, depreciation, which flows from it, amounted to $5.1 billion, a 73% increase over 2013.
5) The Tariff Application was bereft of a report on or justification for the retention of the K-Factor rate of 16%.
6) The Tariff Application lacked a review of the efficiency gains/productivity improvement achieved by the NWC through the X-Factor over the Five-Year Rate Review period.
7) Additional information was required for even a limited Rate Review that reasonably captured the Commission's realities.

2.3. Furthermore, the NWC was very tardy in responding to the OUR's request for additional information. Consequently, given the extent of the information gap in the Tariff Application and NWC's response, in 2018 December the Office took the decision to:

- *Stop the Clock:* in relation to the time required for processing of the Tariff Application. Accordingly, the NWC was given until 2019 January 30 to provide critical data to the OUR, before the clock would be restarted.

- *It would only be prepared to approve an Interim Tariff:* for a twenty-four (24) month period in light of the absence of the cost of service study. NWC would therefore be required to submit a more complete application for a Rate Review within two (2) years of the issuance of the decision.

2.4. On 2019 February 01, the OUR received a response from the NWC with the requisite information for the Interim Tariff Review. The following is a summary of the analysis that flowed from the Interim Tariff Review.

The Analysis of the NWC's Proposals

2.5. The OUR has reviewed the NWC's revenue requirement and its analysis suggests that it should be increased to $31.3 billion instead of the $33.9 billion proposed by the NWC. Of this amount, $24.3 billion is for potable water services and $7.0 billion is for sewerage services. This represents an overall increase of 16.6% compared with NWC's requested 26.2% increase. The details are shown in Table 2.1 below.

Table 2.1: NWC Proposed vs. OUR Approved Revenue Requirement

	Water (J$'000')		Sewerage (J$'000')		Total (J$'000')	
	NWC Proposed	OUR Approved	NWC Proposed	OUR Approved	NWC Proposed	OUR Approved
Total Operational Expenses	21,102,438	20,832,172	5,781,848	5,592,427	26,884,286	26,424,599
Loan Interest	1,711,627	1,053,360	644,560	396,672	2,356,187	1,450,032
Depreciation & Amortisation	3,798,586	3,219,271	1,430,463	1,190,689	5,229,049	4,409,961
Return on Equity	-	-	-	-	-	-
Taxation	-	-	-	-	-	-
Revenue Adjustment (for bulk water, new installation etc.)	(509,789)	(509,789)	(39,739)	(39,739)	(549,528)	(549,528)
Overall Revenue Requirement	**26,102,862**	**24,595,014**	**7,817,132**	**7,140,049**	**33,919,994**	**31,735,063**
Stretch Factor Adjustment (1.26%)	-	(310,674)	-	(90,190)	-	(400,864)
Approved Revenue Requirement	**26,102,862**	**24,284,340**	**7,817,132**	**7,049,859**	**33,919,994**	**31,334,200**
Test Year Revenues	21,210,222	21,210,222	5,661,627	5,661,627	26,871,849	26,871,849
Shortfall	4,892,640	3,074,118	2,155,505	1,388,232	7,048,145	4,462,351
Increase	**23.1%**	**14.5%**	**38.1%**	**24.5%**	**26.2%**	**16.6%**

2.6. In response to the NWC's proposal to consolidate the residential tariff structure into three (3) blocks from six (6) blocks, the OUR is of the view that the consolidation of the block structure is consistent with the tariff principle of simplicity. However, in the absence of more detailed information it has deemed it would be more prudent to consolidate to four (4) blocks in this determination notice.

2.7. The NWC proposed a decreasing block tariff structure for commercial customers with consumption above 2 million IG[1]/month. This would entail setting the volumetric rate for

[1] One imperial gallon (IG) is equivalent to 4.54609 liters

the '0 – 2 Million IG' block 36% above the prevailing rate, while setting the '2 Million IG and above' block at 35% below the existing rate. Considering the balance between the public's perception of fairness and the risk of the defection of large commercial customers, the Office has approved an increase of 7.0% on the current rate for consumers in the first block and a reduction of 20.4% for commercial customers in the second block. The details are shown in Table 2.2 below. Sewerage rates on the other hand, will see a 36.2% increase on the first block and a 20.4% reduction on the second block.

Table 2.2: OUR Approved Commercial Water & Sewerage Rates

Customer Block	Water Tariff			Sewerage Tariff		
	NWC Current $	OUR Approved $/'000IG	% Change	NWC Current $/'000IG	OUR Approved $/'000IG	% Change
0-2Million IG	1,768.00	1,891.76	7.0%	1,604.58	2,184.99	36.2%
Over 2 Million IG	1,768.00	1,102.68	-37.6%	1,604.58	1,276.60	-20.4%

Commercial Customers Standby Charge

2.8. In response to the NWC's request for the introduction of a standby charge for major commercial customers, the OUR takes the view that the request is reasonable. NWC incurs a cost in having additional capacity available for these occasional consumers; therefore, it is only fair that they should pay the incremental cost commensurate with the convenience. The approved standby rates and charges based on the OUR's analysis are as shown in Table 2.3 below.

Table 2.3: OUR Approved Rates Standby Charge Components

Component	Rate/Charge
	($/1000 IG)
Standby Contract Capacity Charge (Monthly)	781.00
Volumetric Rate (for actual consumption)	828.47
Excess Penalty (for consumption above contracted capacity)	781.00

Condominium Rates

2.9. The NWC requested an increase to its condominium rates of 36% and 46% for water and sewerage respectively. Based on the OUR's analysis of the costs, an increase of 7% in water

rate and 36.1% in sewerage rate for this customer category are approved as shown in Table 2.4 below.

Table 2.4: OUR Approved Rates for Condominiums

Details	Current Tariff	Approved Tariff	Change
	($/1000 IG)	($/1000 IG)	%
Water	877.00	938.43	7.0%
Sewerage	796.00	1,083.00	36.1%

School Rates

2.10. In its Tariff Application, the NWC proposed increase of 36% and 46% in the water and sewerage rates respectively for schools. The Office has approved increases of 6.0% for the water rate and 34.9% for the sewerage rate for schools as shown in Table 2.5 below.

Table 2.5: OUR Approved Rates for Schools

Details	Current Tariff	Approved Tariff	Change
	($/1000 IG)	($/1000 IG)	%
Water	707.00	749.69	6.0%
Sewerage	642.00	865.89	34.9%

Sewerage Charge for Inactive and Delinquent Accounts

2.11. A new charge is also being proposed for customers who have been disconnected from the NWC water supply for non-payment of bills, but still benefit from sewerage services. The OUR takes the view that while the proposal is reasonable, among other things, the NWC's proposal has not passed the concept stage and requires further development. In light of this, the NWC's request to apply the sewerage charge has been denied.

Charge for Reduced Sewerage Volume

2.12. The NWC has proposed the introduction of a new regime for charging commercial customers who use water as an input to their operations, but who do not return all water as wastewater to the NWC's sewerage network. This charge is intended to replace the EDWT, which allows a lower sewerage rate for these customers. The OUR takes the view that the proposed methodology which places the emphasis on volumes instead of the rate is feasible but, among other things, the NWC did not present an implementation strategy.

Consequently, the issue of what is required as proof to demonstrate actual sewerage volumes by customers was not addressed. The OUR, at this point, denies the NWC this request. However, it is recommended that NWC develop for the next tariff application exercise, a well thought-out implementation strategy that would minimize the risk of subjectivity and controversy. Accordingly, the EDWT shall remain in effect.

Late Payment Interest Charge and Early Payment Incentive /Late Payment Fee

2.13. With respect to the late payment interest charge to commercial accounts that remain unpaid seven (7) days after the due date of the bill, the OUR takes the view that this is not an unreasonable proposal. This augurs well for the reduction of NWC's collection days. However, the NWC is required to develop and present a proposal to the OUR within six (6) months of the effective date of this Determination Notice, for the OUR to take a final decision regarding this issue.

2.14. Accordingly, the Office, in principle, has approved the late payment interest charge proposal. The Office also approves the continuation of the NWC's current LPF/EPI of -$250/+$250.

Price Adjustment Mechanism

2.15. The PAM shall continue to be applied to customer's bills on a monthly basis. The annual reset of the base values for the three (3) components set out in Table 2.6 below shall take effect on each anniversary of the effective date of this Determination Notice. The approved weights for the PAM indices (CPI, FX and kWh) are as shown in Table 2.6 below.

Table 2.6: OUR Approved PAM Weights

Component	NWC		OUR Approved Weight
	Current Weight	Proposed Weight	
CPI	51%	58%	62%
Electricity	25%	20%	20%
Foreign Exchange	24%	22%	18%
Total	**100%**	**100%**	**100%**

The base values for the PAM indices (CPI, FX and kWh) as at 2019 February are as follows:

- Electricity - $34.09/kWh;
- Exchange Rate - J$133.82 to US$1.00; and
- CPI All divisions - 254.30

K-Factor

2.16. Based on the NWC's objective to accelerate the pace of NRW reduction the OUR has taken the position that the K-Factor should be increased from 16% to 20% with a deemed collection rate of 90%. However, the OUR's cash flow projections derived from the NWC's Revised Tariff Proposal indicates that, except for year-1, outflow exceeds inflow. The NWC is therefore required to refine the priority and the sequencing of its projects and present a revised slate of NRW projects to the OUR for approval within 3 months of the date of this Determination Notice. The Office has decided that the Commission's draw down on the incremental increase in the K-Factor Fund is contingent on the OUR's approval of its refined slate of projects, failing which the K-Factor level at the end of the 6-month period will be rolled back to 16%.

X-Factor

2.17. In the absence of a productivity study, and given that no empirical evidence was presented by the NWC showing improvements in its efficiency, the OUR has taken the position that the X-Factor shall be set at 5.0% of its revenues from 2019 to 2021. During this period, the NWC will be expected to undertake a productivity study, which should not merely indicate its efficiency level, but identify the strategies it should employ to raise its productivity level.

Z-Factor

2.18. The OUR recognizes the NWC's vulnerability to exogenous factors such as natural disasters. Accordingly, the Office has approved NWC's request for a Z-Factor to be included in the tariff mechanism. However, because of the sparseness of information provided, the NWC is required to develop and present the information necessary for the implementation of a robust mechanism that effectively serves the needs of the Commission and its customers. If the NWC submits the requested information to the OUR in a timely manner and the OUR is satisfied with the proposed mechanism, the Z-Factor will be implemented one (1) year time after the effective date of this Determination Notice. The NWC should include in its Z-Factor submission to the OUR, the proposed methodology for funding Z-Factor events.

Quality of Service Standards

2.19. The OUR is of the view that there needs to be continuous improvement in the quality of service that is being delivered by the providers of utility services. This is the basis on which the OUR plans to undertake a comprehensive review of the NWC's quality of service standards within the next twenty-four (24) months. In light of this, the Office takes the position that the revision of the NWC's service standards should await the insights that will be generated in the comprehensive review. In this context, the Office has accepted the NWC's proposal to maintain the existing Guaranteed Standards Scheme until the next Rate Review.

Bill Impact

2.20. Table 2.7 below shows a summary of the bill impact of the Office determined rates versus the NWC's proposed rate increases.

Table 2.7 Summary of the Bill Impact: NWC Proposed vs. OUR's Approved Rates

Customer Type	Avg. Consumption per Month (IG)	WATER		SEWERAGE		COMBINED	
		Bill Impact		Bill Impact		Bill Impact	
		NWC Proposal	OUR Approved	NWC Proposal	OUR Approved	NWC Proposal	OUR Approved
Residential	3,303	29.2%	4.3%	84.3%	30.5%	42.1%	16.6%
Commercial	15,874	31.5%	4.4%	58.3%	33.0%	45.6%	17.8%
Condominiums	88,571	33.1%	4.3%	45.1%	33.0%	41.1%	17.3%
Schools	67,525	32.6%	3.7%	45.4%	31.7%	39.8%	15.5%

3. LEGISLATIVE AND REGULATORY FRAMEWORK

3.1. The role and function of the OUR in the water and sewerage sector is governed by the provisions of the OUR Act. Section 4(1) (a) of the OUR Act provides that the OUR is empowered to *"regulate the provision of prescribed utility services by licensees or specified organizations"*. The provision of sewerage services and the supply and distribution of water are included among the prescribed utility services defined in the First Schedule of the OUR Act.

3.2. Sections 4(4), 11 and 12 of the OUR Act expressly authorises the Office to determine the rates charged for the provision of a prescribed utility service. The sections read:

> *"4(4) The Office shall have power to determine, in accordance with the provisions of this Act, the rates or fares which may be charged in respect of the provisions of a prescribed utility service."*

> *"11. - (1) Subject to subsection (3), the Office may, either of its own motion or upon application made by a licensee or specified organization (whether pursuant to subsection (1) of section 12 or not) or by any person, by order published in the Gazette prescribe the rates or fares to be charged by a licensee or specified organization in respect of its prescribed utility services.*
>
> *(2) For the purposes of this section, the Office may conduct such negotiations as it considers desirable with a licensee or specified organization, industrial, commercial or consumer interest, representatives of the Government and such other persons or organizations as the Office thinks fit.*
>
> *(3) The provisions of subsections (1) and (2) shall not apply in any case where an enabling instrument specifies the manner in which rates may be fixed by a licensee or specified organization."*
>
> *"12. - (1) Subject to subsection (2), an application may be made to the Office by a licensee or specified organization by way of a proposed tariff specifying the rates or fares which the licensee or specified organization proposes should be charged in respect of its prescribed utility services and the date (not being earlier than the expiration of thirty days after the making of the application) on which it is proposed that such rates should come into force (hereinafter referred to as the specified date).*

(2) As respects a specified organization referred to in section 13 an application made under subsection (1) of this section shall take into account the provisions of section 13.

(3) Where an application by way of a proposed tariff is made under subsection (1) notice of such application and, if so required by the Office, a copy of such tariff shall be published in the Gazette and in such other manner as the Office may require.

(4) A notice under subsection (3) shall specify the time (not being less than fourteen days after the publication of the notice in the Gazette) within which objections may be made to the Office in respect of the proposed tariff to which the notice relates.

(5) Subject to the provisions of this Act, the Office may, after the expiration of the time specified in the notice under subsection (3), make an order either –

(a) confirming the proposed tariff without modifications or with such modifications as may be specified in the order; or

b) rejecting the proposed tariff.

6) If, after publication of notice of an application in accordance with subsection (3), no order under subsection (5) has been made prior to the specified date, the proposed tariff shall come into force on the specified date.

(7) An order confirming a proposed tariff shall not bring into operation any rates or fares on a date prior to the date of such order."

3.3. The NWC is a body corporate established by virtue of Section 3 of the National Water Commission Act ("the NWC Act"), and is a specified organization as defined under section 2 of the OUR Act. Section 4 (1)(d) & (e) of the NWC Act empowers the NWC to *"within the limits of its resources provide and improve water supply services throughout the Island" and "maintain and operate water supply services provided by the Commission".*

3.4. Section 11 of the NWC Act requires that the rates imposed by the NWC should be sufficient to cover its reasonable costs and expenses. Subsection (1) of section 11 in particular states:

"11.- (1) All rates and charges imposed by the Commission for water sold by the Commission in bulk or direct to consumers, and for services rendered by the Commission, shall be so fixed that, taking one year with another, the revenue derived in any year by the Commission from such sales and services, together with its revenue (if any) in such year from other sources, will be sufficient and only sufficient, as nearly as might be, to pay all remunerations, allowances, salaries, gratuities, working expenses and other outgoings of the Commission properly chargeable to income in that year, including the payments falling to be made in such year by the Commission in

respect of the interest on, or repayment of, the principal of any money borrowed by the Commission and provision for the redemption of securities issued by the Commission under this Act, and such sums as the Commission may think proper to set aside in that year for reserve fund, expansions, extensions, renewals, depreciation, loans and other like purposes."

3.5. The NWC has applied, and has made a tariff submission, to the OUR for approval of its tariff and quality of service standards with respect to its water supply and distribution and sewerage services.

4. INTRODUCTION

4.1. On 2018 October 02, the NWC submitted its Tariff Application to the OUR for a review to its water and sewerage rates and quality of service standards. Based on convention, the Office sets the NWC tariff on a five (5) year review cycle. However, the NWC requested in its Tariff Application that the OUR consider a three (3) year tariff period - 2019 January to 2021 December - instead of the usual five (5) years. In addition, to its original Tariff Application, the NWC in 2019 July submitted a Revised Tariff Proposal which essentially retained all the elements of its earlier submission, but requested an acceleration in its K-Factor programme through an increase in its K-Factor allotment from 16% to 20%.

4.2. The NWC argued in its Tariff Application that it was presently engaged in activities centered on 'exploring new governance, business model, and Public-Private-Partnership (PPP) options' that would improve its efficiency. These initiatives would 'take about 3 years to roll out'. Consequently, the NWC asserts that it would be more appropriate to capture the expected cost reductions from these initiatives in the new tariffs three (3) years after this Tariff Review. Hence, it proposed a zero X-Factor.

4.3. The NWC outlined the following objectives in its Tariff Application:

- To support the purpose of improving and expanding potable water and sewerage services to address the needs of the people of Jamaica;
- To encourage the utility to improve operating efficiencies by providing appropriate incentives;
- To achieve financial viability to autonomously sustain its operations and finance system developments.

4.4. The NWC requested that the 'price cap approach', previously applied by the OUR, be maintained as the tariff setting methodology in the rate review exercise. Additionally, the Commission requested that its revenue requirement excludes a return on equity and be set equal to its operating expenses, loan interest and depreciation.

4.5. Further, the NWC pointed out that the cost of service used to compute the proposed tariff was based on the building block approach and that the referenced test year data was from its Audited Financial Statements for the fiscal year 2017/2018. The proposed tariff was predicated on an effective revenue requirement[2] of $33.9 billion. This would translate to an average increase of 23.1% for revenues from water charges, and 38.1% for revenues from sewerage charges, relative to the NWC's 2017 test-year revenues. The overall requested increase in the 2017 test-year revenues was 26%.

[2] The effective revenue requirement is equivalent to total revenue less K-Factor revenues.

4.6. In addition, the NWC proposed the following changes to its existing rate structure:

i. Consolidate its residential tariff structure to three (3) blocks from the existing six (6) blocks.

ii. Implement a decreasing block tariff structure for commercial customers with consumption above 2 million IG/month (i.e. 9.1 million litres/month).

iii. Increase its commercial (first block), condominiums and schools rate categories by 36% for water and 46% for sewerage.

iv. Introduce a 'standby charge' for major commercial customers that retain NWC's service connection only as a backup supply.

v. Introduce a sewerage service charge to reflect NWC's fixed cost of providing customers with sewerage services.

4.7. The NWC also proposed that:

- The K-Factor be held at its existing level of 16%. However, this initial request was subsequently modified to 20% in the NWC's Revised Tariff Proposal.
- The X-Factor be reduced from its current level of 6.2% to zero.
- A Z-Factor be included in the price cap mechanism to address the cost impact of exogenous factors, over which the company has no control.
- The existing PAM be kept intact.
- The pass-through of the cost incurred by way of a 'purchase water service' charge to customers for water purchased by NWC from third party suppliers, provided such services are approved by the OUR.
- the replacement of the EDWT by charges calculated on the basis of the sewerage volumes verified by large commercial customers.

4.8. This document sets out the OUR's analysis of the Tariff Application as revised and the decisions arrived at with respect to the NWC's requests.

Structure of the Document

4.9. The document is organized as follows:

- The preceding Chapters 1 and 2 provide an executive summary of NWC's Tariff Application and Revised Tariff Proposal and the main decisions taken by the Office;
- Chapter 3 sets out the legislative and regulatory framework for the Rate Review;
- Chapter 4 introduces the Rate Review;

- Chapter 5 examines the Rate Review Period;
- Chapter 6 presents a summary of the key features of the Tariff Application and Revised Tariff Proposal;
- Chapter 7 provides the OUR analyses, evaluations and determinations with regard to NWC's rate base, return on investment and the revenue requirement;
- Chapter 8 examines NWC's operating expenses;
- Chapter 9 examines various features of the tariff design;
- Chapter 10 discusses the Capital Expenditure Program (K-Factor) and the Productivity Efficiency Factor (X-Factor);
- Chapter 11 presents the discussions and the Office decisions on the Guaranteed and Overall standards.

5. THE RATE REVIEW PERIOD

5.1. The NWC's previous tariff period was envisaged to span the period 2013 October 01 to 2018 September 30. Consequently, the Commission was expected to submit its application for a Rate Review by 2018 June 01. This would allow sufficient time for the required regulatory assessment, all other things being equal, for the implementation of new rates on 2018 October 01.

5.2. In the months prior to 2018 September, the NWC engaged the OUR to discuss the requisite information for the conduct of the Rate Review. Also, as part of the preparation exercise, the OUR had several meetings with the NWC and its tariff consultants. There was an understanding that as part of the Rate Review exercise, the NWC would include in its application for tariff review, among other things, a Cost of Service study and an Asset Revaluation Report.

5.3. Purportedly, in preparing for the 2018 Tariff Review, the NWC by way of a letter dated 2017 September 29, submitted a draft Terms of Reference (TOR) for the OUR's review. The TOR sought to outline the objectives of the 2018 Tariff Review and guide the selected consultant as to the tasks to be carried out in support of the tariff submission.

5.4. The NWC, indicated that the tariff study would be done and it would include:

a) A review of the "K" and "X" Factors

b) Cost of service and marginal cost studies

5.5. In its response, the OUR indicated its perspective of how the review of the "K" and "X" Factors could be enhanced and made the following observations:

1) A Cost of Service study was important and should form the basis of determining cost reflective tariffs. The study should, among other things:

   i. identify the amount of customer charge that is to be allocated to each rate class; and

   ii. clearly separate costs and revenues incurred by the water and sewerage functions of the company, as well as outline the methodology used to separate them.

2) A Marginal Cost Study was costly, time consuming, data driven and required a detailed long-term plan, and having regard to this, the OUR would not consider it prudent for such a study to be undertaken at this time.

3) Cost reflective water and sewerage tariffs should be an output derived from the cost of service study.

4) The realignment of the tariff structure was synonymous with cost reflective tariffs.

5.6. Notwithstanding the OUR's responses to the NWC, the Tariff Application failed to capture key elements of the objectives and activities stated in the draft TOR reviewed by the OUR. The main shortcomings were as follows:

1) The Tariff Application did not refer to a plan for corporate governance and institutional strengthening. This component was critical to the NWC's efficiency improvement and project execution capabilities.

2) The Tariff Application was essentially based on NWC's 2017/2018 audited financials, and did not include a review of its corporate and operational performance versus its plan over the previous tariff period.

3) The Tariff Application was bereft of a 5-year Tariff Planning model and a parallel financial plan, even though the OUR provided its perspective on the need for such a tool in the tariff exercise.

4) Even though the K and X Factors are integral to the tariff, the NWC failed to provide:

- A K-Factor plan and performance report to support its request for keeping the K-Factor at 16%;
- A plan that linked the "zero" X-Factor request to the Non-Revenue-Water reduction plan/projection/achievements.

5) The cost of service study was not included in the Tariff Application. Given that the Tariff Application included a proposal for a new tariff structure, the cost of service study was crucial to the restructuring of the tariff and the establishment of tariffs that sent correct price signals to consumers. This was even more critical given NWC's proposal to restructure its tariff blocks.

6) While there were indications, prior to the submission of the Tariff Application, that the NWC would undertake a revaluation of its asset base, no reference is made to such a revaluation in the Tariff Application.

5.7. Notably, at the 2013 Rate Review, the OUR expressed strong disagreements with the revaluation methodology that was used by the NWC's Tariff Consultant, Castalia. Accordingly, the OUR rejected the proposed changes to the value of the NWC's assets included in the 2013 Tariff Application.

5.8. On 2018 June 18, the OUR had discussions with representatives of the NWC and its consultants (Ernst & Young and Castalia) about its proposed asset revaluation. The NWC advised the OUR that Ernst & Young would undertake the revaluation of its assets island-wide using two methods. In addition, the revaluation would inform the preparation of the financial statements and would be the basis for the derivation of the asset cost estimates

for insurance purposes. However, as indicated above, the asset revaluation study was not included in the Tariff Application.

5.9. It was against this background and after further enquiries, that the OUR concluded early in the review of NWC's application that:

1) In the absence of the cost of service study, it would not be able to arrive at a new tariff structure that was cost reflective.

2) The anticipated asset valuation was not completed in time for the Tariff Application submission and hence its exclusion from the Tariff Application.

3) The NWC relied on its 2013 asset valuation that was performed by its Tariff Consultant, and subsequently approved by its auditors, which resulted in 2012 fixed assets of $37.3 billion revalued to $65.2 billion.

4) Due to the asset revaluation exercise that was conducted in 2013, depreciation, which flows from it, would amount to $5.1 billion, a 73 percent increase over 2013.

5) The Tariff Application was bereft of a report on or justification for the retention of the K-Factor rate of 16%.

6) The Tariff Application did not include a review of the productivity improvement achieved by the NWC through the X-Factor over the five-year tariff period.

7) Based on the data provided at the time, additional information was required for even a limited tariff review reasonably capturing the Commission's realities.

5.10. Based on these deficiencies, the Office concluded as follows:

1) *Five-Year Tariff*: It would not accord with good regulatory practice to put in place a five (5)-year tariff at this time. Otherwise, the OUR would be making determinations that were not predicated on a sound analysis of the NWC's underlying cost, or which incorporated the performance trajectory of the Commission. In other words, the OUR determinations would be based on doubtful cost data and its revenue assumptions could not be reasonably justified.

2) *Interim Tariff*: Based on the NWC's financial statement and the changes in costs since the 2013 Tariff Review, the OUR recognized that in the absence of a five (5)-year tariff, the NWC would still need some kind of interim tariff to keep it afloat. For this to be done, however, at a minimum, the NWC would have to provide additional data to facilitate a limited Rate Review.

3) *Suspension of Time (Stopping the Clock) and Receipt of Critical Data*: Based on the extent of the outstanding information that was required to complete the analysis of the Tariff Application, and given the NWC's tardiness in responding

to the OUR's request for additional information, the OUR decided that a suspension of time of the 2018 Tariff Review process was necessary. The clock for processing the Tariff Application would be restarted once the OUR was satisfied that the critical data was received. The information included K-Factor data, a non-revenue water reduction plan, as well as the findings from its latest Asset Revaluation Report.

5.11. On 2019 February 01, the OUR received a response from the NWC with the requisite information. Accordingly, the OUR recommenced its analysis of the Tariff Application.

5.12. The information provided by the NWC provided no basis for the OUR to change its view that it was insufficient for a full analysis and determination of the usual five (5) year tariff, or even the three (3) year tariff requested by the NWC. Consequently, the OUR determined that a twenty-four (24) month Interim Tariff would allow the NWC time to put together the required data and studies for a thorough tariff review in 2021.

5.13. Additionally, the OUR received a Revised Tariff Proposal in 2019 July requesting that the level of the K-Factor be revisited. The proposal highlighted the need to intensify the Commission's effort to reduce NRW, which would require a 20% rather than a 16% K-Factor. This request was taken into account in arriving at the Determinations set out in this Determination Notice document.

Determination 1:

The Office, in its assessment of the NWC's Tariff Application, found severe weaknesses and major data gaps in the submission. Consequently, it has concluded that it would not be prudent to establish the normal five (5) year tariff at this time.

The Office has therefore decided to approve a twenty-four (24) month Interim Tariff. In this regard, the NWC will be expected to formally apply for a full tariff review twenty (20) months after the effective date of this Determination Notice.

6. SUMMARY OF NWC'S SUBMISSION

NWC'S PROPOSED TARIFF REVIEW OPTIONS

6.1. The Tariff Application presented two options for the tariff review exercise:

a) A full cost recovery: this option would involve the full recovery of the cost of providing service, including a rate of return on equity; and

b) A partial recovery option: this option refers to the recovery of all costs of providing service, except for the return on equity.

The NWC expressed a preference for the partial recovery approach. The Commission argued that this approach resulted in a small increase, which would make the service more affordable to its vulnerable customers.

THE FULL COST RECOVERY OPTION

6.2. The revenue requirement under the full cost recovery option was $37.4 billion versus the historic test year revenue of $26.9 billion. As such, the overall increase in rates would be 39%. However, the rate increase for water service and sewerage service would be 35% and 55% respectively (see Table 6.1 below).

Table 6.1 Full Cost Recovery: Required Revenue Increase

	Water	Sewerage	Total
	($'Million)	($'Million)	($'Million)
Revenue Requirement	28,607	8,760	37,367
Historic Test Year Revenue	21,210	5,662	26,872
Shortfall	7,397	3,098	10,495
Required Increase	**35%**	**55%**	**39%**

6.3. Even though the NWC did not conduct an elasticity study, based on benchmarking techniques, it assumed a price elasticity of demand of -0.2[3]. This meant that for every one (1) percent increase in tariff, consumption was likely to be reduced by 0.2%. The NWC therefore argued that the fall in consumption would negatively affect its revenue target. Hence, the water tariff would have to be increased to 50% and sewerage tariffs to 72% to neutralize the effect of falling consumption on its revenue target.

[3] Derived by taking the lower end of the estimated price elasticity of demand calculated by a World Bank study in 1997 and 2009. Price elasticity of water was calculated as -0.02 to -0.75.

6.4. Given the current economic conditions, the NWC suggested that a 50% and 72% increase in tariffs would be problematic as a typical residential consumer household bill[4] would be 6.3% of total household expenditure, which exceeds the affordability benchmark of 5% set by the Government of Jamaica (GOJ). Thus, the NWC proposed that the OUR should not consider the full cost recovery option.

The Partial Cost Recovery Option

6.5. Under the partial recovery option, the NWC proposed that the revenue requirement be set equal to its operating expenses, loan interest and amortization & depreciation. As indicated before, the NWC would forego the return on equity based on this approach.

6.6. The NWC stated that this option would result in a total revenue requirement of $33.9 billion, $26.1 billion of which would be derived from water services, and $7.8 billion from sewerage services. In light of this the company proposed to increase water and sewerage revenues by 23% and 38% respectively (see Table 6.2). This translated to an overall increase of 26%.

Table 6.2 Partial Cost Recovery: Required Revenue Increase

	Water	Sewerage	Total
	($'Million)	($'Million)	($'Million)
Revenue Requirement	26,103	7,817	33,920
Historic Test Year Revenue	21,210	5,662	26,872
Shortfall	4,893	2,155	7,048
Required Increase	**23%**	**38%**	**26%**

NWC'S PROPOSED TARIFF DESIGN

Residential Tariff Design

6.7. The proposed residential tariff design was based on a fixed service charge and multi-tiered volumetric rate structure.

6.8. The service charge was a fixed monthly charge, which is to be applied to customers' bills and is intended to recover a portion of the fixed costs associated with the customers' connection to the NWC's sewerage system. The NWC requested a 5% increase for all customers having a 5/8-inch meter. The NWC posited that a 5% increase would ensure that water bills for the poor would remain affordable, since the majority of its residential customers have 5/8 inch meters. A 26% increase for water service charge was proposed for other customers with larger meter connection sizes.

[4] An average Household is a household of 5 who is in the medium income quartile in Jamaica.

6.9. In addition, the NWC has proposed a separate fixed monthly service charge of $400 for sewerage services. Previously, there was a single service charge that did not distinguish between water and sewerage services.

6.10. The NWC has proposed the consolidation of the existing six (6) rate blocks for residential customers' monthly billing structure into three (3) blocks, which would include a lifeline tier intended for low-income customers. Making reference to the Draft Water Sector Policy Strategy and Action Plan 2018, the NWC argued that the average basic consumption needs per household was 50 litres (or 11 IG) per capita per day. Consequently, 2,000 IG per month would be adequate to meet the monthly needs of a low-income household, given that the estimated average size of households in Jamaica is 4.3 persons. Hence, 'Block 1' (the Lifeline tier) would be 0 - 2,000 IG, instead of the current 0 - 3,000 IG designation.

6.11. 'Block 2' was proposed to span the consumption range of 'above 2,000 – 7000 IG'. The NWC indicated that this block covered the 40th to the 90th percentile band of residential customers. The average consumer in this block uses 125 litres (or 27.5 IG) per capita per day. It was therefore expected that the average customer in this block would see an increase of between 32% and 33%. The NWC contended that even though bills for these customers would increase by over 30%, they would still find their bills affordable as this increase would represent between 4.6% and 4.7% of average household expenditure for that customer block.

6.12. 'Block 3' was termed by the NWC as 'the excess consumption' block, which represented all consumption above 7,000 IG/month. The NWC proposed an increase of 50% above the average cost of service for this customer group.

6.13. With respect to monthly sewerage rates, the NWC requested the following increases for the respective blocks:

- 'Block 1' (0 -2,000 IG): 13%
- 'Block 2' (above 2,000 – 7,000 IG): 19%
- 'Block 3' (above 7,000 IG): 35%

Commercial Tariff Design

6.14. To incentivize commercial customers to stay on its systems, the NWC proposed a decreasing block tariff structure for water and sewerage services. Based on the proposal, commercial customers in the first block (i.e. 0 – 2 million IG) would see a 36% increase in their water and sewerage rates. However, for the incremental consumption above 2 million IG, it is proposed that these commercial customers should be given a 35% reduction in their rate. Table 6.3 shows the proposed pricing structure for commercial customers.

Table 6.3 Proposed Volumetric Tariff & Increase for Commercial Customers

Customer Block	Water	Sewerage	Change
	($/1000 IG)	($/1000 IG)	%
0-2 Million IG	2,396	2,337	36%
Over 2 Million IG	1,147	1,119	-35%

Standby Charge

6.15. The NWC proposed a new standby charge for large commercial customers. No such charge previously existed. The NWC stated that such a charge was important for commercial entities with alternate water supply, but who use the NWC's supply as a backup supply when there is a failure in their own supply.

6.16. The NWC's proposed Standby Charge was based on a fixed monthly charge, which is determined by a maximum contracted capacity and declining block structure. The standby rates and charges proposed by NWC were as follows:

- *Monthly Fixed charge*: $781/1,000 IG/Month x Contracted Maximum Capacity
- *Block 1 (0 – 2 million IG)*: $1,375/1,000 IG
- *Block 2 (above 2 million IG)*: $366/1,000 IG

6.17. According to the NWC, the proposed standby charge was equal to the incremental capacity cost of the NWC's two planned water schemes at Rio Cobre and Rio Bueno.

Condominium Tariff

6.18. Currently, condominiums are billed at a constant volumetric rate. The NWC proposed increases in water rate and the sewerage rate at 36% and 98% respectively for these customers.

School Tariff

6.19. The NWC requested a 36% increase in the water rates for schools. This increase would require that the rate move from $707 to $958 per 1,000 IG/month. In addition, the NWC proposed that the sewerage tariff be set at 98% of the water tariff. Consequently, sewerage rates for schools would increase from $642 to $935 per 1,000 IG/month. NWC also noted that although the proposed rates for schools are subsidized, they were still below the average costs of providing water and sewerage services.

OTHER PROPOSED CHARGES AND FACTORS

K-Factor and X- Factor Adjustments

6.20. The K-Factor adjustment in NWC's tariff mechanism was developed to assist the NWC with funding critical capital expenditure projects that are required to reduce non-revenue water and expand services. In this regard, there is the expectation that through K-Factor expenditure and other initiatives by the NWC, over time, the overall efficiency of supplying water and sewerage services would improve. The X-Factor adjustment was therefore established to facilitate the sharing of the NWC's anticipated efficiency gains with consumers.

6.21. The NWC proposed in its original Tariff Application that the K-Factor be maintained at the existing level of 16%, and the X- Factor be set at 0%. The Commission argued that the efficiency gains achieved from K-factor projects were already included in its cost of service; plus its planned performance-based contracts were set to commence in another two (2) years. The X-factor for its proposed three (3) year tariff period, therefore should be set at zero.

6.22. As previously stated, in a Revised Tariff Proposal the NWC requested that favourable consideration be given to a 20% K-Factor instead of the 16% K-Factor it had initially requested.

Z-Factor

6.23. A request was also made in the Tariff Application for the introduction of a Z-Factor in the tariff mechanism. This was to account for exogenous events that affect the NWC's costs, which were not due to the NWC's managerial decisions, and were not captured by the other elements of the price regime. The NWC proposed that it be applied to the PAM.

Purchase Water Services Charge

6.24. The Tariff Application included a request for the pass-through of the cost for the services of third party providers to customers. These services include bulk water supply, wastewater collection and Non-Revenue Water (NRW) reduction services. The NWC, further proposed that should the OUR approve adjustments to third party providers' rates, the company be allowed to pass through the additional 'purchase water service cost' immediately to customers.

Charge for Reduced Sewerage Volumes

6.25. The NWC proposed a new regime to charge commercial customers, who use water as an input to their operations, but do not return all water consumed as wastewater to the NWC's sewer network. Instead of charging these commercial customers a discount on sewerage rates if water is a significant input in their manufacturing process, the NWC proposed that the billing should be based on the volume of sewage deemed to be returned to its wastewater

system. The NWC suggested that these customers should install a sewerage discharge meter, a sewerage flow monitor device, or an internal process meter to measure the volume of water that does not return to the sewerage system. Consequently, this information would be used in the billing process.

Charges for Inactive and Delinquent Accounts

6.26. There was also a proposal in the Tariff Application that customers, who are disconnected from water supply for non-payment of bills but are still allowed to use the NWC's sewerage system, be billed for the benefit derived from the sewerage service. However, the NWC did not elaborate on how this concept would be implemented.

Late Payment Fee and Early Payment Initiative

6.27. The NWC indicated that it intended to continue its existing EPI/LPF Scheme. Under the arrangement, residential customers are charged a late payment fee of $250 and credited an early payment incentive of $250.

Introduction of Interest Charge for Commercial Accounts

6.28. Additionally, the NWC proposed an interest charge for the late payment of bills by commercial customers. This interest charge would be applied to bills that are unpaid seven (7) days or more after the due date. Without any elaboration of the details of the mechanism, the NWC indicated that the interest charge mechanism would be similar to that applied by the Jamaica Public Service Company Limited (JPS).

Price Adjustment Mechanism (PAM)

6.29. The NWC acknowledged in its Tariff Application that the three (3) indices in the PAM (CPI, FX and kWh) have worked well to track input cost increases. It therefore proposed that these indices be maintained in the upcoming tariff period. However, the Commission suggested a revision of the weights to better align the mechanism with the actual movement of cost. Table 6.4 below shows the proposed changes to the existing PAM weights.

Table 6.4 NWC's Current and Proposed PAM Weights

Component	NWC	
	Current Weight	Proposed Weight
CPI	51%	58%
Electricity	25%	20%
Foreign Exchange	24%	22%
Total	**100%**	**100%**

7. OUR'S ANALYSIS OF THE SUBMISSION

7.1. In keeping with good regulatory practice, rate setting requires a balance between the interest of ratepayers on one hand, and that of the regulated utility on the other. Accordingly, the OUR's analysis is guided by the principle of establishing rates that are sufficient to cover prudently incurred costs, including a reasonable rate of return on investment, while ensuring that rates are kept reasonable and affordable to the customer.

COMPUTATION OF THE RATE BASE

The NWC's Proposal

7.2. In its Tariff Application, the NWC proposed a rate base of $52.4 billion, of which long-term liabilities amount to $42.8 billion and the proposed equity base totals $9.6 billion. These amounts were also reported in the NWC's 2018 audited financial statements. Table 7.1 below gives the further details of the composition of the rate and equity bases.

7.3. As shown in Table 7.1 deferred tax assets amounting to $12.7 billion were included in the NWC's proposed rate base total of $52.4 billion. The deferred tax asset item represents expected future income tax that will become due and payable to the Government, but will be kept by the NWC. The NWC has been reporting accumulated deficits[5] since the year 2005. The Commission is anticipating, however, that it will realize profits in the future. When this happens, taxes will become due and payable. However, given that the Commission is now making losses, the taxes that will become due, will be held by the Commission as an offset to the tax losses that are now being carried forward.

[5] NWC's accumulated deficit as at 2018 March 31 is J$31.9 billion, as reported in its Audited Financial Statement.

Table 7.1: NWC and OUR 2018 Rate Base and Equity Base

Items	NWC ($'000)			OUR ($'000)		
	Water	Sewerage	Total	Water	Sewerage	Total
Property Plant and Equipment	**31,880,160**	**12,005,357**	**43,885,517**	**31,880,160**	**12,005,357**	**43,885,517**
Add				-	-	
Intangible Assets	66,604.30	25,081.70	91,686	66,604	25,082	91,686
Deferred Tax Assets	9,198,322	3,463,883	12,662,205	-	-	-
Exclusions						
Construction Work In Progress (CWIP)						
A. Total Long Term Assets	**41,145,086**	**15,494,322**	**56,639,408**	**31,946,764**	**12,030,439**	**43,977,203**
Add Current Assets:	**6,483,657**	**2,441,601**	**8,925,258**	**6,483,657**	**2,441,601**	**8,925,258**
Consumers' accounts receivable	4,782,127	1,800,843	**6,582,970**	4,782,127	1,800,843	**6,582,970**
Other accounts receivable and prepaid expenses	595,149	224,120	**819,269**	595,149	224,120	**819,269**
Inventories	1,106,381	416,638	**1,523,019**	1,106,381	416,638	**1,523,019**
Subtract Current Liabilities:	**(9,586,185)**	**3,609,944**	**(5,976,241)**	**(9,586,185)**	**3,609,944**	**(5,976,241)**
Deposit and retentions	157,506	59,313	**216,819**	157,506	59,313	**216,819**
Trade acounts payable	5,405,979	2,035,771	**7,441,750**	5,405,979	2,035,771	**7,441,750**
Other accounts payable	2,785,195	1,048,843	**3,834,038**	2,785,195	1,048,843	**3,834,038**
Taxation payable	1,237,505	466,017	**1,703,522**	1,237,505	466,017	**1,703,522**
B. Net Current Liabilities (Working Capital):	**(3,102,528)**	**(1,168,343)**	**(4,270,871)**	**(3,102,528)**	**(1,168,343)**	**(4,270,871)**
Long-term loans	16,840,882	6,341,901	**23,182,783**	16,840,882	6,341,901	**23,182,783**
Deferred income	4,165,516	1,568,641	**5,734,157**	4,165,516	1,568,641	**5,734,157**
Current maturities of long-term loans	10,052,158	3,785,418	**13,837,576**	10,052,158	3,785,418	**13,837,576**
C. Total Long Term Liabilities	**31,058,556**	**11,695,960**	**42,754,516**	**31,058,556**	**11,695,960**	**42,754,516**
RATE BASE (Total Net Asset) [A+B]	**38,042,558**	**14,325,979**	**52,368,537**	**28,844,236**	**10,862,096**	**39,706,332**
EQUITY BASE [A+B-C]	**6,984,002**	**2,630,019**	**9,614,021**	**(2,214,320)**	**(833,864)**	**(3,048,184)**

7.4. Details of deferred tax assets are shown in Table 7.2 below.

Table 7.2: NWC's Deferred Tax Assets

NWC Deferred Tax Assets (J$'000')				
	Balance at 2017 March 31	Recognised in profit/(loss)	Recognised in equity	Balance at 2018 March 31
Unrealised foreign exchange gain	(544)	(1,758)	-	(2,302)
Accrued investment income	(13,566)	4,652	-	(8,914)
Other accounts payable	351,707	16,690	-	368,397
Employee benefits	8,880,992	693,133	(1,066,660)	8,507,465
Tax losses	409,329	(260,794)	-	148,535
Property, plant and equipment	2,294,932	1,354,092	-	3,649,024
	11,922,850	**1,806,015**	**(1,066,660)**	**12,662,205**

The OUR's Position on the Proposed Equity Base

7.5. The regulatory rate base is defined as property, asset, or other investment deemed to be in service, or is providing a benefit to customers at the current time, rather than in the past or in the future. The deferred tax asset item in the proposed rate base represents expected future income tax benefits. Given the nature of this intangible asset (deferred taxes) and the fact that it reflects a future claim, the OUR is of the view that the NWC's proposal, to present it as an asset on which it should be allowed a return, is unreasonable. Consequently, the OUR has disallowed the deferred assets amount of $12.7 billion from the regulatory rate base, on the basis that to allow such an inclusion would be unsound and without reasonable justification. As a result, the approved rate base on which the NWC is to earn a return is reduced to $39.7 billion. This has resulted in the reduction of NWC's equity base to negative $3.05 billion. See Table 7.2 above for details of the OUR's computation of the rate and equity bases.

7.6. A negative asset base for the NWC, do not accord with reality. This clearly demonstrates the need for a proper revaluation of the Commission's assets. Even so, the OUR takes the view that the recommendation made by the NWC for the exclusion of the return on equity in this Interim Tariff Review is a pragmatic stance. Further, the recently completed Revaluation Report by Ernst and Young, which was not a part of the Tariff Application, should be properly studied to allow for a more complete treatment of a return on investment within the next twenty-four (24) months.

THE COST OF CAPITAL

7.7. The Commission's cost of capital is opportunity cost associated with an investment and is usually funded by way of the weighted average cost of capital (WACC), which is determined by the Commission's long-term debt and shareholder equity.

Return on Equity and Tax Gross-up

Cost of equity

7.8. The NWC computed its return on equity by multiplying its equity base by its cost of equity.

7.9. The cost of equity proposed by the NWC was estimated with the use of the Capital Asset Pricing Model (CAPM). This methodology is widely used in utility rate reviews and is consistent with the OUR's approach. The CAPM nominal cost of equity formula may be represented as follows:

$$Cost of Equity(nominal) = R_f + \beta_E\ (MMRP + CRP)$$

Where:

R_f = Risk free rate
β_E = Equity beta
MMRP = Mature Market Risk Premium
CRP = Country Risk Premium

7.10. Nominal cost of equity is converted into the real cost of equity as followings:

$$The\ Cost\ of\ Equity(real) = \frac{cost\ of\ equity(nominal) - expectedinflation}{1 + expectedinflation}$$

7.11. The NWC, in its Tariff Application, estimated the required return on equity investments to be 26.5% and 23.9% respectively in nominal and real terms.

7.12. The NWC applied the real cost of equity in its tariff calculation. It suggested that this is appropriate because the NWC's assets will be revalued each year. Consequently, that approach would take account of inflation.

Risk free rate (R_f)

7.13. The NWC proposed a nominal Risk free rate of 2.84%. This reflects the current Yield to Maturity (YTM) on non-inflation-indexed 10-year USA Treasury bonds as at 2018 July 19[6].

The equity beta (β_E)

7.14. The equity beta (β_E) measures "the correlation between the company's risk and general market risk". It is determined by the asset beta (β_A), the debt to equity ratio and the tax rate. It may be expressed as follows:

$$\beta_E = \beta_A + (\beta_A) \times (\frac{D}{E}) \times (1\text{-}t)$$

Where:

β_E is the equity beta

β_A is the asset beta

D is the percent of a company financing from debt

[6] U.S. Department of the Treasury. "Daily Treasury Yield Curve Rates." (https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2018)

E is the percent of company financing from equity

t is the NWC's corporate tax rate, which is 33.33 percent

7.15. The NWC proposed an asset beta of 0.76. In keeping with its recommendation to use "an average asset beta of water utilities in the world", the NWC adopted the asset beta in Damodaran's global database of 2018 January. The database reflects information garnered from one hundred and nine (109) water utilities worldwide.

7.16. Applying a tax rate (t) of 33% and equity (E) and debt financing rates of 81.6% and 18.4% respectively, the NWC concluded that its equity beta is 3.02.

7.17. Verification of the value for the average asset beta by the OUR shows a value of 0.81 for one hundred and three (103) water utilities in the world.[7] On 2018 November 22, the OUR accessed the data source, which was updated by Damodaran on 2018 January 05.

Mature Market Risk Premium (MMRP)

7.18. The Mature Market Risk Premium (MMRP) is the expected return over the risk free rate that investors require in order to invest in a well-diversified portfolio of risky assets in a mature market. The MMRP is calculated as the expected return on the market minus the risk free rate.

7.19. The NWC proposed a MMRP of 5.08 percent. According to the NWC, the value was taken from data published by Damodaran [8], which is based on an implied equity risk premium for the Standard and Poor 500 (S&P 500).

Country Risk Premium

7.20. The Country Risk Premium (CRP) is the expected return above the MMRP that investors require for investing in a country whose market is not mature. To derive the CRP, the NWC applied the difference in yield to maturity (YTM) between Jamaican 10-year US$-denominated government bonds and 10-year US Treasury bonds traded in the United States. The NWC posited that Bloomberg reports the YTM on non-inflation indexed 10-year GOJ US$-denominated government bonds as 5.59 percent as of 20 June 2018 and the United States Federal Reserve data shows that the YTM on non-inflation indexed 10-year US

[7] Aswath Damodaran. "Total Beta By Industry Sector: Global"

(http://www.stern.nyu.edu/~adamodar/pc/datasets/totalbetaGlobal.xls, accessed 2018 November 22)

[8] Aswath Damodaran. "Country Default Spreads and Risk Premiums."

(http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html, accessed 2018 September 22).

Treasury bonds is 2.84 percent as of 2018 June 19. Consequently, the NWC computed the nominal CRP as 2.75 percent[9].

NOMINAL AND REAL COST OF EQUITY

7.21. Based on the above, the NWC computed its nominal cost of equity as follows:

$$R_f + \beta_E(MMRP + CRP)$$

$$= 2.84\% + 3.02 \text{ x } (5.08\% + 2.75\%)$$

$$= 26.51\%$$

7.22. Further, the NWC proposed a projected inflation of 2.10 percent. Thus, the Commission's rate was derived from the difference between average monthly yields on 5-year US Treasury bonds and the inflation indexed, 5-year Treasury bonds as at 2018 May. Accordingly, the real cost of equity was derived as follows:

$$The\ Cost\ of Equity(real) = \frac{cost\ of\ equity(nominal) - expected inflation}{1 + expected inflation}$$

$$\frac{26.51\% - 2.10\%}{1 + 2.10\%} = 23.9\%$$

The OUR's Position on the Proposed Nominal and Real Cost of Equity

7.23. The OUR was able to verify that the risk free rate on USA Treasury bonds as at 2018 July 19 was 2.84 percent.[10]

7.24. Further, the OUR shares the NWC's view that "Deriving an estimate of an equity beta for an investment in a country (or set of countries) whose stock market is small, non-existent, or has a short history is imprecise. Consequently, the OUR accepts the use of Damodaran global database in the determination of asset beta (β_A) and the MMRP.

7.25. As previously indicated above, verification of the value for the average asset beta by the OUR shows a value of 0.81 for one hundred and three (103) water utilities in the world.[11]

7.26. The OUR also verified that the 5.08% MMRP proposed by the NWC is correct.

---

[9] CRP = 5.59% – 2.84%

[10] U.S. Department of the Treasury. "Daily Treasury Yield Curve Rates." (https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2018)

[11] Aswath Damodaran. "Total Beta By Industry Sector: Global"

(http://www.stern.nyu.edu/~adamodar/pc/datasets/totalbetaGlobal.xls, accessed 2018 November 22)

7.27. Given the questionable nature of the NWC's equity base, it is necessary to make reasonable assumptions. Therefore, if it is assumed that the Commission has a capital structure based on 54.2% debt and 45.8% equity (as was the case in the 2013 Tariff Review), then the NWC's equity beta would be 1.36 rather than the proposed 3.01.

7.28. In the verification of the value for the non-inflation indexed 10-year GOJ US$-denominated government bonds, the OUR relied on data provided by the Bank of Jamaica (BOJ), which cites its source as Bloomberg. The value for the month of 2018 June was 5.72%. The value for the non-inflation indexed 10-year US Treasury bonds was confirmed as 2.84% as of 2018 June 19.[12] The OUR computes the nominal CRP to be 2.88%.[13]

7.29. The NWC has computed projected inflation at 2.10 percent, which it states is the difference between average monthly yields on 5-year US Treasury bonds and the inflation indexed, 5-year Treasury bonds as at 2018 May.

7.30. The OUR computes projected inflation at 2.09 percent, which is the difference between the risk free rate on nominal USA Treasury bonds as at 2018 July 19, which is 2.84 percent and real risk free rate on USA Treasury bonds as at 2018 July 19, which is 0.75 percent.[14]

OUR's Nominal & Real Cost of Equity

7.31. In light of this, the OUR computes the NWC's nominal and real cost of equity as follows:

Nominal cost of equity as:

$$Re = R_f + \beta_E(MMRP + CRP)$$

$$= 2.84\% + 1.36\ (5.08\% + 2.88\%)$$

$$= 13.66\%$$

Real cost of equity as:

$$The\ Cost\ of\ Equity(real) = \frac{cost\ of\ equity\ (nominal) - expectedinflation}{1 + expectedinflation}$$

$$\frac{12.84\% - 2.09\%}{1 + 2.09\%} = 11.34\%$$

[12] US Department of the Treasury. "Daily Treasury Yield Curve Rates." (https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2018)

[13] CRP = 5.72 % – 2.84%

[14] https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2018

Table 7.3 shows a comparison of the OUR's computation of the cost of equity against the NWC's derivation.

Table 7.3: Nominal and Real Cost of Capital Calculation: OUR vs. NWC

Parameters	NWC	OUR
Rate Base (J$'000')	39,706,332	52,368,537
Long Term Debt (J$'000')	42,754,516	42,754,516
Equity Base (J$'000')	(3,048,184)	9,614,021
Risk free rate (%)	2.84%	2.84%
Equity Beta	3.01	1.36
MMRP (%)	5.08%	5.08%
CRP (%)	2.75%	2.88%
Asset Beta	0.76	0.76
Debt in Capital Structure (D)	81.6%	54.2%
Equity in Capital Structure (E)	18.4%	45.8%
Corporate tax rate (t)	33.3%	33.3%
Expected Inflation	2.10%	2.09%
Nominal Rate of Equity	**26.51%**	**13.66%**
Real Rate of Equity	**23.91%**	**11.34%**

7.32. As previously indicated, the OUR has disallowed the amount of $12.67 billion from the regulatory approved rate base. The disallowance has resulted in a negative rate base, which implies that the NWC would not earn a return on equity.

7.33. In light of this and recognizing that inaccuracies in the assessment of the Commission's plant may have contributed to this outcome, the OUR did not compute a return on equity for the NWC. Additionally, given the NWC's stated preference that the rate of return on equity be excluded, the OUR decided to accord with the request. However, the OUR is of the view that a proper assessment of the rate base ought to be done within the next twenty-four (24) months to ensure greater accuracy in the determination of the Commission's return on equity.

Determination 2:

In keeping with the NWC's request and recognizing the possible inaccuracies in the Commission's assessment of its rate base, the Office has opted not to include a rate of return on equity in the computation of the Commission's revenue requirement.

Loan interest from long-term loans

The NWC's Proposal for Interest Payment on Total Loans

7.34. The NWC reported a total loan interest (including K-Factor project loans) from long-term loans amounting to $1,933 million. This was derived by multiplying the weighted average interest rate (5.03%) of all long-term loans by the average principal outstanding (i.e. $38,462 million) in the period (see Table 7.4 below).

7.35. The NWC allocated the interest on loansfor water and sewerage services based on the proportion of the NWC's water and sewerage assets. Therefore, with the 73%:27% water-sewerage asset split, the NWC proposed loan interest payments of J$1,404 million and $528,813 million for water and sewerage respectively.

Table 7.4: NWC's Outstanding Loans and Interest Rates

NWC's Outstanding Loans and Interest Rates					
Loan	**Beginning of Period Principal Outstanding (J$'000')**	**End of Period Principal Outstanding (J$'000')**	**Average Principal Outstanding (J$'000')**	**Interest Rate (%)**	**Wgt. Avg. Int. Rate (%)** OUR computed
BNP - Paribas €1,919,509	267,867	150,335	209,223	4.96%	0.03%
Government of Jamaica - Jamaican Dollar	789,645	789,645	789,645	2.00%	0.04%
Government of Jamaica - US$7,499,999	965,004	944,887	954,946	3.38%	0.08%
Government of Jamaica - €212,155	28,100	28,100	28,100	5.77%	0.00%
Inter-American Development Bank	2,330,224	2,112,637	2,221,431	2.65%	0.15%
Inter-American Development Bank	12,414,857	12,107,581	12,261,219	2.65%	0.84%
The Bank of Nova Scotia Jamaica Limited	36,811	-	18,406	6.25%	0.00%
The Bank of Nova Scotia Jamaica Limited	9,924	-	4,962	6.75%	0.00%
JSCD Trustee Services Limited	1,889,979	1,889,979	1,889,979	8.95%	0.44%
BNP - Paribas	6,503,799	5,697,882	6,100,841	7.02%	1.11%
Vinci Construction Grand Projects	879,894	765,823	822,859	9.77%	0.21%
Vinci Construction Grand Projects	329,987	287,207	308,597	9.77%	0.08%
National Housing Trust	82,351	74,383	78,367	5.00%	0.01%
Syndicated Loan	12,083,994	10,866,206	11,475,100	7.55%	2.25%
National Commercial Bank Jamaica Limited	78,750	61,875	70,188	10.85%	0.02%
National Commercial Bank Jamaica Limited	826,500	652,086	739,293	10.38%	0.20%
National Commercial Bank Jamaica Limited	386,002	377,955	381,979	3.25%	0.03%
Sagicore Bank	-	213,778	106,889	9.50%	0.03%
Total	**39,903,688**	**37,020,359**	**38,462,024**		**5.54%**

The NWC's Proposal for Interest Payment on K-Factor Loans

7.36. In the Tariff Application, the NWC correctly indicated that the interest payment on loans ought to be separated from the total interest payment, since the K-Factor Fund is financed

separately from its normal revenue requirement. Using the same methodology applied to interest payment on total loans, the NWC claimed that the interest payment on K-Factor projects based on a 4.5% weighted average interest rate amounts to $650.8 million (see Table 7.5 below).

Table 7.5: Loan Used to Finance K-Factor Projects

Loans used to Finance K-Factor Projects									
Loan	K-Factor Allocation (%)	Interest Rate (%)	Beginning of Period Principal Outstanding (J$'000')	OUR			NWC		
				Average Principal Outstanding (J$'000')	K-Factor Allocation (J$'000')	Weighted Avg. Interest Rate (%)	Average Principal Outstanding (J$'000')	K-Factor Allocation (J$'000')	Weighted Avg. Interest Rate (%)
Inter-American Development Bank	73%	2.65%	12,414,857	12,261,219	8,950,690	1.60%	12,261,219	8,950,690	1.60%
BNP - Paribas	65%	7.02%	6,503,799	6,100,841	3,965,547	1.87%	6,100,841	3,965,547	1.87%
Vinci Construction Grand Projects	65%	9.77%	879,894	822,859	534,858	0.35%	822,859	534,858	0.35%
Vinci Construction Grand Projects	65%	9.77%	329,987	308,597	200,588	0.13%	308,597	200,588	0.13%
National Housing Trust	100%	5.00%	82,351	78,367	78,367	0.03%	78,367	78,367	0.03%
National Commercial Bank Jamaica Limited	100%	10.38%	826,500	739,293	739,293	0.52%	739,293	739,293	0.52%
National Commercial Bank Jamaica Limited	100%	3.25%	386,002	381,979	381,979	0.08%	381,979	381,979	0.08%
Total			**21,423,390**	**20,693,155**	**14,851,322**	**4.58%**	**20,693,155**	**14,851,322**	**4.58%**

The OUR's Position on Interest Payment on Total Loans

7.37. The Tariff Application showed total balances of $37,020.4 million and $38,462.0 million as the end of period principal outstanding and average principal outstanding respectively.

7.38. In the Tariff Application, the NWC reported that it computed the weighted average interest rate on all long-term loans as 5.0 percent. The information provided by the NWC in Table 7.5 above displays a weighted average interest rate of 5.03%. However, the OUR re-computation indicated that the weighted average interest rate to be 5.54%.

7.39. Therefore, the OUR approves a total loan interest from long term loans in the amount of $2,130.5 million based on the weighted average interest rate of 5.54% and the average principal outstanding balance of $38,462 million.

7.40. Based on the NWC's 73%:27% water- sewerage asset apportionment, the OUR has deemed the amounts of $1,547.7 million and $582.8 million for water and sewerage services respectively as the interest on loans to be included in the revenue requirement.

Determination 3:

The Office has approved, the amount of $2,130.5 million to be included as interest payments in the NWC's revenue requirement. The approved amount shall be apportioned in the tariff in the amounts of $1,547.7 million and $582.8 million for water and sewerage services respectively.

The OUR's Position on Interest Payment on K-Factor Projects

7.41. The NWC has requested a total interest payment of $1,547.7 million of which $494.3 million was attributable to K-Factor projects. Consequently, it proposed that $1,053.4 million be included in the revenue requirement for interest payment.

7.42. The NWC has reported that revenues to cover loan interest from loans used to finance K-Factor projects will be separately obtained through K-Factor proceeds, and therefore, these amounts were not included in the revenue requirement. The NWC, using the same methodology for calculating the total loan interest, the amount used to fund K-Factor has projected an amount of J$650.8 million to fund the K-Factor.

7.43. The NWC has further indicated that the weighted average interest rate of loans used to fund K-Factor projects is 4.5%. The OUR's analysis, however shows that based on the NWC's methodology, this precise weighted average interest rate is 4.58%, and this would have resulted in K-Factor loan interest of $680.5 million (see Table 7.6 below for details on the loans used to finance K- Factor projects).

Table 7.6: Loan Interest in Revenue Requirement

Loan Interest in Revenue Requirement						
	NWC			OUR		
	Water (J$'000')	Sewerage (J$'000')	Total (J$'000')	Water (J$'000')	Sewerage (J$'000')	Total (J$'000')
Total loan interest from long-term loans	1,404,261	528,813	1,933,074	1,547,701	582,830	2,130,531
Loan interest from loans used to finance K- Factor projects	(472,747)	(178,026)	(650,773)	(494,341)	(186,158)	(680,499)
Foreign exchange losses	780,113	293,773	1,073,886	-	-	-
Total loan interest component of the revenue requirement	**1,711,627**	**644,560**	**2,356,187**	**1,053,360**	**396,672**	**1,450,032**

7.44. Based on the OUR's analysis $1,450.0 million has been approved as total interest payment (see Table7.7). Of this amount, $1,053.4 million is attributable to water services and $396.7 million to sewerage services.

Table 7.7: Loan Interest in Revenue Requirement

Loan Interest in Revenue Requirement						
	NWC			OUR		
	Water (J$'000')	Sewerage (J$'000')	Total (J$'000')	Water (J$'000')	Sewerage (J$'000')	Total (J$'000')
Total loan interest from long-term loans	1,404,261	528,813	1,933,074	1,547,701	582,830	2,130,531
Loan interest from loans used to finance K- Factor projects	(472,747)	(178,026)	(650,773)	(494,341)	(186,158)	(680,499)
Foreign exchange losses	780,113	293,773	1,073,886	-	-	-
Total loan interest component of the revenue requirement	**1,711,627**	**644,560**	**2,356,187**	**1,053,360**	**396,672**	**1,450,032**

Determination 4:

Given that interest payment associated with K-Factor projects amount to $680.5 million, the Office has approved the net amount of $1,450.0 million to be included in the revenue requirement. Of the $1,450.0 million, $1,053.4 million shall be assigned to water tariffs and the remaining $396.6 million to sewerage tariffs.

The NWC's Proposal for Foreign Exchange Losses

7.45. In its Tariff Application, the NWC argued that foreign exchange losses were implicitly part of the cost of debt, as these losses resulted from the use of large USA dollar and Euro denominated loans. The Commission claimed that when the Jamaican dollar depreciates against the USA dollar or the Euro, all loans denominated in these currencies are revalued in Jamaican dollars at the current exchange rate. Consequently, the associated currency losses are registered in its books.

7.46. The NWC reported that average foreign exchange losses in the past five (5) years is $1,073.9 million,[15] of which it attributes $780.1 million to water services and $644.5 million to sewerage services. It further argued that it was reasonable to assume that the pattern of currency depreciation will continue; hence, its request was valid.

[15] NWC' Statement of Profit or Loss and Other Comprehensive Income from financial year 2014 to 2018.

The OUR's Position on Foreign Exchange Losses

7.47. Contrary to the NWC's calculation of foreign exchange losses, the OUR's analysis shows that the reported average losses of $1,073.9 million occurred over the past four (4) years and not five (5) years (see Table7.8 below).

Table 7.8: NWC' Foreign Exchange Losses 2014 - 2018

Foreign Exchange Losses 2014 - 2018 (J$'000')						
2014	2015	2016	2017	2018	Average	
					Last Five (5)	Last Four (4)
2,426,748	1,312,261	1,932,797	1,702,426	(651,938)	1,344,459	1,073,886.5

7.48. Whilst recognizing that for accounting purposes, the NWC revalues its foreign exchange denominated loans at a specific point in time, the OUR takes the view that in spite of its foreign exchange losses, the NWC is insulated to a certain degree by the monthly adjustment by PAM. However, the extent to which it is insulated depends on the length of time customers take to settle their bills. The NWC has, however failed to show the mitigating effect in its computation.

7.49. Additionally, the NWC requested that interest be charged on late payment for commercial customers. The implementation of that interest rate charge, if properly designed, should compensate for the effects of currency depreciation. Accordingly, for the foregoing reasons, the OUR has disallowed the amount of $1,073.9 million for foreign exchange adjustments to the revenue requirement.

Determination 5:

The Office has disallowed the NWC's claim of $1,073.9 million, which it associates with foreign exchange losses, from the approved revenue requirement.

8. ASSESSMENT OF TOTAL OPERATING EXPENSES

8.1. Operating expenses are the ongoing costs associated with the NWC's main operating activities. These costs are classified in the Commission's Income Statement and are analysed separately from the Commission's capital expenditure.

The NWC's Proposal on Operating Cost

8.2. The NWC proposed total operating expenses of $26,884.3 million, and this was further adjusted for known and measurable changes of $20.3 million. The Commission explained that the known and measurable changes consisted of $11.66 million, which represents payments to the Water Resources Authority (WRA) for a recurring water abstraction fee, which was not a requirement in the past. A further $8.65 million was included to account for an estimated wastewater discharge fee payable to the National Environment and Planning Agency (NEPA), for wastewater discharged from fourteen (14) wastewater treatment plants.

8.3. Table 8.1 shows the NWC's proposed operating expenses for water and sewerage services.

Table 8.1: Proposed Operating Expenses ($'000)

Cost Categories	Water	Adjust-ment	Sewerage	Adjust-ment	Total
	($'000)	($'000)	($'000)	($'000)	($'000)
Salaries, Wages & Related Expenses	7,278,547		1,754,480		9,033,027
Repair & Maintenance	2,543,889		964,234		3,508,123
Administration	4,070,688	11,660	1,048,974	8,645	5,139,967
Electricity	6,426,264		498,149		6,924,413
Telephone	110,925		29,229		140,154
Fuel & Lubrication	246,046		25,700		271,746
Water Purchase	414,419		0		414,419
Soapberry Cost	0		1,452,437		1,452,437
TOTAL	**21,090,778**	**11,660**	**5,773,203**	**8,640**	**26,884,286**

OUR's Analysis of Operating Expenses

8.4. The OUR maintains the position that the deemed operating expenses, should be that of the test year adjusted for expenses that are known and measurable within a twelve (12) month period, and which reflects the reasonable cost of providing acceptable quality of service to customers.

8.5. As shown in Table 8.1 below, over the tariff period 2013/14 to 2017/18, operating expenses have increased by 27.36%. The largest increase of 13% occurred between the fiscal years 2015/16 and 2016/17. The main driver of this increase was administration costs, which increased from $3.79 billion to $5.18 billion.

Table 8.1: Movement in NWC's Operating Costs ($'000)

Category	2013/14	2014/15	2015/16	2016/17	2017/18
	($'000)	($'000)	($'000)	($'000)	($'000)
Salaries, Wages & Related Cost	6,507,028	7,159,828	7,794,890	8,415,040	9,033,027
Repairs & Maintenance	3,149,411	3,922,617	3,683,403	3,955,515	4,960,560
Administration	4,227,513	4,113,567	3,788,131	5,179,561	5,119,662
Electricity	6,487,201	6,132,476	5,146,343	5,789,747	6,924,413
Telephone	113,243	120,370	132,324	114,246	140,154
Fuel & Lubricant	279,971	266,392	250,608	240,054	271,746
Purchases – water	329,060	530,147	569,292	449,177	414,419
TOTAL	**21,093,427**	**22,245,397**	**21,364,991**	**24,143,340**	**26,863,981**
Percentage Change	-	**5.46%**	**-4.12%**	**13.00%**	**4.60%**

Salaries Wages and Related Expenses

8.6. The NWC indicated in its Tariff Application that salaries, wages and related expenses incurred in the test year amounted to $9,033 million. This consists of the following categories of expenses - allowances, pension, gratuity, group insurance, traveling and transportation and statutory contributions. Of the total salaries, wages and related expenses, $7,278.5 million was incurred in the provision of water services and $1,754.5 million was incurred in providing sewerage services. The NWC has made no known and measurable changes to this cost category. Table 8.2 below shows the sub-components of salaries, wages and related expenses.

Table 8.2 Sub-Components of the Proposed Salaries Wages and Related Expenses

Components	**Water**	**Sewerage**	**Total**	**Proportion**
	($'000)	($'000)	($'000)	($'000)
Salaries and Wages	2,656,839	617,838	3,274,677	36.25%
Allowances — Housing	142,901	30,714	173,615	1.92%
Allowances — Motor Vehicle	440,444	100,417	540,861	5.99%
Allowances — Uniform	178,859	45,801	224,660	2.49%
Allowances — Other	844,887	214,932	1,059,819	11.73%
Pensions	2,405,690	601,044	3,006,734	33.29%
Gratuity Paid	105,324	26,177	131,501	1.46%
Insurance (group)	241,083	56,694	297,777	3.30%
Travelling and Transportation	7,836	655	8,491	0.09%
Statutory Contributions	254,684	60,208	314,892.00	3.49%
Total Salaries	**7,278,547**	**1,754,480**	**9,033,027**	**100.00%**

Source: NWC's supplementary information to the financial statement 2017/2018

8.7. The OUR accepts the NWC's proposed figures for salaries, wages and related expenses. Notwithstanding, the OUR takes the view that pension costs and other allowances, which represent 33.3% and 11.7% of total salaries, wages and related expenses respectively require further examination, and these are discussed in detail below.

Pension Cost

8.8. The NWC's financial statement shows an amount of $3,007 million for its annual obligations in respect of defined pension benefits under the Pensions (Parochial Officers) Act and the NWC's Pension Scheme. Similar to other agencies, the NWC in 2002 January 01 implemented a defined contributory pension scheme for its employees, allowing employees to contribute to the new pension scheme. The contributions to this pension scheme is calculated by an independent actuary based on a formula that links the NWC's staff compliment and salaries, with accrued benefits, increasing over time in line with inflation and/or other economic factors.

8.9. However, the notes to the financial statements explain that a large portion of the proposed pension cost is in respect of employees' benefit obligations under the Pension Parochial Act. Most staff members have exercised their option to continue to be eligible for benefits under the Pension Parochial Act, despite the implementation of the NWC's Pension Scheme in 2002.

8.10. Given that the NWC's Pension Scheme is being operated within the provisions of the current pension legislation, the OUR approves the recovery of the amount of $3,007 million for annual pension expenses.

Other Allowances

8.11. "Other Allowances" were stated as $1.059 billion, which represents 11.73% of total salaries wages and related expenses. To justify the proposed amount, the OUR requested additional data from NWC. The data submitted revealed that other allowances included meal allowances, subsistence, taxi fare, lunch subsidies, shift premium, duty allowance, professional membership fees, staff relocation and per diem.

8.12. The NWC in its Tariff Application advised that allowances were payable to public sector workers, and they would be revised for the periods 2017/18 to 2020/21. However, the OUR takes the view that the amounts paid for allowances, especially meal allowance, lunch subsidies and taxi fare allowance in the test year seem exorbitant for an entity which is currently reporting a loss before taxation of $2.13 billion.

8.13. A more in-depth analysis shows that allowances payable to fortnightly workers have all increased significantly since the last rate review, even though, the NWC claims that it has been outsourcing some services normally performed by fortnightly workers. The OUR takes the view that the payment of these allowances is within the NWC's control and should be monitored closely to promote efficient and prudent spending practices.

Other Known and Measurable Changes

8.14. Base salaries & wages and statutory contributions were adjusted upwards by 4% to reflect the GOJ has approved wage increase for the upcoming fiscal year 2019/2020. The OUR approved salaries & wages and related expenses are as shown in Table 8.3 below.

Table 8.3: OUR Approved Salaries Wages and Related Expenses ($'000)

Salaries & Wages and Related Costs All amounts in J$'000s						
Items	NWC			OUR		
Categories	Test Year	Adjustments	Total	Test Year	Adjustments	Total
Salaries and wages	3,274,677		3,274,677	3,274,677	130,987	3,405,664
Allowances	1,998,955		1,998,955	1,998,955	(1,940)	1,997,015
Pensions	3,006,734		3,006,734	3,006,734		3,006,734
Gratuity paid	131,501		131,501	131,501		131,501
Insurance (group)	297,777		297,777	297,777		297,777
Travelling and transportation	8,491		8,491	8,491		8,491
Statutory contributions	314,892		314,892	314,892	12,596	327,488
Total	**9,033,027**		**9,033,027**	**9,033,027**	**141,643**	**9,174,670**

Determination 6:

The Office approves total salaries, wages and related costs in the amount of $9.17 billion, of which $7.39 billion is for water and $1.78 billion is for sewerage components.

Repairs and Maintenance

8.15. The NWC proposed a test year "repairs and maintenance" cost of $4,960.6 million for inclusion in the revenue requirement. It stated that this was necessary for the determination of water and sewerage rates. This total included $1.44 billion paid to the Central Wastewater Treatment Company (CWTC) for providing wastewater treatment services at its Soapberry facility to the NWC under contract. Based on the NWC's 2017-2018 financial statements, this amount represents the Commission's total cost for repairs and maintenance activities in the process of providing water and sewerage services during the period, and is disaggregated as shown in Table 8.4 below.

Table 8.4: NWC's Test Year (2017 /18) Repairs and Maintenance Costs Breakdown

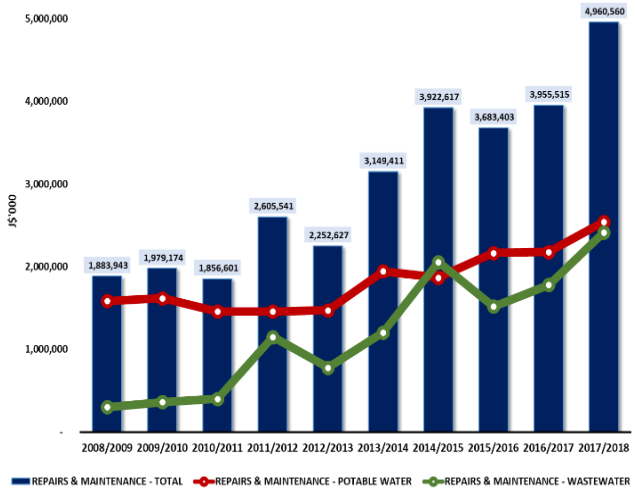
NWC REPAIRS AND MAINTENANCE COSTS FOR YEAR ENDED 2018 MARCH 31			
CATEGORY	**WATER**	**SEWERAGE RELATED**	**TOTAL**
	J$'000	J$'000	J$'000
GENERAL REPAIRS (PIPES)	290,145	112,973	403,118
MATERIALS AND SUPPLIES	439,092	1,747,403	2,186,495
MOTOR VEHICLES	215,082	47,740	262,822
PLANT AND EQUIPMENT	729,286	337,130	1,066,416
BUILDING	190,011	63,662	253,673
CHEMICALS	231,168	18,987	250,155
EQUIPMENT RENTAL	300,467	60,561	361,028
REINSTATEMENT OF ROADS	115,776	19,696	135,472
OFFICE FURNITURE & EQUIPMENT	16,902	4,132	21,034
CLAIMS AND CONTINGENCIES	15,960	4,387	20,347
TOTAL	2,543,889	2,416,671	4,960,560
PROPORTIONS (%)	51.28%	48.72%	100%
% OF TOTAL OPEX	12.06%	41.86%	18.47%

8.16. The 2017/18 financial statements also indicate that this cost reflects an increase of $1,005 million (approximately 25%), over that reported for the 2016/17 period.

8.17. Figure 8.1 below, shows the movement in the repairs and maintenance cost over the 2008-2018 rate period. As shown, this cost component escalated from $1,883 million at the end of 2009 March, peaking at $4,960 million by the end of 2018 March. This represents an overall increase of $3,077 million (163%), with an average increase of $342 million per year.

Figure 8.1: Variation in NWC's Repairs and Maintenance Costs 2008-2018

ANNUAL NWC REPAIRS AND MAINTENANCE COSTS 2008/09 – 2017/18



AVG. ANNUAL CHANGE/CATEGORY 2008/09 – 2017/18

CATEGORY	*J$'000*	*%*
GENERAL REPAIRS (PIPES)	+23,566	+11.29%
MATERIALS AND SUPPLIES	+178,416	+29.22%
MOTOR VEHICLES	+16,555	+10.57%
PLANT AND EQUIPMENT	+76,037	+15.04%
BUILDING	+15,707	+12.49%
CHEMICALS	+8,744	+4.86%
EQUIPMENT RENTAL	+17,284	+7.40%
REINSTATEMENT OF ROADS	+7,772	+14.42%
OFFICE FURNITURE AND EQUIPMENT	+1,184	+9.04%
CLAIMS AND CONTINGENCIES	-3,419	-36.60%

8.18. In the Tariff Application, the NWC acknowledged the escalation in the repairs and maintenance costs, and indicated that the main reason for the costs exceeding the PAM-compensated increase, is largely due to three (3) new large projects identified below:

1. The Portmore Sewerage Project (Repairs and Maintenance Cost: $263 million);
2. The Hopewell and Kemps Hill Wells (Repairs and Maintenance Cost: $56 million); and
3. The Downtown Kingston Sewerage Project (Repairs and Maintenance Cost: $175 million).

8.19. The OUR however, notes that the projects listed above, appear to be capital related major maintenance projects and would not be treated as recurring operating expenditure.

OUR's Review of NWC's Proposed Repairs and Maintenance Cost

8.20. Following the submission of the Tariff Application, the OUR carried out an initial review of the proposed repairs and maintenance costs, to validate its reasonableness for inclusion in the operating cost component of the revenue requirement. At the preliminary stage of the review, the OUR identified the need for, and requested additional information and supporting schedules. The NWC submitted a detailed cost schedule, containing a list of transactions classified as being related to repairs and maintenance activities during the period 2017 April 1 to 2018 March 31.

Evaluation of the NWC's 2017-2018 Repairs and Maintenance Costs Data

8.21. The repairs and maintenance costs information were assessed by the OUR in order to ascertain if the constituent transaction costs represented legitimate expenditures, were reasonably incurred and appropriately classified. The OUR made adjustments where clear discrepancies were identified. The acceptable transactions were grouped to reflect repairs and maintenance activities and costs directly linked to third party entities/external contractors and NWC's internal staff and resources. This information is summarized in Table 8.6 below.

8.22. For the cost categories shown in Table 8.6, the majority of the transactions, 53,067 (87.5%), were executed by third party entities with associated costs of $4.49 billion (90.7%). Notably, the two (2) categories with the largest associated total repairs and maintenance costs are "Materials and Supplies" and "Plant and Equipment" with a reported costs of $2.19 billion (44.1%) and $1.07 billion (21.5%) respectively.

OUR's Findings and Comments - NWC's Repairs and Maintenance Cost Data

8.23. A number of anomalies were identified with the NWC's component of this cost. These include, among other things, the definition and reporting of expenses, inconsistencies with categorisation and treatment of recurring and capital cost, significant duplication of cost transactions and the inclusion of disconnection/reconnection activities as part of repair and maintenance cost.

Table 8.6: NWC's 2017-2018 Repairs and Maintenance Cost Breakdown

SUMMARY OF REPAIRS AND MAINTENANCE INFORMATION SUBMITTED BY NWC							
CATEGORY	DESCRIPTION	NUMBER OF TRANSACTIONS			COSTS (J$'000)		
		Internal	External	Sub-Total	Internal	External	Sub-Total
General Repairs (Pipes)	Purchase and issuance of pipes, fittings, and related labour costs.	3,299	1,504	4,803	221,492	181,625	403,117
Materials and Supplies	Operations And Maintenance activities of wide-ranging description.	708	18,213	18,921	10,667	2,175,827	2,186,495
Motor Vehicles	Licencing fees, the cost of tyres and vehicle repair costs	233	4,228	4,461	13,707	249,115	262,822
Plant and Equipment	Materials and labour costs related to the repair of pumps and other equipment.	409	13,306	13,715	14,378	1,052,038	1,066,416
Building	Materials and labour costs related to the repair of building infrastructure.	190	11,206	11,396	821	252,852	253,673
Chemicals	Costs related to purchase of chemicals and laboratory supplies.	2,733	420	3,153	200,252	49,903	250,155
Equipment Rental	Costs related to rentals of vehicles and heavy equipment.	2	2,517	2,519	90	360,938	361,028
Reinstatement of Roads	Costs related to contracts, material and labour related to road reinstatement activities.	3	1,277	1,280	1,057	134,415	135,472
Office Furniture and Equipment	Costs related to maintenance of office furniture and equipment	15	329	344	42	20,992	21,034
Claims and Contingencies	Costs related to flood damage and other claims	1	67	68	3	20,344	20,347
	TOTAL:	7,593	53,067	60,660	462,510	4,498,050	4,960,560
		CWTC: J$1.44 Billion			NWC: J$3.52 Billion		

8.24. These anomalies are described in detail below:

- The repairs and maintenance costs presented in the NWC's 2017/18 Financial Statements and Tariff Application were separated into water and sewerage service costs. However, the detailed cost transaction data did not, in most instances, make such a distinction. Consequently, this limitation restricted the OUR in validating the reported allocation of repairs and maintenance costs to water and sewerage services.
- The detailed repairs and maintenance cost data contained a total of 4,682 duplicated transactions aggregating $216.3 million. This requires attention by the NWC.
- A large portion of the recorded transactions only had a value cost but very limited or no definition/description. For example, no scope of service and contractor was provided for a significant number of outsourced maintenance services.
- A significant number of the transaction costs were entered as negative without any clear basis. Further explanation from the NWC may be needed on this issue.
- A significant number of the cost items/service orders had transaction dates occurring on the first and last days of the reporting period accounting for $618 million. The basis for posting this large number of transactions on these dates was not made clear to the OUR.

8.25. In addition to the issues outlined above, there were noticeable data quality issues, which shall be addressed within the framework of the NWC's monitoring and quality control processes.

Treatment of Soapberry Wastewater Treatment Plant Costs

8.26. Based on the NWC's 2017/18 cost data, approximately $1.44 billion relating to fees paid to CWTC for wastewater treatment at the Soapberry Sewerage treatment plant were included as annual repair and maintenance costs, specifically under the "Materials and Supplies" category. Given that these costs are covered under contract between the NWC and CWTC, they were removed from the NWC's total repair & maintenance costs, and treated separately in the revenue requirement. To ensure transparency in the reporting of the relevant costs, going forward, the NWC should ensure that costs related to CWTC are fully separated from costs directly associated with the utility's water and sewerage operations.

OUR's Position on Repair and Maintenance

8.27. The majority of the NWC's repair and maintenance costs data did not clearly indicate the specific utility service that the transactions were connected to. Consequently, the approach taken, in the allocation of approved costs, was to use ratios derived from the allocations

provided in the 2017/18 financial statements (with Soapberry costs excluded). The OUR approved repairs and maintenance cost is shown in Table 8.7 below.

Table 8.7: OUR Approved Repairs and Maintenance Costs for Revenue Requirement

SUMMARY OF ADJUSTMENTS TO REPAIRS AND MAINTENANCE COSTS FOR NWC REVENUE REQUIREMENT				
NWC 2017/2018 COST (J$'000)	OUR ADJUSTMENT (J$'000)	OUR APPROVED COSTS (J$'000)		
		POTABLE WATER	WASTEWATER	TOTAL
3,520,304	-293,049	2,339,666	887,589	3,227,255

8.28. As previously indicated, approximately $293 million was excluded from the NWC's proposed repairs and maintenance costs to be included in the revenue requirement. A breakdown of the excluded repairs and maintenance costs are shown in Table 8.8 below.

Table 8.8: OUR Adjustments to NWC's 2017/2018 Repairs and Maintenance Costs

ADJUSTMENTS TO NWC 2017/2018 REPAIRS AND MAINTENANCE COSTS			
GENERAL REPAIRS (PIPES)			
	INTERNAL COSTS (J'000)	EXTERNAL COSTS (J'000)	TOTAL (J$'000)
2017/18 REPORTED	221,492	181,625	403,117
OUR ADJUSTMENTS	-	-50,876	-50,876
Duplicate Transactions	-	*3,827*	*3,827*
Capital Related Costs & Other Components Not Consistent with Repairs & Maintenance Costs	-	*-54,703*	*-54,703*
OUR APPROVED	**221,492**	**130,749**	**352,241**
MATERIALS AND SUPPLIES			
2017/18 REPORTED	10,667	735,571	746,238
OUR ADJUSTMENTS	-	-17,886	-17,886
Duplicate Transactions	-	*-17,886*	*-17,886*
OUR APPROVED	**10,667**	**185,453**	**728,352**
MOTOR VEHICLES			
2017/18 REPORTED	13,707	249,115	262,822
OUR ADJUSTMENTS	-47	2,183	2,135
Duplicate Transactions	*-47*	*2,183*	*2,135*
OUR APPROVED	**13,660**	**251,297**	**264,957**
PLANT AND EQUIPMENT			
2017/18 REPORTED	14,378	1,052,038	1,066,416
OUR ADJUSTMENTS	-81	-193,418	-193,499

ADJUSTMENTS TO NWC 2017/2018 REPAIRS AND MAINTENANCE COSTS			
Duplicate Transactions	*-81*	*-193,418*	*-193,499*
OUR APPROVED	**14,297**	**858,620**	**872,917**
BUILDING			
2017/18 REPORTED	821	252,852	253,673
OUR ADJUSTMENTS	-3	-21,857	-21,860
Duplicate Transactions	*-3*	*-3,448*	*-3,452*
Capital Related Costs & Other Components Not Consistent with Repairs & Maintenance Costs	-	*-18,409*	*-18,409*
OUR APPROVED	**818**	**230,995**	**231,813**
CHEMICALS			
2017/18 REPORTED	200,252	49,903	250,155
OUR ADJUSTMENTS	-12,426	-396	-12,822
Duplicate Transactions	*-12,426*	*-396*	*-12,822*
OUR APPROVED	**187,826**	**49,508**	**237,334**
EQUIPMENT RENTAL			
2017/18 REPORTED	90	360,938	361,028
OUR ADJUSTMENTS	-	-8,400	-8,400
Duplicate Transactions	-	*-4,764*	*-4,764*
Capital Related Costs & Other Components Not Consistent with Repairs & Maintenance Costs	-	*-3,636*	*-3,636*
OUR APPROVED	**90**	**352,538**	**352,628**
REINSTATEMENT OF ROADS			
2017/18 REPORTED	1,057	134,415	135,472
OUR ADJUSTMENTS	-	10,763	10,763
Duplicate Transactions	-	*10,763*	*10,763*
OUR APPROVED	**1,057**	**145,178**	**146,235**
OFFICE FURNITURE AND EQUIPMENT			
2017/18 REPORTED	42	20,992	21,034
OUR ADJUSTMENTS	-	-604	-604
Duplicate Transactions	-	*-604*	*-604*
OUR APPROVED	**42**	**20,388**	**20,430**
CLAIMS AND CONTINGENCIES			
2017/18 REPORTED	3	20,344	20,347
OUR ADJUSTMENTS	-	-	-
Duplicate Transactions	-	-	-
OUR APPROVED	**3**	**20,344**	**20,347**

8.29. These costs were excluded because they were not classified as repairs and maintenance expenses and were not considered reasonable or prudently incurred by the NWC in the provision of potable water and wastewater services to its customers.

8.30. These cost exclusions result in a combined repairs and maintenance costs for CWTC and the NWC of $4.67 Billion, which is still relatively high compared to the average over the 2013 to 2018 rate period.

8.31. In light of this, the OUR recommends the following:

- The NWC should consider reviewing the repairs and maintenance cost data issues outlined by OUR in this Determination Notice, and if necessary, upgrade its cost accounting systems so as to enable the Commission to better handle the cost accounting requirements; and
- Given, the range of issues identified, urgent steps should be taken to review the NWC's accounting policies, procedures and practices.

OUR's Determination

8.32. Based on the OUR's review and analysis, the NWC's proposed test year repairs and maintenance costs were adjusted to reflect prudent and reasonable costs. The Office therefore makes the following determination:

Determination 7:

The Office has approved repairs and maintenance costs for inclusion in the NWC's operating cost component of the revenue requirement for $3,227.3 million. This sum includes $2,339.7 million and $887.5 million for potable water and sewerage services respectively.

CWTC/Soapberry Costs

8.33. The NWC has included $1.45 billion per annum as the amount payable CWTC for the treatment of sewage at the Soapberry Wastewater Treatment Plant. However, this amount overstates the test year financial statement and the raw data supplied by the NWC in its repair and maintenance spreadsheet. As shown in Table 8.9 below the amount should be $1.44 billion.

8.34. The OUR requested and received additional information (i.e. four (4) invoices that the NWC received from CWTC, along with actual volumes deposited to Soapberry) in order to evaluate and reconcile the true CWTC cost for inclusion in the revenue requirement.

Both the fixed and variable rates outlined on the invoices were checked against the OUR's approved rates for CWTC.

8.35. CWTC rates are approved by the OUR and the company has not applied for a rate increase since its last Determination Notice in 2013. CWTC has a PAM in place and the last approved annual price adjustment was in 2015 August. Consequently, the rates charged by CWTC to the NWC would be based on the approved 2013 rates that were adjusted by the Annual Price Adjustment Mechanism (ANPAM).

8.36. The existing base tariff structure for CWTC is as follows:

- *Fixed tariff*: $30.22 million per month; and
- *Variable (volumetric) tariff*: $46.05/ M^3

8.37. The OUR verified the above-mentioned rates against the volumes treated by CWTC over the years. The OUR's calculation results in a total cost of $1.44 billion for Soapberry. Table 8.9 below shows the details of the calculation of CWTC's costs.

Table 8.9: Analysis of Soapberry Cost

CWTC INVOICED AMOUNTS		OUR VERIFIED CALCULATION					
Quantity (m^3)	Invoice Total ($)	Quantity (m^3)	Fixed Charges	Volumetric Charge	Total Before PAM	Monthly PAM	Grand Total
1,730,300	112,056,661	1,730,300	**30,219,466**	79,680,315	109,899,781	2268566	112,168,348
2,186,306	134,728,404	2,186,306	**30,219,466**	100,679,391	130,898,858	3962711	134,861,568
1,752,034	114,455,160	1,752,034	**30,219,466**	80,681,166	110,900,632	3667238	114,567,870
1,862,081	119,439,604	1,862,081	**30,219,466**	85,748,830	115,968,296	3589201	119,557,498
1,669,022	109,165,033	1,669,022	**30,219,466**	76,858,463	107,077,929	2195904	109,273,833
1,877,557	119,550,852	1,877,557	**30,219,466**	86,461,500	116,680,966	2988508	119,669,474
2,052,595	128,297,187	2,052,595	**30,219,466**	94,522,000	124,741,466	3682588	128,424,054
1,974,155	123,657,984	1,974,155	**30,219,466**	90,909,838	121,129,304	2651852	123,781,156
1,985,151	126,744,771	1,985,151	**30,219,466**	91,416,204	121,635,670	5232791	126,868,461
1,987,563	127,355,830	1,987,563	**30,219,466**	91,527,276	121,746,742	5732891	127,479,633
1,623,172	104,307,334	1,623,172	**30,219,466**	74,747,071	104,966,537	-552563	104,413,974
1,957,868	120,500,065	1,957,868	**30,219,466**	90,159,821	120,379,288	243183	120,622,470
	1,440,258,885		**362,633,595**	**1,043,391,874**	**1,406,025,470**	**35662870**	**1,441,688,339**

Determination 8:

The Office approves the amount of $1,440 million in the revenue requirement as payment to CWTC for the treatment of sewage at the Soapberry Wastewater Treatment Plant.

The NWC's Administration Expense Proposal

8.38. The NWC's proposed total test year administrative expense was $5,119.7 million. Included in this amount were; bad debt, rent, rates and taxes, security services, insurance charges, computer services, printing and stationary, consultancy fee, postage and cables, overseas travel, audit and accounting fees, staff welfare, legal expenses, advertising and other miscellaneous expenses. Of the amount, $4,070.7 million was attributed to water services and $1,049.0 million to sewerage services.

8.39. The NWC further explained that the test year administration costs were adjusted to make allowance for the following known and measurable costs:

- Water abstraction fee of $11.67 million, which is payable to the WRA annually.
- Wastewater discharge fee of $8.65 million, which is calculated based on the sewerage volumes to be discharged from its fourteen (14) existing wastewater treatment plants. This is payable to NEPA.

8.40. Accordingly, the total adjusted administration costs proposed by the NWC is $5,140 million.

OUR's Review and Analysis of NWC's Proposed Administration Costs

8.41. The OUR, having evaluated the sub-components of the proposed administration costs, accepts the amount of $5,119.7 million as proposed by the NWC. The OUR also accepts and have included the amount of $11.7 million for water abstraction costs payable to the WRA and $8.65M for wastewater discharge fee payable to NEPA. Additionally, the OUR has included an adjustment for meter testing and administration costs as a known and measurable component of the NWC's administration cost. Further details of the meter testing and administration costs are provided below. With the exception of bad debt expenses, the proposed cost items were adjusted by fiscal year to date (2018 April to 2019 February) inflation rate of 2.53%. Table 8.10 below shows the details of the approved administration costs.

Table 8.10: OUR Approved Administration Costs

Items	NWC Proposed	Inflation Adjust. (2.53%)	OUR Approved
All Amounts in J$'000			
Bad Debt Expenses	3,269,772	0	3,269,772
Rent, rates and taxes	270,744	6,850	277,594
Security services	336,009	8,501	344,510
Insurance charges	212,932	5,387	218,319
Computer services	125,049	3,164	128,213
Printing and stationery	51,985	1,315	53,300
Consultancy fees	472,822	11,962	484,784
Postage and cables	131,371	3,324	134,695
Overseas travel	3,808	96	3,904
Audit and accounting fees	16,792	425	17,217
Staff welfare	93,623	2,369	95,992
Legal expenses	8,529	216	8,745
Advertising	16,385	415	16,800
Miscellaneous expenses	109,841	2,779	112,620
Meter Administration Cost	0	0	24,944
Water Abstraction Fee		0	11,660
Wastewater Discharge Fee		0	8,645
Total Administration	**5,119,662**	**46,802**	**5,211,713**

Meter Testing and Administration Cost

8.42. The Meter Testing Administrative and Operational Protocol for the Electricity and Water Sectors in Jamaica (MTAOP), requires the NWC to comply with the following meter testing and verification requirements:

- Pattern Testing and Approval;
- Acceptance Testing and Approval;
- Compliance Testing;
- Customer Requests for Meter Accuracy Verification Checks; and
- Accreditation of the NWC's Meter Testing, Calibration & Repair Facilities and Services.

8.43. The MTAOP was gazetted and promulgated in 2017 October, and the NWC's requests for meter testing under the MTAOP commenced 2018 June. As such, the NWC's costs related to MTAOP activities were not captured in the 2017-2018 Financial Statements.

8.44. Based on information from the NWC, plans are in place for large-scale deployment of advanced water meters in its water network over the medium to long-term. It is anticipated that this water meter programme should improve the accuracy of measurements, operational efficiency and reduce overall operating costs. However, during this process it is anticipated that the NWC will incur additional costs to cover the MTAOP requirements and procedures outlined above.

8.45. The annual cost for these MTAOP activities was estimated by the OUR at $24.9 million, as shown in Table 8.11 below.

Table 8.11: NWC's Annual MTAOP Costs

NWC's ANNUAL MTAOP COST FOR INCLUSION IN ADMINISTRATIVE COST COMPONENT OF THE REVENUE REQUIREMENT	
COST ITEM	[J$]
MTAOP TESTING REQUIREMENTS	23,443,547
NWC's METER TESTING FACILITIES ACCREDITATION	1,500,000
TOTAL	24,943,547

8.46. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 9:

The Office approves total administration cost in the amount of $5.21 billion, which comprises $4.15 billion for water services and $1.06 billion for sewerage services.

The NWC's Electricity Cost

8.47. As a public utility, the NWC has the responsibility to provide adequate, reliable, safe, economic and efficient water and sewerage supply services to its customers, based on modern standards, and consistent with prudent water utility practice. Notably, the provision of these utility services is a highly energy-intensive operation. This is compounded by the orientation and configuration of the water and sewerage infrastructure, as well as the geographical dispersion of water sources and demand across the country.

8.48. Based on electricity sector consumption data, a significant portion of JPS' annual electricity sales (kWh) is attributed to the NWC's utility processes. This energy allocation is typically utilized in the following segments:

- Raw water extraction and conveyance;
- Potable water treatment, distribution and storage;
- Wastewater collection, treatment, and discharge; and
- Commercial and administrative processes.

8.49. A large quantity of electrical energy is required to power these processes, and this is having a significant impact on the NWC's cost of operation. Despite electricity being a crucial input to the NWC's utility operations, the OUR recognizes that there are certain influential

factors that are not directly within the NWC's control. However, this does not relieve the NWC from its responsibility to manage, monitor and control its electricity consumption (kWh) and demand (KVA) profile, which are key variables contributing to the overall electricity cost. As indicated in the NWC's 2017-2018 financial statements, electricity cost is the utility's second highest operating expense, after "Salaries, Wages and Related Cost". Given the magnitude of this cost, immediate and sustained reductions are required to ensure the sustainability of the NWC's utility operations.

8.50. Based on the NWC's financial reports, electricity used in the various potable water and wastewater processes accounts for approximately 24% – 32% of the utility's total annual operating expenses, over the 10-year period from 2008 April to 2018 March, as indicated in Table 8.12 below.

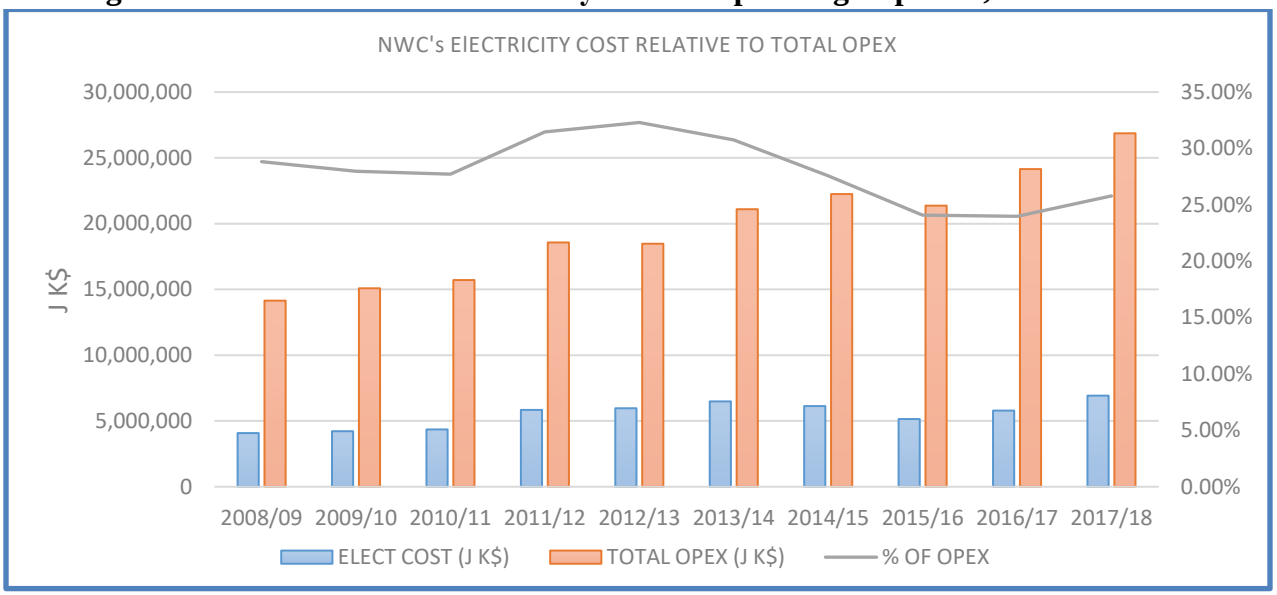
8.51. As shown in Table 8.12, at the start of the 2013-2018 rate review period, annual electricity cost trended downwards from $6.48 billion in 2013 to $5.15 billion by 2016 March. However, the trend was subsequently reversed, increasing to $6.92 billion by the end of 2018 March. This movement in annual electricity costs represents an overall point-to-point increase of approximately 7% between 2013 and 2018. Notably, the reported 2017/18 electricity cost reflects an increase of $1.134 billion (approximately 20%) over that for the 2016/17 period. Table 8.12 also shows the NWC's electricity cost projections for 2013-2018, with an average annual value of $6.166 billion, which were presented at the 2013 tariff review. The actual annual electricity costs reported for the same period, turned out to be lower on average with a variance of approximately $70.4 million.

Table 8.12: NWC's Electricity Cost Relative to Total Operating Expenses for 2008 – 2018

NWC's Electricity Cost Relative to Total Operating Expenses: 2008 – 2018 [J$' Million]											
ITEM	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	LAST 5-YEAR AVE.
ELECT. COST (Projected)	-	-	-	-	-	6,036.00	6,376.00	6,231.00	6,134.00	6,055.00	6,166.40
ELECT. COST (Actual)	4,078.93	4,220.76	4,356.63	5,839.77	5,965.45	6,487.20	6,132.48	5,146.34	5,789.75	6,924.41	6,096.04
TOTAL OPEX (Actual)	14,144.79	15,083.94	15,710.09	18,566.89	18,470.03	21,093.43	22,245.40	21,364.99	24,143.40	26,863.98	23,142.23
ELECT COST % OF OPEX	**28.84%**	**27.98%**	**27.73%**	**31.45%**	**32.30%**	**30.75%**	**27.57%**	**24.09%**	**23.98%**	**25.78%**	**26.43%**

8.52. The relative movement in the NWC's annual electricity cost and total operating expenses over the 2013 - 2018 rate period is illustrated in Figure 8.2 below.

Figure 8.2: NWC's Annual Electricity Cost & Operating Expenses, 2013 – 2018



NWC's 2013 – 2018 Energy and Water Performance Statistics

8.53. The NWC's main energy and water performance indicators for the 2013 – 2018 rate period is shown in Table 8.13 below. Based on the performance levels, the following was observed:

- Although water consumption remained constant between2017 and 2018, production volume (Imperial Gallons - IG) increased by approximately 10%. This implies increased water losses and inefficiency in the system.
- Water production appears to be a major factor driving electricity consumption.
- 2018 wastewater volume increased by 4% over that for 2017, but wastewater electricity cost decreased by 7%.

Energy Efficiency Indicator

8.54. In the Tariff Application, the NWC noted that the utility failed to achieve its 2017 water energy efficiency (EE) target of 2.3MWh per 1,000 imperial gallons (IG) of potable water produced, with actual performance reported at 2.89MWh per 1,000 IG. This reflects 2014 performance levels, suggesting a deterioration in EE. The 2017 performance effectively translates to an adverse deviation of approximately 26% below target.

Table 8.13: NWC's 2013 – 2018 Energy and Water Performance Statistics

INDICATOR	2013/14	2014/15	2015/16	2016/17	2017/18
Electricity Consumption (KWh)	196,179,835	189,943,922	194,421,009	203,710,454	204,836,179
Potable Water Production (1000 IG/year)	65,874,705	65,055,119	64,189,740	64,866,908	71,492,652
Potable Water Consumption (1000 IG/Year)	17,077,914	16,868,792	17,209,432	19,137,529	19,160,703
WW/Sewerage Consumption (1000 IG/Year)	4,902,304	4,794,295	4,881,648	5,599,918	5,822,343
PW Electricity Cost (J$ Million)	5,970,473	5,626,464	4,724,816	5,253,568	6,426,264
WW Electricity Cost (J$ Million)	516,728	506,012	421,527	536,179	498,149
Total Electricity Cost (J$ Million)	6,487,201	6,132,476	5,146,343	5,789,747	6,924,413
Average Fuel Rate (J$/kWh)	25.237	22.899	12.509	14.958	18.798
Average Billing FX Rate (1$US: J$)	104.22	113.28	119.04	127.41	127.82

8.55. While the NWC has specifically highlighted the 2017 EE performance, the energy and water performance data indicate that none of the proposed annual targets for 2013 – 2018 was achieved.

NWC Electricity Cost Proposal

8.56. The NWC has proposed a test year electricity cost of $6,924 million for inclusion in the operating cost component of the revenue requirement. According to the NWC, the proposed electricity cost was derived from electricity bills received during the 2017 April to 2018 March reporting period, for its various potable water and sewerage facilities.

8.57. Based on the NWC's 2017-2018 Financial Statements, this amount represents the costs of providing water and sewerage services during the stated period, as shown in Table 8.14 below.

Table 8.14: NWC's Proposed Electricity Cost for Revenue Requirement

NWC's Proposed Test Year Electricity Cost			
ITEM	WATER	SEWERAGE	TOTAL
ELECTRICITY COST ($ '000)	6,426,264	498,149	6,924,413
PROPORTION (%)	93%	7%	100%

8.58. In its 2013 tariff application, the NWC acknowledged the untenable situation regarding high energy usage and cost and proffered a number of improvement measures, such as:

- Reinforcement and expansion of its "Pump and Tank" programme;

- Pump replacement;
- Power factor correction for pump motor drives; and
- NRW reduction.

8.59. During this 2018 rate review process, the NWC posited that it has been exploring options to improve operational efficiency, including energy conservation, demand management and self-generation. However, the NWC has not presented a firm proposal in this regard.

OUR's Review of NWC's Proposed Electricity Cost

8.60. Following the submission of the Tariff Application, the OUR carried out an initial review of the NWC's proposed electricity cost, to validate its reasonableness for inclusion in the revenue requirement, and to ascertain whether it reflects efficient utilization of electrical energy in its water and sewerage operations. The OUR identified the need for and requested additional supporting information and schedules in order to substantiate the proposal. This information was, in the most part, provided.

8.61. The OUR considered, among other things, the following inputs and assumptions:

- Monthly energy consumption (kWh) for all metered facilities;
- Load demand (KVA) for all applicable electricity accounts;
- JPS' Non-Fuel Rate Schedule currently in effect;
- Monthly Billing Foreign Exchange (FX) Rate - for FX adjustment to the non-fuel portion of the electricity costs;
- Power Factor (PF) levels for facilities with a demand charge;
- Estimated JPS Fuel Rate based on historical fuel prices, historical fuel rates and fuel price forecast;
- Scope for EE initiatives; and
- Scope for self-generation.

8.62. Emanating from the NWC's reasoning, is the notion that energy utilization in its utility operations is viewed as an essential cost of doing business, which should be simply incorporated into the respective rates, and passed on to customers. However, the current operating environment is characterized by revenue constraints and increasing operating costs. Therefore, there is a need for greater scrutiny with respect to the efficiency and the reasonableness of the NWC's electrical energy consumption and the corresponding cost to deliver the required water and sewerage services. In that context, electricity costs relating to the NWC's utility operations is being subjected to rigorous regulatory review and assessment so as to ensure that such costs are deemed prudent and reasonable. This approach should also incentivise the NWC to implement feasible strategies for either

increasing revenues or reducing operating expenses. Based on the NWC's energy data, electricity usage accounts for a percentage of its total annual operating expenses. Therefore, going forward, the NWC energy situation will require a more detailed examination and assessment.

OUR'S DERIVATION OF NWC'S ELECTRICITY COST FOR REVENUE REQUIREMENT

8.63. For comparison, the OUR also computed the annual electricity cost for all the NWC electricity accounts with JPS, by applying the relevant inputs and assumptions. The results were then aggregated to derive the total annual electricity cost. This approach also includes sensitivity analysis around certain inputs, as well as statistical evaluation to test the soundness of the results.

8.64. Based on the OUR's calculations, the estimated annual electricity cost to be included in the NWC's operating cost component of the revenue requirement is $6,356 million, with allocations to water and sewerage of $6,024 million and $331.94 million, respectively, as shown in Table 8.15 below.

Table 8.15: OUR's Calculation of NWC's Annual Electricity Cost for Revenue Requirement

NWC ELECTRICITY COST TO BE INCLUDED IN REVENUE REQUIREMENT [J$'000]								
NWC PROPOSED			OUR DETERMINED			VARIANCE		
Potable Water	Wastewater	Total	Potable Water	Wastewater	Total	Potable Water	Wastewater	Total
6,426,264.00	498,149.00	6,924,413.00	6,024,008.43	331,935.27	6,355,943.70	402,255.57	166,213.73	568,469.30
93%	7%	100%	95%	5%	100%	-	-	-

OUR's Findings and Comments - NWC's Electricity Cost Data

8.65. Based on the review and evaluation of the NWC's electricity cost proposal, the OUR's findings and comments are as follows:

1. The NWC's electricity cost data provided, does not indicate that increases in annual electricity consumption and costs are dominated by the following factors:
    a. Installation of new technologies to meet more stringent potable water standards and regulations;
    b. Climate change conditions necessitating treatment of water from lower quality sources and using more energy-consuming technologies; and
    c. Demand growth and network infrastructure expansion dictating the transport of water to greater distances and greater elevations.

2. The evaluation found that the magnitude of the NWC's energy consumption and costs is largely influenced by the following conditions:

    - Aged and dilapidated water and sewerage infrastructure which is contributing to increased electrical energy consumption through excessive water losses and inefficient electrical/mechanical systems, such as, pump and drive motor assemblies;
    - Inadequate energy use (kWh) management strategies and practices to improve EE and reduce energy consumption and costs;
    - Sub-optimal configuration of electrical and mechanical systems; and
    - Limited EE interventions focused on pumping and treatment efficiencies, reduction of water loss in distribution systems, and energy and water efficiency improvements in residential water use.

3. Billing Inaccuracies: Erroneous and overstated measurements (KVA and KWh) were associated with certain accounts resulting in significant bill amounts being included in the NWC's 2017- 2018 electricity cost. There was no indication that these anomalies were rectified and commensurate billing adjustments made during the period. Costs resulting from these billing related errors were not considered prudent, and therefore were not allowed in the approved electricity cost.

4. Load (KVA) Demand: The evaluation found that the NWC's demand management approach is not rigorous enough to realize targeted demand reductions and costs for potable water and wastewater facilities. Based on the nature of the NWC's operations and the power demand price signals, with a robust demand strategy, significant savings can be achieved through peak load shaving, for the relevant facilities. For example, in wastewater treatment plants, peak flow rates and peak organic loads, which require increased pumping and treatment capacity, tend to occur during the hours that are coincident with peak demand periods of the electric utility. Peak demand at treatment plants is mainly for the operation of aeration systems used in treating organic loads (typically accounting for over fifty percent (50%) of plant process use). Therefore, process control, proper scheduling, load shifting and storage, offer significant peak load reduction opportunities.

5. A significant portion of the NWC's Rate 40 accounts had power demand (KVA) levels that reflect a Rate 50 demand profile. Transitioning these accounts to Rate 50 would allow the NWC to benefit from lower non-fuel rates. However, this may require negotiations with JPS.

6. The NWC's electricity expenses can be impacted by factors, such as, FX rate variation, rate of inflation and fuel price volatility. However, the available electricity data indicate that increasing potable water production volumes dictated by system inefficiencies, is

driving energy consumption, and thus affecting overall electricity cost. Therefore, this needs to be urgently addressed.

7. The NWC did not present any forecasts involving potable water production/consumption, wastewater consumption, related energy costs, and efficiency improvements.

8. Data Quality: The NWC's electricity billing data submitted for the period 2013-2018 shows various anomalies in measured quantities and charges. These are undesirable data quality issues, which needs to be addressed within the framework of the NWC's monitoring and quality control processes, on an on-going basis.

9. No Energy Management Plan (EMP) was presented by the NWC for the new tariff period to address EE concerns. The EMP is considered a key requirement that is central to the energy reduction strategy. In this regard, the NWC is required to develop and implement its EMP, which should encompass, among other things, a practicable framework to integrate EE into its day-to-day operation and medium to long-term planning of the water and sewerage infrastructure. The NWC, in addressing the energy situation, should also seek to employ a structured approach involving the use of applicable management tools, simulation models, energy management systems, best practices and other relevant resources in order to ensure that established objectives can be achieved. This will likely enhance the long-term sustainability of the utility.

10. Given the current operating environment, it is imperative that the NWC takes a holistic view of energy management, as there are substantial opportunities and potential for the utility to reduce its energy costs and realize cost savings. Some of the measures are quick and easy to deploy with a limited amount of investment cost. This can be achieved through a range of initiatives, including:

    - Utilization of modern energy-efficient water sector technologies;
    - Reconfiguration of pumping systems for optimum performance. It is important to target this area since pumping accounts for greater than 80% of the NWC's energy consumption. This may include, among other things, pump rehabilitation, pump optimization, correct sizing of pumps, installation of premium efficiency motors, and use of variable frequency drives (VFDs);
    - Developing alternative pumping schemes and pump system upgrades;
    - Increasing system automation with the deployment of Supervisory Control and Data Acquisition (SCADA) systems and other electronic monitoring & reporting systems, for improved network visibility, monitoring, coordination and control;
    - Process optimization - optimizing the operation of critical equipment, apparatus and systems;

- Building upgrades, including lighting and heat, ventilation, and air-conditioning (HVAC) equipment;
- Benchmarking and conducting energy audits – to establish baseline for measuring and tracking changes over time;
- Evaluation of demand-side management opportunities to reduce energy consumption during peak hours by shifting power consumption from on-peak to off-peak hours;
- Adding additional storage to pump and store water during off-peak electric rate periods;
- Promoting water conservation and encouraging the use of energy efficient products by customers;
- Conducting water audits and reducing system leaks;
- Evaluation of system life cycle energy costs associated with proposed projects; and
- Evaluating the use of alternative energy sources.

8.66. Improving EE is not only a strategy that translates to energy/cost savings, but delivers other tangible benefits, such as, monetary savings on chemicals and other treatment supplies, extended life of existing infrastructure, enhanced customer relations, and environmental sustainability.

8.67. The OUR is of the view that through the application of appropriate energy management strategies and practices, the NWC's energy costs can be controlled and reduced. The OUR therefore recommends that the NWC submits a plan in its next Rate Review Application that comprehensively addresses the efficient use of energy.

Supervisory Control and Data Acquisition (SCADA) System

8.68. While SCADA does not necessarily constitute the core of a water utility's EMP, this system, integrated with other electronic monitoring systems and communication systems, can significantly enhance the utility's ability to, monitor and control network operations, from a central location. In addition, it can be effectively used to coordinate, track, and manage energy-related decisions and operational dynamics. Some of the operational and energy related benefits that can be derived from deploying a proper SCADA system, include:

- Improvements in system operation and reduced energy consumption due to increased automation, superior monitoring and controls.

- Reporting of real-time status of monitored facilities and triggering alerts or alarms when a malfunction is detected.
- More efficient use of the utility's resources. Remote monitoring capabilities, reduce the need for manual inspection and physical monitoring.
- Quicker response to system water quality and pressure issues, which can effectively conserve water, save energy costs, and improve service reliability.
- Enabling system operators to monitor tank levels, flow meters, chlorine analyzers, security cameras and pump status in real time, thus increasing system efficiency and security.

8.69. Given the expansive capabilities of SCADA and its associated benefits, the OUR is of the view that the NWC should consider the full deployment of this pivotal tool/resource in its potable water and sewerage infrastructure, as part of its overall strategy for system modernization and improvement.

OUR's Determination

8.70. Based on the OUR's review and analysis, the Office makes the following determinations:

Determination 10:

1. The NWC proposed test year electricity cost of $6.924 billion is adjusted by the OUR to reflect "Known and Measurable" changes and conditions.
2. The OUR approves an annual electricity cost for inclusion in the NWC's revenue requirement of $6,356 million. This includes $6,024 billion and $332 million for potable water and sewerage services respectively.
3. Based on the inefficient use of electricity in the NWC's utility operations, the Commission shall be required to review the electricity related issues delineated by the OUR in this Determination Notice, and take the necessary actions where applicable.

NWC's Water Purchase Cost

8.71. The NWC proposed a water purchase cost of $414.42 million, presumably to pay for bulk water bought from third party sources.

The OUR Analysis of Water Purchase Costs

8.72. The OUR is aware that in sections of the island where the NWC has little or no access to water sources feasible for production, the Commission sometimes purchases bulk water from approved suppliers. Third party suppliers such as the National Irrigation Commission (NIC), and the Runaway Bay Water Company Limited (RBWCL) are regulated by the OUR. In such instances the bulk water rates employed by these third party suppliers are approved by the OUR. In other instances, the supply and price of bulk water is determined by private contracts between the NWC and other third party suppliers.

8.73. It is reasonable in the circumstances for the OUR to permit third party bulk water rates it has approved as a pass-through to NWC's customers. In this regard, the Office makes the following determination:

Determination 11:

The Office approves the NWC's proposed water purchase costs. Accordingly, the sum of $414.42 million shall be included in the revenue required to meet this expense.

NWC's Other Operating Costs

8.74. The other operating costs included in the Tariff Application were:

- *Telephone expense:* $140 million
- *Fuel & lubricant costs:* $271 million

8.75. The OUR has no objections to the amount represented for telephone expenses and the fuel and lubricant costs. These costs, as presented in the financial statement appears reasonable given the scale and scope of the Commission's operations.

8.76. In addition, the OUR took note that the NWC did not make a proposal for the recovery of regulatory fees in its Tariff Application. Given its knowledge on this issue, the Office has included and approved, the amount of $176.6 million to cover this expenditure.

Determination 12:

1. The Office approves the NWC's proposed telephone expense of $140 million and its fuel & lubricant cost of $271 million included in its Application.
2. Further, the Office considers that provision should be made for regulatory fees, and has approved the sum of $176.6 million in the NWC's revenue requirement.

Total Operations Cost

8.77. Total operating costs determined by the Office is as outlined in Table 8.16 below.

Table 8.16: Total Operation Costs

Approved Operating Expenses All amounts in J$'000s						
Items	**NWC**			**OUR**		
Categories	**Test Year**	**Adjustments**	**Total**	**Test Year**	**Adjustments**	**Total**
Salaries, wages and related cos	**9,033,027**		**9,033,027**	**9,033,027**		**9,174,670**
Salaries and wages	3,274,677		3,274,677	3,274,677		3,405,664
Allowances	1,998,955		1,998,955	1,998,955		1,998,955
Pensions	3,006,734		3,006,734	3,006,734		3,006,734
Gratuity paid	131,501		131,501	131,501		131,501
Insurance (group)	297,777		297,777	297,777		297,777
Travelling and transportation	8,491		8,491	8,491		8,491
Statutory contributions	314,892		314,892	314,892		327,488
Repairs and maintenance	**4,960,560**		**4,960,560**	**4,960,560**		**3,227,255**
Administration	**5,119,662**	**20,305**	**5,139,967**	**5,119,662**		**5,211,713**
Bad debts	3,269,772		3,269,772	3,269,772	-	3,269,772
Other administration expenses	1,849,890		1,849,890	1,849,890	92,051	1,941,941
Electricity	**6,924,413**		**6,924,413**	**6,924,413**	(568,469)	**6,355,944**
Telephone	**140,154**		**140,154**	**140,154**	3545.8962	**143,700**
Fuel and lubrications	**271,746**		**271,746**	**271,746**	6875.1738	**278,621**
Purchases - water	**414,419**		**414,419**	**414,419**		**414,419**
Regulatory Fees						**176,588**
Soapberry			-	-		**1,441,688**
TOTAL OPERATING EXPENSES	**26,863,981**		**26,884,286**	**26,863,981**		**26,424,598**

8.78. Based on the OUR's review and analysis of the NWC's operation cost proposal, the following determination has been made:

> **Determination 13:**
>
> The Office approves the recovery of $26,424.6 million in NWC's revenue requirement in relation to its total operating expenses.

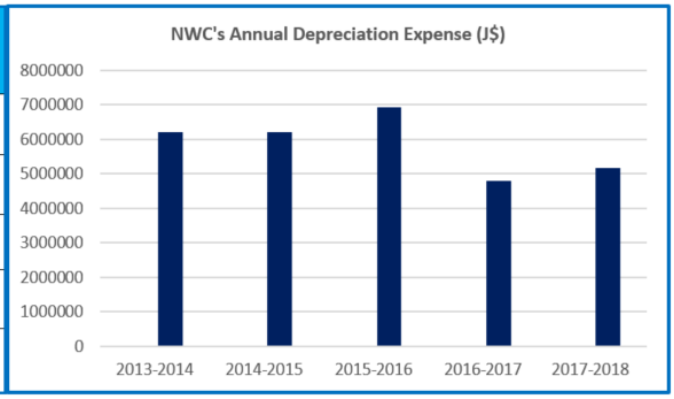
DEPRECIATION AND AMORTISATION

Overview of NWC's Depreciation Expenses

8.79. The NWC's depreciation expenses reported during the 2013-2018 rate period is shown in Figure 8.3 below.

Figure 8.3: NWC's 2013-2018 Depreciation Expenses

Reporting Period	NWC's Annual Depreciation Expense (J$'000)
2013-2014	6,212,550
2014-2015	6,213,527
2015-2016	6,935,406
2016-2017	4,801,975
2017-2018	5,171,647



8.80. According to the NWC's depreciation data, these annual depreciation expenses are dependent on the initial asset cost, incremental investment, asset re-valuation and de-recognition.

NWC's Depreciation and Amortisation Proposal

8.81. The NWC's depreciation and amortisation proposals were as follows:

- *Depreciation:* The test year depreciation expense of $5.171 billion was proposed for inclusion in the revenue requirement.
- *Amortisation:* The test year amortisation charges of $57.403 million was proposed for inclusion in the revenue requirement.

OUR's Review of NWC's Proposed Depreciation and Amortisation Expenses

8.82. The OUR carried out an initial review of the NWC's proposed depreciation expenses, to validate its reasonableness for inclusion in the revenue requirement. At the preliminary stage of the review, the OUR identified and requested supporting information to substantiate the proposal, which was for the most part supplied. These information requirements, included the following:

- The NWC's fixed asset register;
- The NWC's (2017 April 1 – 2018 March 31) depreciation schedule, containing the relevant parameters, depreciation calculations and methodology; and
- Details on proposed "Amortisation Expenses" including a description of the related assets, costs, useful asset lives and amortisation charge in each case.

8.83. The OUR examined all the relevant information, including the depreciation data to validate whether the NWC's calculated depreciation charges for component assets are accurate; consistent with the depreciation conditions outlined in the financial statements; and are in accordance with the International Financial Reporting Standards (IFRS). This

approach was employed to ensure that the proposed depreciation charges were prudent, reasonable and qualified for inclusion in the revenue requirement.

OUR's Estimation of NWC's Depreciation Expenses for Revenue Requirement

8.84. The OUR also estimated the (2017 April 1 – 2018 March 31) depreciation expense for the NWC's fixed assets by applying the established depreciation methodology to the relevant inputs and parameters defined in the Financial Statements and Depreciation Schedule. In addition, adjustments were made to the computation based on the discrepancies discussed below.

8.85. Applying this procedure, the OUR estimated NWC's depreciation expense for the referenced period to be $4.354 Billion (see Table 8.17 below). Accordingly, this is the total depreciation expense that is allowed in the revenue requirement for NWC's potable water and waste water/sewerage rates, for the new Rate Review period.

Table 8.17: OUR Estimated Depreciation Expense for inclusion in NWC's Revenue Requirement

NWC DEPRECIATION EXPENSE TO BE INCLUDED IN REVENUE REQUIREMENT								
NWC PROPOSED			OUR DETERMINED			VARIANCE		
Potable Water	Sewerage/	**Total [J$'000]**	Potable Water	Sewerage/	**Total**	Potable Water	Sewerage/	**Total**
		5,171,000			**4,354,303.58**			**- 816,696.42**

OUR's Estimation of NWC's Amortisation Charges for Revenue Requirement

8.86. The NWC indicated that its proposed amortisation charges largely pertain to software resources related to its CIS and Oracle software. A description of these software assets is provided in Table 8.18 below.

Table 8.18: Description of NWC's Software Assets subject to Amortisation

NWC's SOFTWARE ASSETS – SUBJECT TO AMORTISATION			
ASSET NAME	**ASSET LIFE (YEARS)**	**ASSET LIFE (YEARS) – Specified in Financial Statements**	**ASSET COST (J$ MILLION)**
Customer Information System (CIS) Software	10 Years	10 Years	496.23
CIS Upgrade	4 Years	10 Years	11.91
Oracle Software	4 Years	4 Years	19.37

8.87. As part of the evaluation, the OUR also examined these software assets and their respected amortisation charges. This was to validate their accuracy and, consistency with the amortisation conditions outlined in the Financial Statements, and their alignment with IFRS requirements. .

8.88. This approach required that adjustments be made to the useful life of the CIS software from 4 years to 10 years in keeping with the depreciable life specified in the NWC's Financial Statements.

8.89. Based on the OUR computations, the amortisation expense for the stated period was estimated to be, $55.66 Million, as shown in Table 8.19. This is the total amortisation expense that is allowed in the revenue requirement for the determination of NWC's potable water and wastewater/sewerage rates, for the new rate period

Table 8.19: OUR Estimated Amortisation Expense for inclusion in NWC's Revenue Requirement

NWC AMORTISATION CHARGESTO BE INCLUDED IN REVENUE REQUIREMENT								
NWC PROPOSED			OUR DETERMINED			VARIANCE		
Potable Water	Sewerage/Waste water	Total [J$'000]	Potable Water	Sewerage/Waste water	Total [J$'000]	Potable Water	Sewerage/Waste water	Total [J$'000]
		57,402,000			55,656,933			-1,745,067

OUR's Findings and Comments - NWC's Depreciation and Amortisation Data

8.90. The OUR detected a number of inconsistencies and omissions, in the NWC's depreciation data, which appear to have materially affected the derivation of the proposed depreciation and amortisation charges. The OUR's findings and comments are delineated as follows:

Asset Recognition and Categorization of Cost

1) There are accounting issues involving Property, Plant and Equipment (PPE), recognition of assets, representation of their carrying amounts and related depreciation charges.

2) The treatment of certain cost items and activities appears to deviate from the relevant requirements of the IFRS and conditions in the financial statements. This includes, but is not limited to, the following:

   a. Some cost items were recognized as assets that do not satisfy the IFRS, International Accounting Standard (IAS 16), asset recognition criteria.

   b. The carrying amount of component assets/parts that were replaced were not shown to be derecognized, as dictated by the derecognition provisions of IAS 16.

   c. In several cases, the "Initial Cost" of items of PPE did not appear to be reflective and representative of such asset costs based on industry information.

   d. Intangible assets were included in the fixed asset register and depreciation schedule, which should not be the case.

   e. Depreciation charges were applied to land without any justification. Land is usually recognized as an asset with unlimited useful life and is therefore not depreciated.

In comments to the OUR, the NWC posited that such an irregular calculation is a system error and that the utility will take the necessary corrective measures to address the error.

Depreciation Calculation Issues

1) The depreciation schedule indicates that the "Straight-Line" depreciation method was applied in deriving the NWC's proposed depreciation expense. In principle, this method entails the systematic allocation of assets' costs over their useful lives, therefore yielding a constant depreciation charge, if the assets' residual value does not change. However, in several cases, there were apparent deviations from this principle. In comments to the OUR, the NWC argued that an asset revaluation was done in 2013, which would have changed the residual value of some assets; resulting in their residual values being written-off over their remaining useful lives. The NWC's comments are noted, but such information was not clearly represented in the depreciation data submitted. The OUR also observed that the deviations go beyond the scope of asset residual value.

2) The NWC's depreciation charges included in the depreciation schedule, when checked mathematically and aggregated (approximately $5.144 billion), did not equate to the proposed test year depreciation expense ($5.171 billion). In comments to the OUR, the NWC stated that there were challenges in extracting the annual depreciation charge from its system. According to the NWC, the Financial Information System (FIS) in current use is archaic and poses a challenge in extracting required information. The NWC also indicated that it would provide a revised depreciation schedule, but this has not been submitted to the OUR.

3) While the financial statements show the total accumulated depreciation for each reporting period, the submitted depreciation schedule and fixed asset register do not show the accumulated depreciation for each individual asset. This does not allow for proper tracking of the depreciation charges, and the remaining asset cost prior to retirement. This raises some concerns as to the veracity of the net book values (NBV) shown for the assets.

4) The depreciation schedule shows that depreciation charges were calculated using the straight-line method with monthly applications. However, in some cases, it was not clear how these charges were calculated and applied. In addition, in other cases, depreciation charges were not applied for the entire twelve (12) months during the reporting period, even though the depreciation data, such as depreciation start date and useful asset life, suggest that the total twelve (12) month charges should be applied.

5) Although the 2017-2018 financial statements accounted for depreciation expenses between 2017 April 1 and 2018 March 31, according to the depreciation schedule,

the NWC included twelve (12) months of depreciation charges for assets with depreciation start dates ranging from 2017 May 1 to 2018 March 31, which is inaccurate. In comments to the OUR, the NWC stated that such irregular calculations appear to be system errors and warrant further investigation. Based on the in-service date of these assets, depreciation charges not applicable during the reporting period (2017 April 1 – 2018 March 31), should not have been included in the "Test Year" depreciation expense for the purpose of this rate review. Accordingly, these charges were excluded from the depreciation expense allowed in the revenue requirement.

Depreciation Rates and Useful Asset Lives

1) In the depreciation schedule, depreciation charges were computed for some assets under the category of "Plant & Machinery" at a rate of 4% (useful life – 25 years). However, based on the NWC's 2017-2018 Financial Statements, this 4% depreciation rate was not specified for depreciation of any asset category defined above. In comments to the OUR, the NWC asserted that sewer pipelines are being depreciated at a rate of 4% and that the notes in the financial statement will be updated accordingly in future audited reports. Notwithstanding, this evidence suggests that there are clear discrepancies in the NWC's depreciation data.

2) A number of cases were identified where the specified depreciation rates were not applied to the respective asset category, as defined in the financial statements.

3) There were several instances where the indicated useful life of an asset did not translate to the depreciation rate for such assets specified in the 2017-2018 financial statements. Such misalignment is likely to induce errors in the calculations and affect the accuracy of the respective depreciation charges. In comments to the OUR, the NWC stated that an asset revaluation was done in 2013, which would have changed the residual value. However, the revaluation of an asset does not necessarily change the assets useful live. In addition, depreciation begins when the asset is available for use and continues until the asset is derecognized, even if it is idle.

Identification and Description of Assets

1) There were a number of cases where the proper identification and specific location of certain assets, such as, major pipeline systems, service reservoirs, water treatment facilities, pump/drive motor assemblies, waste water treatment plants, etc., were not stated. This information is critical for regulatory monitoring and assessment of the NWC's asset base. In comments to the OUR, the NWC indicated that the existing FIS only includes the parishes in which the assets are located, but it is planning to include a more detailed location and description of the assets in the upcoming implementation of a new FIS.

2) Costs reported by the NWC for "Road Reinstatement", were included as items of PPE, and corresponding depreciation charges computed and applied. According to the NWC's 2017-2018 Financial Statements, costs associated with "Road Reinstatement", are classified as "Repairs and Maintenance" expenditures, and accordingly should be appropriately allocated.

3) Costs reported by the NWC for some day-to-day servicing/routine maintenance of plant assets were also included as items of PPE and depreciation charges applied. Under the asset recognition criteria, these activities do not qualify as assets and should not be subject to depreciation treatment. In keeping with the relevant standards, those costs should be accounted for under "Repairs and Maintenance" expenditures or other operating cost categories.

4) A significant number of major assets were placed in service, particularly in the parish of Portland during the 2016 – 2018 timeframe. However, details including the scope of activities and costs pertaining to such assets were not provided in the Tariff Application and supporting documents.

5) Costs and depreciation charges for site reinforcement, general maintenance, and security related activities as well as other activities, were included in the Depreciation Schedule. In some instances, it would appear that elements of these costs were also accounted for in the "Repairs and Maintenance" costs. This needs to be reviewed by the NWC to eliminate any duplication of costs or double counting.

Lease Arrangements

1) A significant number of cost items defined as "Lease Hold Improvements", applied to Land, Buildings, Plant and other items were included in the Depreciation Schedule, which do not appear to be consistent with the asset recognition and depreciation principles of the IFRS. The 2017-2018 Financial Statements do not make any reference to "Lease Hold Improvements" and do not provide any explicit or implicit details on those arrangements. No clear basis and/or documentation to support these lease arrangements and justification for applying depreciation charges were provided by the NWC.

2) The 2017-2018 Financial Statements make reference to "Leased Motor Vehicle Assets" at a depreciation rate of 25%. However, no information detailing such arrangements was provided by the NWC. In comments to the OUR, the NWC stated that these assets were all fully depreciated in the 2016 financial year. This was not indicated in the Depreciation Schedule.

Amortisation Charges

1) According to the 2017-2018 financial statements, the useful life of the NWC's CIS software is ten (10) years (amortisation rate – 10%). However, it appears that an amortisation rate of 4% was used to calculate the 2017-2018 amortisation charges for a component of this software asset. This constitutes a deviation and needs to be rectified by the NWC.

Used and Useful Principle

1) In the NWC's depreciation data, costs related to Construction Work in Progress (CWIP) were not recognized for depreciation based on the "used and useful" principle. However, the status of plant and machinery was not indicated. It is therefore not clear which assets are in service and are "used and useful" in providing potable water and wastewater/sewerage services. In general, "used" means that a plant is actually providing the service, and "useful" means that without such plant, either costs would be higher or the quality of service would be lower. In that context, the NWC is required to show that assets required to provide a service are used and useful and associated costs are prudently incurred. This means that the costs of assets not found to be "used and useful" should be excluded from the NWC's rate base and related depreciation charges disallowed.

OUR's Position

8.91. Taking into consideration the results and issues emanating from the review of the NWC's depreciation data, the OUR recommends the following:

1) The NWC should review the depreciation and amortisation issues outlined above and take the necessary actions where applicable;

2) The NWC should upgrade its FIS to modern standards so as to enable the Commission to handle greater complexity and cost accounting requirements;

3) Given, the range of issues identified, the NWC should urgently review its accounting policies, procedures and practices; and

4) The NWC should engage a competent consultant to conduct a depreciation study in order to determine the depreciation rates for its assets for the next rate review. The terms-of-reference (TOR) of this study shall be approved by the OUR.

8.92. With respect to the treatment of regulatory assets, the IFRS provides general guidance. However, given the extent of the issues uncovered involving the NWC's assets, it may be necessary for the OUR to consider prescribing separate regulatory accounts for reporting the NWC's assets and costs.

Depreciation Expenses Allocation

8.93. In allocating depreciation expense between water and sewerage services, the 73%:27% split observed in the assignment of its assets was applied.

OUR's Determination

8.94. The NWC's proposed test year depreciation and amortization expenses of $5,172 million and $57.4 million respectively, were adjusted by the Commission to reflect what it deemed to be prudent and reasonable costs. Based on the OUR's review and analysis, further adjustments were required. Consequently, the following determination is made:

Determination 14:

1. The Office approves a total of $4,410.0 million for depreciation and amortisation expenses for inclusion in the NWC's revenue requirement. Of this total, $4,354.3 million and $55.7 million are attributable to depreciation and amortization expenses respectively.
2. Additionally, in keeping with the overall 73%: 27% asset split for water and sewerage services, $3,218.3 million of total depreciation and amortization expenses have been assigned to water revenues and $1,190.7 million to sewerage revenues.
3. Further, the NWC shall conduct a depreciation study prior to the next Rate Review in order to address deficiencies in its approach to allocating the cost of its assets over their useful lives.

Determination on the Revenue Requirement

8.95. Based on the above assessment and aggregation of the components of the NWC's operating costs and depreciation/amortization expenses, the OUR has arrived at the Commission's revenue requirement. The composition of the approved revenue requirement is shown in Table 8.20 below.

8.96. International best practice suggests that in order to account for the gap between historic productivity and expected productivity a 'stretch factor' or 'consumer productivity dividend' may be included in arriving at a reasonable revenue requirement. Given that there is significant scope for greater efficiency in NWC's operation the Office has determined that a stretch factor of 1.26% should be applied to the Commission's overall revenue requirement. This is reasonable considering the opportunities available to improve energy efficiency and trim operating cost in the short run.

8.97. The OUR has apportioned the Commission's operation costs and loan interest into its respective water and sewerage categories, based on the separation specified in the audited

financial statement[16]. Consistent with the OUR's review and analysis, as well as the application of a 1.26% stretch factor the following determination has been made:

Table 8.20: OUR Determined Revenue Requirement

	Water (J$'000')		Sewerage (J$'000')		Total (J$'000')	
	NWC Proposed	OUR Approved	NWC Proposed	OUR Approved	NWC Proposed	OUR Approved
Total Operational Expenses	21,102,438	20,832,172	5,781,848	5,592,427	26,884,286	26,424,599
Loan Interest	1,711,627	1,053,360	644,560	396,672	2,356,187	1,450,032
Depreciation & Amortisation	3,798,586	3,219,271	1,430,463	1,190,689	5,229,049	4,409,961
Return on Equity	-	-	-	-	-	-
Taxation	-	-	-	-	-	-
Revenue Adjustment (for bulk water, new installation etc.)	(509,789)	(509,789)	(39,739)	(39,739)	(549,528)	(549,528)
Overall Revenue Requirement	**26,102,862**	**24,595,014**	**7,817,132**	**7,140,049**	**33,919,994**	**31,735,063**
Stretch Factor Adjustment (1.26%)	-	(310,674)	-	(90,190)	-	(400,864)
Approved Revenue Requirement	**26,102,862**	**24,284,340**	**7,817,132**	**7,049,859**	**33,919,994**	**31,334,200**
Test Year Revenues	21,210,222	21,210,222	5,661,627	5,661,627	26,871,849	26,871,849
Shortfall	4,892,640	3,074,118	2,155,505	1,388,232	7,048,145	4,462,351
Increase	**23.1%**	**14.5%**	**38.1%**	**24.5%**	**26.2%**	**16.6%**

Determination 15:

The Office approves a revenue requirement of $31,334.2 million of which $24,284.3 million is for water services and $7,049.9 million is for sewerage services.

[16] See Annex 1 for the detail cost split table showing operating expenses/costs.

9. TARIFF DESIGN/RATE STRUCTURE

9.1. According to the NWC, water and sewerage tariffs would need to be increased by an average 50% and 72% respectively to allow the Commission to recover its proposed revenue requirement, when full cost recovery is applied. The NWC has indicated that this level of increase would be not affordable for poor and middle class customers and has proposed the exclusion of a return on equity from its revenue requirement. Hence, NWC has requested that water and sewerage rates be increased by 23% and 38% respectively.

9.2. The NWC, in its Tariff Application, further argued that it faced the risk of some of its larger commercial customers defecting, as it may be more economical for these customers to self-supply or to obtain water services from private water providers. The NWC therefore proposed several changes to the existing tariff structure to address the residential affordability and the risk of network defection by commercial customers.

9.3. In this regard, the NWC indicated that its Tariff Application had been guided by the following considerations:

- Setting revenue to cover operating expenses, loan interest, and depreciation, while excluding a return on equity. This, according to the NWC was sufficient to cover the Commission's cash needs.
- Keeping its services affordable. This entailed establishing residential water tariffs for average water consumption at a level approximately equivalent to five percent (5%) of expenditure for poor households;
- Designing a structure that was attractive to large users and aimed at encouraging these customers to stay on the system;
- Fashioning tariff to send appropriate price signals, to preserve resources and deter waste.
- Ensuring that bill increases, with the exception of the lowest residential consumption block, were kept relatively consistent across customer categories and consumption levels.

9.4. The proposed changes to the tariff structure included:

- Consolidating the six (6) residential blocks into three (3) blocks.
- Offering a lower rate of increase in the 0 to 2,000 IG residential block.
- Introducing a two-block consumption structure for commercial customers, with a decreasing upper tier. The first block was proposed for monthly consumption below 2 million IG and the second, for usage above 2 million IG.
- Establishing a new standby rate for large commercial customers.

- Introducing a separate sewerage service charge to reflect NWC's fixed costs of providing customers with that service.

9.5. A summary of the comparison of the NWC's test year revenues and the proposed revenue requirement is shown in Table 9.1 below:

Table 9.1: NWC's Comparison of Test Year and Required Revenue

Customer Type	Water Service ($'million)	Sewerage Service ($'million)	Total ($'million)
Revenue Requirement	26,102.9	7,817.1	33,920.0
Actual Test Year Revenue	21,210.2	5,661.6	26,871.8
Shortfall	4,892.7	2,155.5	7,048.2
Proposed Increase	**23%**	**38%**	**26%**
Revenue Allocation	**77%**	**23%**	**100%**

9.6. In deriving its proposed tariff, the NWC made the fundamental assumption that consumption will decrease because of the rate increase. The Commission contended that given the price elasticity of demand, tariffs would need to rise by more than 35% (water) and 55% (sewerage) to meet the revenue requirement. The NWC has indicated that it assumes a price elasticity of demand for water supply services of -0.2, which dictates that for every 1% increase in tariffs, consumption is expected to fall by 0.2 percent. Hence, rather than 35% and 55% for the change in revenue from volumetric charges for water and sewerage services respectively, the NWC proposed that the increase be 50% and 72% respectively to overcome the effect of price elasticity.

THE OUR'S ANALYSIS OF NWC'S TARIFF PROPOSAL

9.7. The NWC's assumption that, all other things remaining equal, demand will fall if the price is increased is correct. However, the same does not hold for the relationship between revenue and an increase in price. In this regard, the NWC's elasticity analysis is fundamentally flawed. Economic theory suggests that if the demand for a product is inelastic, a price increase invariably leads to an increase in revenue. Given that it is generally assumed that water demand is inelastic, then the proposed increase would not necessarily require a further increase to achieve the Commission's revenue objective. In fact, if NWC's elasticity assumption is to hold, then a further increase in tariffs would lead to a greater reduction in revenue, which would necessitate a further increase. Thus, leading to an endless downward revenue spiral.

9.8. In addition, the NWC's revenue analysis did not take into account the possibility of demand growth, which is likely given the country's economic outlook. Consequently, the NWC's argument for an amplification of the required increase is less than persuasive.

9.9. On the other hand, the OUR for the most part, is not opposed to the tariff design criteria proposed by the NWC, as most of the elements of the criteria are in keeping with international best practice and guidelines for water and sewerage tariff design. The principles which guide the OUR's consideration of the NWC's rate design are as follows:

- Economic Efficiency – the tariff should promote patterns and the level of use, which tend to reduce the total cost of providing service.
- Revenue Recovery – the tariff should allow the utility to generate revenues that cover its cost of service.
- Cost Reflexivity (Equity) – the tariff should provide for recovery of costs from customers in proportion to their use of the system and should recognise the impact each class has on system facilities and operations.
- Simplicity – The tariffs should avoid unnecessary complexity and should be understandable to users who make decisions based on price.
- Fairness – all stakeholders' (users and the public) should perceive the tariffs as being fair.
- Public Interest – the tariff should take into account matters of public interest such as the Government's policy objective of ensuring that each person has the right to receive a minimum level of drinking water supply at an affordable price, and that tariffs should, as much as possible, discourage "excessive" or "wasteful" use of water, thus promoting conservation.

9.10. The OUR recognizes that some of the above pricing principles may conflict with each other, but expects the tariff design to maintain an appropriate balance between all principles. The tariff design criteria proposed by the NWC were mapped to the above principles. The mapping shows that the NWC's pricing criteria elements are consistent with the principles necessary for a sound and robust tariff design (see Table 9.2 below).

9.11. It is important to note that cost reflectivity could only be incorporated in the tariff design, with reasonable precision, if a cost of service study was included in the Tariff Application. However, this study was not a part of the NWC's submission. Consequently, the allocation of costs among customer classes was done without the benefit of this insight.

Table 9.2: Analysis of NWC's Pricing Principles

NWC Proposed Criteria	Best Matched Tariff Design Principle
The revenue generated covers NWC's operating expenses, loan interest, and depreciation, but not a return on equity, and is sufficient to cover NWC's cash needs.	Revenue Recovery
Services are affordable; meaning a basic needs level of water consumption accounts for about 5 percent of expenditure for poor households; and average water consumption accounts for no more than 5 percent of expenditure for average households.	Public Interest
The structure is attractive to large users, encouraging them to stay on the system (or pay for standby capacity if they leave the system).	Public Interest
The structure sends appropriate price signals, so as to preserve resources and deter waste.	Economic Efficiency and Public Interest
Bill increases are kept relatively consistent across customer categories and consumption levels (except for low consumption residential users, whose bills will rise less than the bills for other customers).	Fairness
Reduce number of tariff blocks for residential customers from six (6) to three (3)	Simplicity

9.12. In addition, arising from the absence of a cost of service study, the Tariff Application lacked the basis for a proper allocation of costs between the sewerage and water services.

9.13. In addition, the NWC has requested that of its $33,920 million proposed revenue requirement, 77% be assigned to water services and 23% to sewerage services (see Table 9.1 above).

The OUR's Assessment

9.14. As indicated earlier, the OUR does not accept the NWC's hypothesis regarding the relationship between revenue and the impact of price elasticity. Apart, from the conceptual difficulties associated with the hypothesis, if price elasticity is to be factored into the rate calculation, then the elasticity coefficient applicable, must be based on empirical studies in Jamaica as there is very little knowledge of how NWC's customers respond to prices.

9.15. In the absence of a cost of service study, the NWC's proposal to maintain the same proportion of the allocation of revenues between water and sewerage services as observed from the reported revenues in the NWC's audited Financials for 2017/2018 is not unreasonable. Thus, the OUR approves the apportionment of the revenue requirement between water and sewerage services as 77% and 23% respectively.

9.16. In the absence of a cost of service study, the OUR was unable to ascertain the proportion of cost that should be borne by each customer class, and is also not in a position to determine what portion of costs should be considered fixed versus variable. In light of this limitation, the OUR opted not to allow a tariff design predicated on the reallocation of costs between customer classes.

9.17. Tables 9.3 – 9.5 below shows the NWC's proposed rate schedule and the annual revenue that would be generated from the application of these rates, plus the contribution of the customer classes to this revenue requirement. However, the OUR's analysis suggest that even though there is some reallocation of costs between customer classes, it is relatively insignificant and thus, on that basis, the OUR proceeded to assess the other elements of the NWC's proposed tariff design.

Table 9.3: NWC's Proposed Rate Schedule

Customer Category & Block	Service Charge for Connection Type									Volumetric Rate $/1000 IG
	5/8 inch/15mm	3/4 inch/20mm	1 inch/25mm	1 1/4 inch/30mm	1 1/2 inch/40mm	2 inch/50 mm	3 inch/75 mm	4 inch/100 mm	6 inch/150mm	
Residential										
0 - 2,000	870.00	2,140.00	2,800.00	5,270.00	5,270.00	7,460.00	13,550.00	21,890.00	33,340.00	495.06
2,000 - 7,000	870.00	2,140.00	2,800.00	5,270.00	5,270.00	7,460.00	13,550.00	21,890.00	33,340.00	1,032.02
7,000 +	870.00	2,140.00	2,800.00	5,270.00	5,270.00	7,460.00	13,550.00	21,890.00	33,340.00	1,720.04
Commercial										
0-2,000,000	870.00	2,140.00	2,800.00	5,270.00	5,270.00	7,460.00	13,550.00	21,890.00	33,340.00	2,395.48
2,000,000+	870.00	2,140.00	2,800.00	5,270.00	5,270.00	7,460.00	13,550.00	21,890.00	33,340.00	1,146.69
Condo										
All	870.00	2,140.00	2,800.00	5,270.00	5,270.00	7,460.00	13,550.00	21,890.00	33,340.00	1,188.31
School										
All	870.00	2,140.00	2,800.00	5,270.00	5,270.00	7,460.00	13,550.00	21,890.00	33,340.00	958.26

Table 9.4: Revenue Requirement from NWC's Proposed Rates

Customer Category & Block	Total Service Charge Revenue	Service Charge Revenue for Connection Type									Volumetric Revenue $	Total Revenue $
		5/8 inch/15mm	3/4 inch/20mm	1 inch/25mm	1 1/4 inch/30mm	1 1/2 inch/40mm	2 inch/50 mm	3 inch/75 mm	4 inch/100 mm	6 inch/150mm		
Residential												
0 - 2,000	1,674,312,360	1,642,285,080	23,599,920	4,670,400	948,600	316,200	716,160	325,200	1,050,720	400,080	3,185,730,617	4,860,042,977
2,000 - 7,000	1,785,273,480	1,738,364,400	33,538,080	9,576,000	948,600	379,440	716,160	162,600	788,040	800,160	5,102,104,388	6,887,377,868
7,000 +	241,678,560	195,040,080	7,909,440	13,675,200	2,529,600	885,360	9,131,040	2,113,800	9,193,800	1,200,240	4,024,417,463	4,266,096,023
Total Residential	**3,701,264,400**	**3,575,689,560**	**65,047,440**	**27,921,600**	**4,426,800**	**1,581,000**	**10,563,360**	**2,601,600**	**11,032,560**	**2,400,480**	**12,312,252,468**	**16,013,516,868**
Commercial												
0-2,000,000	404,252,280	218,436,120	5,238,720	38,472,000	6,324,000	4,490,040	43,775,280	13,008,000	63,305,880	11,202,240	9,239,301,677	9,643,553,957
2,000,000+	6,028,320	-	-	-	-	-	-	487,800	3,940,200	1,600,320	667,365,768	673,394,088
Total Commercial	**410,280,600**	**218,436,120**	**5,238,720**	**38,472,000**	**6,324,000**	**4,490,040**	**43,775,280**	**13,495,800**	**67,246,080**	**12,802,560**	**9,906,667,444**	**10,316,948,044**
Condo												
All	21,685,680	918,720	51,360	1,108,800	252,960	189,720	5,192,160	1,626,000	12,345,960	-	309,435,569	331,121,249
Total Condo	**21,685,680**	**918,720**	**51,360**	**1,108,800**	**252,960**	**189,720**	**5,192,160**	**1,626,000**	**12,345,960**	**-**	**309,435,569**	**331,121,249**
School												
All	30,136,560	4,572,720	205,440	7,257,600	505,920	442,680	11,010,960	1,138,200	4,202,880	800,160	640,592,576	670,729,136
Total Schools	**30,136,560**	**4,572,720**	**205,440**	**7,257,600**	**505,920**	**442,680**	**11,010,960**	**1,138,200**	**4,202,880**	**800,160**	**640,592,576**	**670,729,136**
TOTAL REVENUE	**4,141,681,560**	**3,798,698,400**	**70,491,600**	**73,651,200**	**11,256,720**	**6,513,720**	**65,349,600**	**17,235,600**	**82,481,520**	**16,003,200**	**22,859,512,488**	**27,001,194,048**

Table 9.5: Contribution of Customer Classes to Revenue Requirement

Residential												
0 - 2,000	6.2%	6.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.8%	18.0%
2,000 - 7,000	6.6%	6.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	18.9%	25.5%
7,000 +	0.9%	0.7%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.9%	15.8%
Total Residential	**13.7%**	**13.2%**	**0.2%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**45.6%**	**59.3%**
Commercial												
0-2,000,000	1.5%	0.8%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	34.2%	35.7%
2,000,000+	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2.5%
Total Commercial	**1.5%**	**0.8%**	**0.0%**	**0.1%**	**0.0%**	**0.0%**	**0.2%**	**0.0%**	**0.2%**	**0.0%**	**36.7%**	**38.2%**
Condo												
All	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.2%
Total Condo	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.1%**	**1.2%**
School												
All	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	2.5%
Total Schools	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**2.4%**	**2.5%**
TOTAL	**15.3%**	**14.1%**	**0.3%**	**0.3%**	**0.0%**	**0.0%**	**0.2%**	**0.1%**	**0.3%**	**0.1%**	**84.7%**	**100.0%**

Fixed Service Charge

9.18. Fixed Service Charge refers to the fixed monthly charge applied to customer's bills. This charge is intended to recover the fixed costs incurred by the NWC because of customers being connected to its network.

9.19. The NWC requested a 5% increase for all customers with 5/8-inch meters, to ensure that water service for the poor remains affordable since the majority of its residential customers have 5/8 inch meters. The Commission further requested an increase to 26% for all other connection sizes.

9.20. Given the OUR's revision of the NWC's revenue requirement to reflect prudently incurred costs; the allowed revenue reflects approximately 69% of the requested sum. Accordingly, to recover the customer portion of the revenue requirement, the OUR has opted to increase customers with 5/8-inch meters by 3% instead of 5%. This category of customers represents 99% of the customer base. For the remaining 1% of the customer base with larger meter sizes, a 10% increase in service charge has been deemed reasonable. The details are set out in Table 9.6 below.

Table 9.6 OUR Approved Service Charge

Meter Size	Service Charges				
	NWC			OUR	
	Current	Proposed	% Increase	OUR Approved	% Increase
5/8 inch/15mm	$ 830.00	$ 870.00	5%	$ 854.90	3%
3/4 inch/20mm	$ 1,700.00	$ 2,140.00	26%	$ 1,870.00	10%
1 inch/25mm	$ 2,220.00	$ 2,800.00	26%	$ 2,442.00	10%
l¼ inch/30mm	$ 4,180.00	$ 5,270.00	26%	$ 4,598.00	10%
1 1/2 inch/40mr	$ 4,180.00	$ 5,270.00	26%	$ 4,598.00	10%
2 inch/50mm	$ 5,920.00	$ 7,460.00	26%	$ 6,512.00	10%
3 inch/75mm	$ 10,750.00	$ 13,550.00	26%	$ 11,825.00	10%
4 inch/100mm	$ 17,370.00	$ 21,890.00	26%	$ 19,107.00	10%
6 inch/150mm	$ 26,460.00	$ 33,340.00	26%	$ 29,106.00	10%

9.21. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 16:

The Office has approved the following fixed monthly Service Charges for water services, which depends on the specific meter size installation:

Meter Size	Service Charge
5/8 inch/15mm	854.90
3/4 inch/20mm	1,870.00
1 inch/25mm	2,442.00
l¼ inch/30mm	4,598.00
1 1/2 inch/40mm	4,598.00
2 inch/50mm	6,512.00
3 inch/75mm	11,825.00
4 inch/100mm	19,107.00
6 inch/150mm	29,106.00

Water Tariffs for Residential Customers

9.22. In an effort to make the rate structure administratively simpler, the NWC proposed the consolidation of its existing six (6) blocks residential rate structure into three (3) blocks. The proposed three (3)-block structure was designed using the following principles.

- *Block 1* – promotes affordability for 'basic needs' level of consumption.
- *Block 2* – caters to average levels of consumption and is set near average cost.
- *Block 3* – applies to high consumption users. The rate set above average cost to promote efficiency and deter waste.

9.23. For the first block, the NWC proposed a reduction of the consumption band from 0 – 3,000 IG to 0 – 2,000 IG. The reduction in the band would be such that it would still be sufficient to cover the basic consumption needs of a household of 50 litres[17] per capita per day (lpcd), as specified in the National Water Sector Policy and Implementation Plan, 2019.

9.24. Assuming a household size of six (6) persons, the total consumption to cover basic needs is 1,980 IG/month. The NWC indicated in its Tariff Application that the last survey of living conditions estimated the average Jamaican household size at 4.3 persons. Hence, 2,000 IG per month is more than sufficient to cover a household's basic needs.

[17] 50 litres is equivalent to approximately 11 imperial gallons.

9.25. The NWC proposed the consumption range of 2,001 – 7,000 IG for the second usage block. This second block covers the 40th to 90th percentiles of current residential consumption. The average consumption for the block is 125 lpcd. Consequently, the average consumer in the block would see a 32% to 33% increase in his or her bill. Table 8.7 below shows the NWC's computed bill impact for the typical 'Block 2' residential customers.

Table 9.7: NWC's Proposed Increase in 'Block 2' Customers' bills

Household Size	Consumption/ IG	Bill Under Existing Tariffs	Bill Under Current Tariff	% increase
4	3,300	$2,789	$3,713	33%
5	4,125	$3,558	$4,701	32%
6	4,950	$4,324	$5,689	32%

9.26. The NWC estimated that even with the over 30% increase in 'Block 2' customer bills, the typical customer bill in this income group would represent 4.6% to 4.7% of household expenditure.

9.27. The third block, which the NWC referred to as "the excess consumption block", consumes more than 7,000 IG per month or 177 lpcd. This is three (3) times more than the typical 'Block 1' customer. The NWC proposed a rate increase of 50% above the cost of service for this block.

Analysis of Water Tariffs for Residential Customers

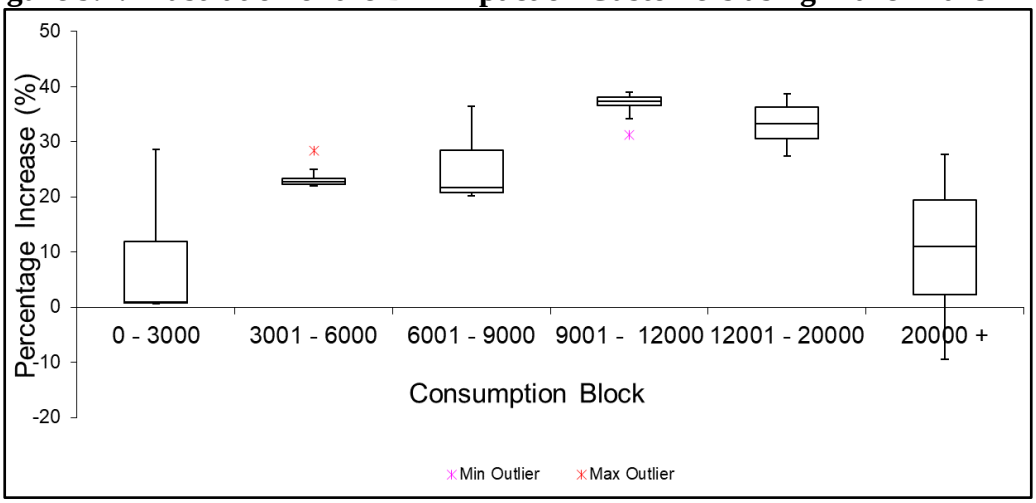
9.28. Figure 9.1 below shows a boxplot of percentage increase in bills using the NWC's proposed rate schedule as provided in Table 9.7 above. The boxplot exhibits the median, lower quartile, upper quartile, minimum and maximum bill impact in each consumption block.

9.29. Figure 9.1 below shows that based on NWC's proposed tariff, the following would occur:

- While more than 50% of residential customers in the 0 – 3000 IG block will see bill increases of below 5%, some customers in this block may see increases of up to 30%.
- Some customers with consumption in excess of 20,000 IG per month would see a decrease of up to 10% on their bills.

9.30. If the assumption is made that those customers that use more than 20,000 IG per month are the wealthiest customers, then the proposed structure raises questions of social justice.

Figure 9.1: Illustration of the Bill Impact on Customers using March 2018 Bills



9.31. In keeping with the Office's recommendation in its 2008 Rate Determination Notice,[18] the OUR recognizes that there is merit in the simplification of the existing six (6) block residential tariff structure by reducing the number of tiers. However, the OUR takes the view that the NWC's proposed three (3) block structure should be reconfigured to achieve greater balance over the entire consumption range.

9.32. In this regard, to prevent high volume water consumers from experiencing a rate decline, while imposing steep increases in the other consumption blocks, a four (4) block structure should be implemented at this time. However, it is recommended that the NWC revisits the three (3) block structure and strive for greater balance in the next Rate Review. The four (4) residential blocks for residential customers approved are as follows:

Block 1: 0 – 3,000 IG

Block 2: above 3,000 – 6,000 IG

Block 3: above 6,000 – 9,000 IG

Block 4: above 9,000 IG

[18] National Water Commission review of Rates – Determination Notice (Document No. WAT 2008/01) dated 2008 April 28

9.33. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 17:

The Office has determined that the NWC's consumption block will be reduced from six (6) blocks to four (4) blocks. The OUR-approved consumption blocks for residential customers is as follows:

Block 1: 0 – 3,000 IG

Block 2: above 3,000 – 6,000 IG

Block 3: above 6,000 – 9,000 IG

Block 4: above 9,000 IG

9.34. It is anticipated that the combination of the four (4) tier tariff structure with the tariff design principles outlined earlier, will result in the residential water rates shown in Table 9.8 below will lead to a more favourable outcome.

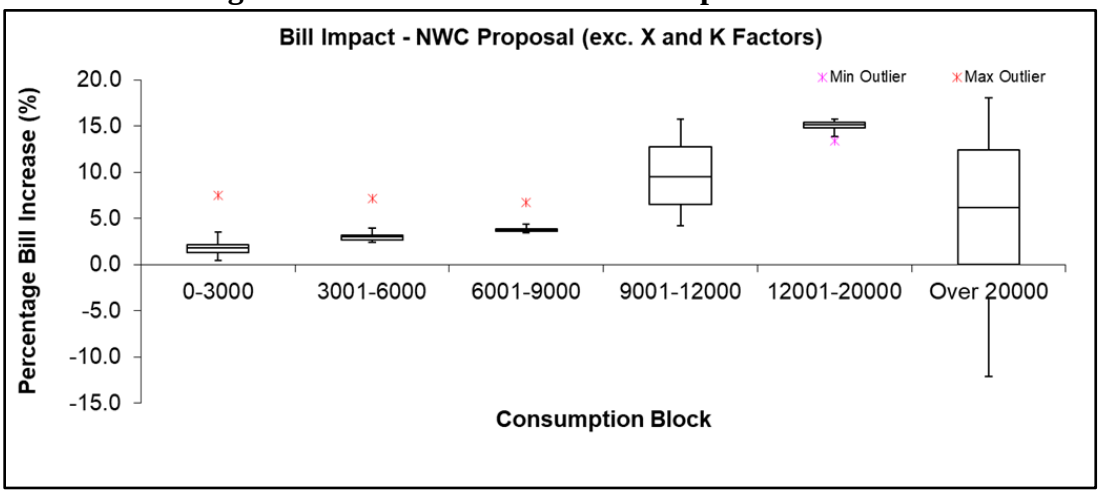
Table 9.8: OUR Tariff Design Structure for Residential Water Rate

Customer Category and Block	Volumetric Rate $/1000IG
Residential	Water
0 - 3,000	495.06
For the next 3000	881.08
For the next 3000	960.31
Over 9000	1,638.11

9.35. Figure 9.2 below provides an analysis of the bill impact of the OUR's reconfigured four (4) block structure water tariff for residential customers based on bill invoices for 2018 March. The boxplot of percentage increase in bills shows the following:

- High consuming customers will not generally experience a reduced bill while lower consumers face larger increases.
- More than 90% of customers in 'Block 1' will only see an increase below 5%.
- Other consumption blocks will experience higher increases, but the first three consumption blocks will not experience increases higher than 15%.

Figure 9.2: Illustration of the Bill Impact on Customers



9.36. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 18:

The Office has determined that the NWC's tariff for residential water rates under a four (4) block structure shall be as follows:

Block 1	(0 – 3,000 IG)	:$495.06 per 1,000 IG
Block 2	(>3,000 – 6,000 IG)	:$881.08 per 1,000 IG
Block 3	(> 6,000 – 9,000 IG)	:$960.31 per 1,000 IG
Block 4	(above 9,000 IG)	:$1638.11per 1,000 IG

SEWERAGE TARIFF FOR RESIDENTIAL CUSTOMERS

9.37. The NWC proposed the same three (3) tier residential block structure for both water and sewerage residential customers. It requested the following adjustment to sewerage rates:

- *Block 1* : 13% increase in sewerage rate for lifeline customers
- *Block 2*: 19% increase for the average consumption block
- *Block 3*: 35% increase for high-end users

Analysis of Sewerage Tariffs for Residential Customers

9.38. The NWC's proposal to retain the same block structure for sewerage tariffs as for water is logical, since to do otherwise would create unnecessary complications in the billing process. In this regard, given that the Office determined that a four (4) block structure is applicable to residential customers, the same structure will be applied to sewerage tariffs.

9.39. The NWC proposed the introduction of a separate service charge for sewerage services, instead of the single existing service charge, which does not discriminate between water and sewerage services. The NWC's request was as follows:

- For all non-commercial classes of all meter sizes: $400
- For commercial customers of all meter sizes: $5000.

9.40. The OUR understands the rationale for introducing a service charge for sewerage because there are components of sewerage costs that are fixed or which vary with capacity but not with sewerage volumes. However, the proportion of costs, which are to be recovered through the service charge, should correctly be determined from a cost of service study.

9.41. The OUR is of the view that the application of the same service charge regardless of meter size, as proposed by the NWC, sends the incorrect price signal to customers. In general, the service charge covers two types of costs, one that varies with the number of customers and the other, which varies with the capacity of infrastructure that is made available to serve customers. The meter size is often used as a proxy for the customer's contribution to the capacity based costs. Although sewerage is not metered, it is fair to assume that about 90% of water used returns to the sewer, so the size of sewerage pipes corresponds closely with the size of the water meter.

9.42. Consistent with the approach applied in the derivation of residential water tariffs above, the OUR's analysis suggests that residential sewerage rates should be as shown in Table 9.9 below.

Table 9.9: OUR Approved Sewerage Rates for Residential Customers

Customer Category and Block	Volumetric Rate $/1000IG
Residential	Sewerage
0 - 3,000	571.80
For the next 3000	1,017.65
For the next 3000	1,109.17
Over 9000	1,892.02

9.43. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 19:

In keeping with a four (4) block tariff structure and the balancing of critical tariff principles, the Office has determined that the NWC's tariff for residential sewerage services shall be as follows:

Block 1	(0 – 3,000 IG)	:$571.80 per 1,000 IG
Block 2	(>3,000 – 6,000 IG)	:$1,017.65 per 1,000 IG
Block 3	(> 6,000 – 9,000 IG)	:$1,109.17 per 1,000 IG
Block 4	(above 9,000 IG)	:$1,892.02 per 1,000 IG

Water Tariff for Commercial Customers

9.44. The NWC proposed a decreasing two (2) block structure for the commercial water tariff. According to the NWC, this initiative should incentivize high consuming commercial customers to remain on its network. Based on this proposal, customers with consumption above 2 million IG/month would benefit from a lower rate. Table 9.10 below shows the proposed pricing structure for commercial customers.

Table 9.10 Current and Proposed Water Tariff for Commercial Customers

Consumption Blocks	Current Tariff ($/1,0000IG)	Proposed Tariff ($/1,000IG)	% Change
0 -2,000,000	1,768	2,396	36%
Over 2,000,000	1,768	1,147	-35%

9.45. The NWC stated that high consuming customers are sometimes capable of self-supplying or alternatively, procuring the product privately at lower rates. Consequently, a declining tariff structure would incentivize these large users to remain on the network.

9.46. In the water sector, declining block tariffs are typically used for large industrial customers who often impose lower average costs on the utility because they enable the utility to capture economies of scale in water source development, transmission, and treatment. There is a trend to move away from decreasing block tariffs, essentially because water conservation is usually an important government policy, and the water structure does not incentivize water conservation.

9.47. The NWC did not provide an analysis of the cost to self-supply for large commercial customers, nor did it provide an indication of the prices being offered by private water providers to enable the OUR to assess whether the tariff for large commercial customers is

currently uneconomical. In addition, as indicated before, the NWC failed to include in its Tariff Application a cost of service study, which would have shed some light on the cost to serve large commercial customers versus smaller customers.

9.48. Notwithstanding, the OUR takes the view that there is some merit to the NWC's claim of defection risk. This is of particular importance, given the fact that the distribution of water resources are not uniform across the island, and this creates the opportunity for a regional provider to supply services below the national rates charged by the NWC.

9.49. An analysis of the NWC's billing data shows that only twenty-two (22) customers qualify, and they consume about 3% of the water delivered to customers. The NWC requested that the volumetric rate for the block above 2 million IG/month be set at 35% below the prevailing rate while the block below 2 million IG be set 36% above the prevailing rate.

9.50. The OUR is of the view that the commercial defection risk is real, which may put the recovery of the Commission's revenue requirement in jeopardy. In this regard, the OUR has no objection to the introduction of a second tier declining structure for commercial customers.

9.51. The NWC's proposal would result in bill increases of up to 45% for low consuming commercial customers while customers who consume up to 6 million IG/month would experience a reduction of 6% on their bills. The OUR takes the view that a 45% increase is an undue burden for small commercial customers and as such, does not approve the proposed tariff levels for commercial customers.

9.52. Considering the balance between the issue of fairness and the impact of the defection of large commercial customers, the OUR's analysis suggests that commercial rates, providing for an increase of 7% on the first block and -38% on the second block would provide an incentive for the high volume consumers to remain on the water network (see Table 9.11 below). This will ensure that the bill impact for all commercial water consumers is below 5%, while allowing for a more attractive rate for the largest commercial customers.

Table 9.11: OUR's Analysis of Water Rates for Commercial Customers

Customer Category and Block	Volumetric Rate $/1000IG
Commercial	Water
0-2,000,000	1,891.76
Over 2,000,000	1,102.68

9.53. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 20:

In keeping with the principle of equity, while recognizing the real risk of defection from the NWC's network, the Office has determined that the NWC's tariff for commercial water services under a two (2) block structure shall be as follows:

Block 1 (2 million IG and less) :$1,891.76 per 1,000 IG

Block 2 (above 2 million IG) :$1,102.68 per 1,000 IG

Sewerage Tariff for Commercial Customers

9.54. As in the case of commercial water customers, the NWC proposed a decreasing two (2) block tariff structure for commercial sewerage customers. NWC has also proposed that sewerage rates for customers be set at 98% of water rates. This would result in commercial customers being required to pay $2,337 per 1000 IG for consumption of 2 million IG and less, and $1,119 per 1000 IG for incremental consumption above 2 million IG.

9.55. Observing established tariff design principles, while giving due recognition to the balance between consumer equity and the risk of network defection, the OUR's analysis suggests that commercial sewerage rates should be set at the levels shown in Table 9.12 below.

Table 9.12: OUR's Analysis of Sewerage Rates for Commercial Customers

Customer Category and Block	Volumetric Rate $/1000IG
Commercial	Sewerage
0-2,000,000	2,184.99
Over 2,000,000	1,273.60

9.56. Based on the OUR's review and analysis, the Office makes the following determination.

Determination 20:

In keeping with the principle of equity, while recognizing the real risk of defection from the NWC's network, the Office has determined that the NWC's tariff for commercial sewerage services under a two (2) block structure shall be as follows:

Block 1 (2 million IG and less) :$2,184.99 per 1,000 IG

Block 2 (above 2 million IG) :$1,273.60 per 1,000 IG

Standby Charges for Commercial Customers

9.57. In its Tariff Application, the NWC proposed the implementation of a standby charge for large commercial customers that remain connected to the network only for backup supply, in the event that their own water source fails or is interrupted. The proposed rate would, on average, be equivalent to $781 per 1,000 IG. According to the NWC, the proposed standby charge was equal to the incremental capacity cost per 1,000 IG of the NWC's next two planned water schemes; Rio Cobre and Rio Bueno (see Table 9.13 below). The specific rate structure requested for the customer category was as follows:

- *Block 1* (2 million IG or less) :$1,375 per 1,000 IG
- *Block 2* (Above 2 million IG) :$366 per 1,000 IG

Table 9.13: Incremental Capacity Cost

Project	Annualized Capital Cost	Fixed Operating Cost	Annual Capacity Cost	Volume of Additional Water Sold	Incremental Capacity Cost
	($ millions)	($ millions)	($ millions)	(Billion IG)	($ per 1,000 IG)
Rio Bueno	726	64	790	1.47	599
Rio Cobre	N/A	N/A	1414	1.47	964
Standby Charge					**781**

9.58. The NWC further proposed that the standby charge regime should be governed by the following rules:

- Each commercial customer should be identified as a standby user or a non-standby user. Standby users would be required to set their desired standby volumes on a forward-looking basis for the next twelve (12) months. The desired volumes would be agreed on in advance, as this would form the basis of the calculation of the stand-by charges to be applied.

- The usage patterns of users who are non-standby customers would be monitored for any unusual consumption pattern, to see if these users should be charged a standby rate. A penalty of two times the normal volumetric rate is to be applied if standby users exceed the pre-agreed standby volumes.

OUR's Analysis of NWC Proposal of Standby Charges for Commercial Customers

9.59. Standby charges are not unusual, even though they are not common features of water tariffs. Several jurisdictions outside of Jamaica have standby service as an option of their water service. Typically, this option is for customers with their own source or alternate water supply, but may require the water utility to provide some level of guarantee of service continuity for emergency conditions or to meet shortfalls in supply.

9.60. In its book, *Principles of Water Rates, Fees, and Charges,* the America Water and Wastewater Association (AWWA)[19] indicates that:

> *"…the water utility providing standby service must have the necessary reserve capacity to supply the level of standby demand requested by the customer without compromising the safe yield commitment to its other customers. Additionally, transmission main interconnections must be in place to transfer the water on demand, and provisions should be made to prevent backflow to the emergency provider".*

9.61. In other words, in offering standby service, the NWC ought to ensure that it has enough water to supply the customer requiring these additional supplies. Consequently, it must have the appropriate infrastructure in place to serve such customers, even if they do not take water from the NWC regularly. In light of this, the OUR takes the view that a standby rate is reasonable.

9.62. Standby charges ideally should cover the direct costs incurred to provide service connection (if the customer is new), a capacity charge to cover the costs of infrastructure to meet the needs of standby customers, plus a charge for water actually taken. The NWC's proposal included a capacity charge, which it called the standby charge and a charge for volumes actually consumed. The OUR therefore has no objection to the structure of the standby charges.

9.63. The Commission proposed that the volumetric rate and the standby charge, for the standby customer, sum to 90% of the average volumetric rate, of the regular commercial customer, since the standby customer must specify maximum consumption volume. The OUR infers from this, that the standby customers' annual specification of their maximum volumes would facilitate better planning and contribute to reducing system cost in the long run.

[19] America Water and Wastewater Association Manual M1, Fifth Edition.

9.64. The NWC's methodology for deriving the standby charge is based on the estimated incremental cost, since marginal (incremental) cost provides an efficient price signal. The OUR takes the view, however, that the NWC has not provided a thorough analysis of its incremental cost. Nevertheless, the OUR, at this point, sees no harm in accepting the NWC's proposal since, at the very least, it represents a lower boundary of the cost.

9.65. The OUR does not approve the penalty for consumed volumes above the pre-agreed amount set at twice the volumetric rate of regular commercial customers. The OUR takes the view that the level of the penalty appears to be excessive. In this context, the penalty on the incremental water volumes above the agreed capacity should be equivalent to the volumetric rate for standby customers.

9.66. Notwithstanding the rules proposed by the NWC for the application of standby charges, the OUR believes that the NWC should develop a standby charge policy prior to the implementation of the new arrangement. The policy should elaborate the terms and conditions for the application of the charge and the contractual arrangements that will be made with customers that are deemed standby customers. The Commission should also provide a roll out plan, since this is a new tariff feature for the NWC, and customers need to be adequately informed and prepared.

9.67. Currently, the connection of commercial customers to the NWC's network is informed by the Commission's Draft Impact Fee Policy. This policy allows the NWC to charge commercial customers a fee when an increase in consumption volumes would have required the NWC to expand its facilities to accommodate the increased demand. In this regard, customers who have already paid an Impact Fee to the NWC should not be subjected to the additional standby charge, provided the capacity required remains unchanged. However, should the customer increase the required capacity, a standby charge should be applied to the incremental capacity.

9.68. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 21:

1. The Office has determined that the NWC's standby tariff for commercial water services shall be as follows:
   - ***Annual Contracted Capacity Charge:*** $781 per 1,000 IG x Capacity
   - ***Volumetric Rate*** (applicable to all consumption): $828.47 per 1,000 IG
   - ***Penalty*** (applicable to incremental volumes above agreed capacity): $828.47 per 1,000 IG
2. In addition, the Office has determined that:

a) The NWC shall submit a "Standby Charge Policy" and a rollout plan to the OUR within three (3) months of the effective date of this Determination Notice.

b) The NWC shall not implement the standby charge prior to the OUR's approval of the "Standby Charge Policy" and roll out plan.

c) The standby charge is not applicable to NWC customers who have already paid an Impact Fee, provided the required standby capacity does not exceed the capacity established when the Impact Fee was paid.

d) Should the required standby capacity exceed the level accounted for in the payment of its Impact Fee, then the customer shall be required to pay the ***standby tariff*** for the incremental volume.

Condominium Tariff

9.69. The water and sewerage volumetric rates for condominiums are both single block tariff structures. The NWC signaled its intention to retain the existing rate architecture. However, it proposed increases of 36% and 46% for water and sewerage services respectively. Table 9.14 below shows the proposed water and sewerage rates for condominium customers.

Table 9.14 Current vs Proposed Condominium Rates

Details	Current Tariff $/'000 IG	Proposed Tariff $/'000 IG	% Change
Water	877	1188	36%
Sewerage	796	1,159	46%

9.70. In its review of the condominium tariff, the OUR has no objection to the NWC's plan to retain a uniform volumetric rate for both water and sewerage. However, in keeping with the reduction in the revenue requirement, approved by the OUR, it was necessary to moderate the NWC's request for water services, while shifting the larger cost burden to the sewerage services component.

9.71. In this regard, the OUR's analysis suggests the tariff shown in Table 9.15 below should be applied to condominiums.

Table 9.15: OUR Approved Condominium Tariffs

Details	Current Tariff J$/'000 IG	Approved Tariff J$/'000 IG	% Change
Water	877.00	938.43	7%
Sewerage	796.00	1,083.89	36%

9.72. Based on the OUR's review and analysis, the Office makes the following determination.

Determination 22:

The Office has determined that the volumetric tariffs applicable to condominiums shall be as follows:

Water Service : $938.43 per 1,000 IG

Sewerage Service: $1083.89 per 1,000 IG

School Tariff

9.73. The NWC requested a 36% increase in the volumetric water rate charged to schools. The proposed rate would move from the current rate of $707/1,000 IG to $958/1,000 IG. The Commission has also proposed that the sewerage tariff be set equal to 98% of the water tariff. This would require that sewerage rates for schools be increased from $642/1,000 IG to $935/1,000 IG. The NWC has indicated that the proposed rates for schools are subsidized rates, as they are below the average costs of providing water and sewerage services.

9.74. The Office has no objection to the NWC retaining a uniform volumetric rate for both water and sewerage for schools. The OUR also agrees that tariffs for schools should be kept below the overall average tariff due to the strong public good component associated with these services.

9.75. After making adjustments for the reduction in the approved revenue requirement, the OUR's analysis suggests that the tariff for schools should be those shown in Table 9.16 below.

Table 9.16: OUR Approved School Tariffs

Details	Current Tariff J$/'000 IG	Approved Tariff J$/'000 IG	% Change
Water	707.00	749.69	6%
Sewerage	642.00	865.89	35%

9.76. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 23:

The Office has determined that the volumetric tariff rates applicable to schools shall be as follows:

Water Service : $749.69 per 1,000 IG

Sewerage Service: $865.89 per 1,000 IG

Charge for Reduced Sewerage Volumes

9.77. The NWC proposed the introduction of a new sewerage volumetric billing regime for commercial customers. Given the nature of the manufacturing business of some commercial customers, the sewerage output of these customers is significantly less than their water intake. This is because water is an important input in their production operations. In recognition of this reality, the NWC currently charges these customers a reduced volumetric sewerage rate, referred to as the EDWT. However, the NWC proposed to replace the existing charging approach with one, which allows customers to demonstrate the actual volumes, discharged into the sewerage network. This information would be used by the NWC in the billing of the customer. This change in approach may, among other things, require that these customers install a sewerage discharge meter, a sewerage flow monitor device or an internal process meter to measure the volume of water that does not return to the sewerage system.

9.78. Having reviewed the NWC's request, the OUR takes the view that the proposed methodology is feasible. Notwithstanding, the OUR must make it clear that the measurement and accounting for the sewerage outflow into its network is the NWC's responsibility and not that of the customers. In this regard, the OUR encourages the Commission to develop a robust and complete strategy to more accurately and efficiently capture sewerage outflows for billing purposes. This is to ensure that the implementation of the new regime is seamless and will not cause any undue burden on the efficiency or effectiveness of the manufacturing sector.

9.79. The NWC is therefore required to develop an implementation strategy for the proposed regime within six (6) months of the effective date of this Determination Notice, which proposal will be subjected to a consultation process prior to any Office approval.

9.80. Accordingly, until the Office approves the new approach, and subject to the submission to the OUR by the NWC of a robust implementation strategy, the existing EDWT will remain in effect.

Determination 24:

The Office sees merit in the billing of sewerage volumes to commercial customers based on actual measurements or a more advanced estimation technique. However, the NWC's proposal to change from the existing Economic Development Wastewater Tariff (EDWT) lacks a convincing implementation strategy. The Office has therefore determined the following:

a) The existing EDWT shall remain in effect until the NWC submits and receives approval for its implementation plan to support the proposed approach.
b) The NWC shall within six (6) months of the effective date of this Determination Notice present to the OUR a robust implementation plan for the proposed approach.

Sewerage Charge for Inactive and Delinquent Accounts

9.81. The NWC has indicated in its Tariff Application that customers disconnected from its water supply network for non-payment of bills, sometimes continue to benefit from sewerage services. The NWC is therefore proposing to charge these customers based on an estimated sewerage service bill. The rationale is that sometimes these customers retain inactive accounts for prolonged periods.

9.82. Whilst the NWC's proposal is not unreasonable, it is not clear:

- How the Commission proposes to collect sewerage revenues from delinquent customers who have in the past failed to pay both water and sewerage bills.
- What factors the Commission will use to characterize customers as being inactive. This appears not to have passed the concept stage.
- What will be the basis upon which the Commission will estimate these sewerage service bills.

In this regard, the OUR takes the position that the proposal has not advanced beyond the concept stage and requires more work before it can be properly evaluated. However,

the OUR encourages the NWC to further develop and submit to the OUR, a detailed proposal and the associated implementation strategies, for review prior to its next Rate Review.

9.83. Based on its review and analysis, the Office makes the following determination:

> **Determination 25:**
>
> The Office has denied the NWC's request to apply estimated sewerage charges to inactive and delinquent accounts.

Late Payment Fee and Early Payment Initiative to Residential Customers Accounts

9.84. The NWC signaled in its Tariff Application its intention to continue to charge residential customers a late payment fee of $250 per month and offer an early payment incentive of $250 per month. The OUR has no objection to the continuation of this payment incentive/penalty mechanism. The initiative, from all indications, has been positive.

Introduction of Late Payment Interest Charge to Commercial Customers Accounts

9.85. In its Tariff Application, the NWC proposed a late payment interest charge to commercial accounts that remain unpaid for seven (7) days after the due date on the bill. The Commission requested that the interest charge be applied in a fashion similar to that, which currently obtains for JPS.

9.86. While the proposal is a positive development, given its potential to help the NWC to reduce its high level of receivables, the proposal as presented is still at an embryonic stage and requires further elaboration before it is to be deemed fit for implementation. Among other things, the NWC did not provide details on what the interest rate would be applied, whether there would need to be any changes to its billing system to accommodate this charge and how long this would take.

9.87. In addition, the Commission did not provide any information on how this interest payment mechanism would affect its disconnection policy. More significantly, there was no mention of a customer engagement plan, which would be essential to this type of policy change.

9.88. The OUR supports the proposal in principle, however, in light of the gaps highlighted, there is a need for the NWC to fully develop the proposal, bearing in mind the issues raised above. Accordingly, the NWC is required to develop and present an Interest Late Payment Plan to the OUR within six (6) months of the effective date of this Determination Notice. This will allow a regulatory decision to be taken on the issue concerning its implementation; one (1) year after this Determination Notice becomes effective.

9.89. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 26:

The Office acknowledges that there is value in the NWC's implementation of a late payment interest charge to commercial customers. However, the NWC's proposal on this initiative is deficient. Additional information is required for it to be fully evaluated and deemed implementable. The Office has therefore determined the following:

a) The NWC shall be allowed to implement the proposed Late Interest Initiative for commercial customers one (1) year after this Determination Notice becomes effective PROVIDED it submits to the OUR a plan which the OUR assesses to be implementable for its rollout.
b) The NWC shall, within six (6) months of the effective date of this Determination Notice present to the OUR an 'Interest Late Payment Plan' which fully elaborates the components of the proposed approach.

Purchased Water Services Pass-through Charge

9.90. The NWC requested that it be allowed to pass-through directly to customers, charges for services rendered by providers of bulk water, wastewater collection and treatment and NRW reduction services. The request was made in the context that the rates charged by these providers are approved by the OUR.

9.91. The Commission proposed that the independent service providers (ISP) cost pass –through should be treated similar to the independent power purchase pass-through cost of JPS. The NWC suggested that the ISP costs should be included as a charge on customers' bills in the month after they were incurred.

9.92. The NWC requested that all charges related to water services should be added, divided by the volume of water sold, and the resulting figure in $/1,000 IG would be multiplied by each customer's billed water consumption and added to the customer's bill. Similarly, charges related to wastewater services would be recovered over wastewater volumes.

9.93. The NWC proposed that ISP costs, whether variable or fixed, should meet the following criteria:

a) The charge is for the supply of water and wastewater services, where:
    - Water services include the supply of bulk water, distribution of water and reduction in water losses.

- Wastewater services include collection, treatment and disposal of wastewater, and treatment and disposal of sludge.

b) The charge is incurred pursuant to a contract with an ISP, where:

- The use of the ISP was included in an improvement plan proposed by NWC and approved by the OUR.
- The ISP service was procured in accordance with a process approved by the OUR.

The OUR's Position

9.94. The OUR is not opposed to the notion of an ISP charge akin to the JPS non-fuel IPP surcharge mechanism. However, there are information gaps on how such a mechanism would be adapted to the NWC's situation.

9.95. It is worth noting, that ISPs that are regulated by the OUR (such as RBWCL and CWTC) have prices that are set for a prolonged period, and are only adjusted for changes in the economic variables captured in their PAM. Consequently, there is a need to examine more closely how this impact the NWC's other operating costs and the implications for its approved revenue requirement recovery.

9.96. In this regard, the OUR suggests that the NWC presents a fully developed proposal on this issue at the next tariff review scheduled in twenty-four (24) months. Accordingly, the Office makes the following determination:

Determination 27:

The Office has denied the NWC's request for the introduction of a separate independent service provider (ISP) charge.

The Price Adjustment Mechanism (PAM)

9.97. The NWC has proposed a revision to the weights in the PAM. This is to reflect an update on the distribution of costs between the variables in the index (see Table 9.17 below).

Table 9.17: OUR Approved PAM Weights

Component	NWC		OUR Approved Weight
	Current Weight	Proposed Weight	
CPI	51%	58%	62%
Electricity	25%	20%	20%
Foreign Exchange	24%	22%	18%
Total	**100%**	**100%**	**100%**

9.98. The OUR accepts the NWC's PAM proposal. However, the OUR has slightly adjusted the weights of the PAM to reflect the distribution of the approved costs in the variables as at 2019 February (see Table 9.17). In this regard the PAM weights shall continue to be applied to customer's bills on a monthly basis and will be reset at its anniversary (2020 March 1); at which time, the new base values for the three (3) components will be set.

9.99. Accordingly, the base values for the PAM indices are chosen as at 2019 February and are as shown below:

- Electricity $34.09/kWh;
- Exchange Rate J$133.82 to US$1.00; and
- CPI All divisions 254.3.

Based on the OUR's review and analysis, the Office makes the following determination:

Determination 28:

The Office has approved the NWC's revision of the weights in the price adjustment mechanism (PAM), which shall be as follows:

- Electricity: 20%
- Exchange Rate: 18%
- CPI (All divisions): 62%.

The existing PAM weights shall remain in effect until 2020 March 1 when the above weights shall take effect.

In addition, the effective base rates for the PAM variables shall be:

- Electricity $34.09/kWh;
- Exchange Rate J$133.826 to US$1.00; and
- CPI All divisions 254.3.

10. CAPITAL EXPENDITURE PROGRAM (K-FACTOR), PRODUCTIVITY EFFICIENCY FACTOR (X-FACTOR) AND THE Z-FACTOR

K-FACTOR

Summary of NWC Request for adjustment of the K-Factor

10.1. In an effort to address the severe shortage of capital faced by the NWC, the OUR approved in 2008 the establishment of a K-Factor Fund ("Fund"). The OUR, at the time, recognized that the capacity of the NWC to provide adequate service to its customers was severely hampered by infrastructural deficiencies and inadequate resources. It was in this context that the OUR initiated the Fund to bolster the NWC's capital investment programme with a view that, among other things, it would accelerate efficiency improvement and enhance the Commission's quality of service.

10.2. The primary objectives of the K-Factor are as follows:

- To fund capital intensive programmes for efficiency improvement, inclusive of mains replacement, and other non-revenue water (NRW) reduction activities.
- To fund capital rehabilitation programmes that may not yield any significant increase in revenues to the NWC, but are required to comply with a specific regulatory direction.
- To strategically expand the wastewater collection network to facilitate increased usage of the Soapberry Wastewater Treatment Plant (WWTP).

10.3. In its Tariff Application the NWC requested the following with respect to the K-Factor and X-Factor:

1. The K-Factor be kept at the existing level of 16% through to 2022.
2. The deemed K-Factor inflows into the Fund, based on the Commission's revenue, should be increased from 88% to 90%.
3. The X-Factor be reduced from 6.2% to 0%, and reset after three (3) years, by which time the efficiency gains will be known and measurable.

10.4. However, after reviewing the OUR's draft Tariff Determination the NWC, in late 2019 June, met with the OUR. In that meeting the NWC signaled its desire to submit a Revised Tariff Proposal. On 2019 July 26 the NWC submitted its Revised Tariff Proposal requesting that:

- The OUR's proposed increase in its basic revenues of 18.1% be reduced to 10.9%
- The K-Factor be increased from 16% to 20%
- The OUR's proposed X-Factor of 6.2% be set at zero.

10.5. The Revised Tariff Proposal was made against the background of severe water disruptions caused by major road repairs in Kingston and St. Andrew (KSA) and restrictions in water supply occasioned by a drought. NWC took the view that strategically, a further acceleration in the Commission's capital expenditure on efficiency improvement programmes would be needed to minimize future disruptions and accelerate the reduction in NRW. It therefore argued that, at this time, increasing the K-Factor allotment would facilitate the financing of the investment needed to accelerate the proposed efficiency and infrastructural improvements.

Rationale for original 16% K-Factor Request

10.6. In support of the 16% K-Factor request in its original Tariff Application, the NWC had argued that:

- The K-Factor funding to date had allowed the NWC to make efficiency gains, which have served to lower its cost of service.
- The NRW reduction projects are the ones most likely to have significant efficiency gains. As such, the NWC decided to implement NRW projects across its entire network on a performance-based contract with Miya International (Miya), a water-efficiency management company.
- The current X-Factor of 6.25% would starve the NWC of resources because it does not match the gains expected to be achieved during the tariff period from the K-Factor.
- Given external constraints for project funding approval and procurement, the island-wide NRW performance-based contracts with Miya are unlikely to start until two (2) years after the OUR's approval. Therefore, it would take a 3-year period before the NRW gains would become evident. Consequently, setting the X-Factor at zero for the next three (3) years would be reasonable.

Rationale for NWC's Revised 20% K-Factor Request

10.7. NWC argued that the reduction in NRW in KSA over the last 3½ years is evidence of its focus and commitment to the improvement of efficiencies. Over this period, NWC claimed, that based on its co-management contract with Miya, it reduced NRW from some 60% of water supply into KSA to 42% as at 2019 May. Based on the volume of water loss per connection per day, the NRW is 680 litres per connection per day (l/conn/d). This is down from 1,040 l/conn/day.

10.8. Given its success with its NRW programme in KSA, the NWC requested an increase in the K-factor to provide sustainable financing for the following slate of projects:

1) An extension of the NRW reduction co-management approach with Miya to South-east St. Catherine (Portmore).

2) Implementation of projects to more accurately determine baseline data for NRW for them to track NRW improvements over time. These include:

   a. Census Mapping Project – for surveying and geo-referencing of NWC customers.

   b. Water Supply Network Monitoring Programme - procurement and installation of data loggers at strategic points to measure water flows and pressures.

   c. Production Metering Project – completion of the metering of all NWC production sources.

   d. Customer Information System – the upgrading of NWC's customer information system, to improve customer billing.

3) Island wide Consumer Metering Programme – continued installation of 450,000 consumer meters.

4) Northern Parishes NRW Performance Based Contract (PBC) – covering St. Ann, Trelawny and St. James.

5) Old Harbour/May Pen/Mandeville (Three Towns) Water Supply Improvement – for NRW reduction and water supply improvements.

6) Greater Savanna-la-mar (Roaring River) Water Supply Project –Phase 1 – NRW Reduction and extensive pipeline replacement for the Greater Savanna-la-mar area.

7) Replacement of transmission mains in KSA (originally planned to be funded as an Inter-American Development Bank project). The areas targeted are (i)Three Miles, along Spanish Town Road to Glenmore Road; (ii) Stanton Terrace to Marescaux Road; and Six Miles, along Washington Boulevard, to Dunrobin/Constant Spring Road.

10.9. NWC proposed that it would seek loans to finance its slate of projects. In computing the cash flow associated with the projects, it assumed that each loan would be for 10 years at an interest rate of 8%. The estimated debt servicing for these projects is summarized in Table 10.1.

10.10. In light of the request, the OUR takes the view that the NWC's request is worthy of consideration, particularly in the context of the ongoing issues which have severely affected the delivery of water to its customers, including improvements to the ongoing road network in the KSA.

Table 10.1: New NWC Projects in its Revised Proposal

Parish	Project Name		Project Cost (J$M)	YR1	YR2	YR3
Westmoreland	Greater Savanna-la-mar (Roaring River) Water Supply Project -Ph2, Sewerage & Drainage	CAPEX	6,500	-	800	2,000
		Debt Servicing	-	-	-	119
St. Catherine/ Clarendon/Manchester	May Pen/Old Harbour/Mandeville Water Supply (Three Towns WS) Project	CAPEX	9,100	-	910	2,730
		Debt Servicing	-	-	-	1,356
St. Catherine	Portmore NRW	CAPEX	2,210	221	663	884
		Debt Servicing	-	-	33	132
St. James/Trelawny/St.	Northern Parishes Water Supply - NRW	CAPEX	1,950	-	195	585
		Debt Servicing	-	-	-	291
Islandwide	Consumer Meter Installation Programme	CAPEX	13,500	3,000	3,000	3,000
		Debt Servicing		-	447	894
KSA	Six Miles to Glenmore Road Transmission Main	CAPEX	4,160	2,080	2,080	-
		Debt Servicing	-	-	620	620
KSA	Washington Boulevard Transmission Main	CAPEX	1,950	195	780	975
		Debt Servicing	-	-	291	291
KSA	Stanton Terrace to Marescaux Road Transmission Main	CAPEX	1,300	650	350	300
		Debt Servicing	-	-	194	194
Islandwide	Production Metering	CAPEX	1,500	600	600	300
		Debt Servicing	-	224	224	224
Islandwide	Customer Information System	CAPEX	200	80	120	-
		Debt Servicing	-	-	30	30
Islandwide	Customer Mapping Programme	CAPEX	250	100	150	-
		Debt Servicing	-	100	150	-
	Water Supply Network Monitoring Programme	CAPEX	1,200	700	500	-
		Debt Servicing	-	179	179	179
		CAPEX - Total	43,820	7,626	10,148	10,774
		Debt Servicing by K-Factor		502	2,167	4,328

10.11. The NWC's new slate of projects in its Revised Tariff Proposal is based on K-Factor expenditures of $3.37 billion in year 1, which would climb to $15.11 billion in year 5 (see Table 10.2 below).

Table 10.2: NWC's Revised K-Factor Cash Flow Requirement

Projects	Project Cost	YR1	YR2	YR3	YR4	YR5
Projects in Progress	9,935	1,045	1,443	1,174	1,223	1,026
Projects Not Yet Started	3,673	203	654	623	587	511
Deemed K-Factor Projects that are being Financed by NWC Bond	376	71	71	71	71	71
Projects Financed by Existing Loans		1,544	2,475	2,475	2,475	2,475
Projects Proposed to be Financed by New Loans	61,465	502	1,062	4,328	7,693	9,369
Projects with IDB Financed Designs Proposed to be Financed by New Loans	10,660	-	1,104	1,104	1,104	1,104
MIDP Projects	3,726	-	555	555	555	555
TOTAL	**89,835**	**3,365**	**7,364**	**10,329**	**13,708**	**15,111**

Analysis of K-Factor Activities since October 2013

10.12. As shown in Table 10.3 below, over the tariff period 2013-2018, K-Factor outflows outstripped inflows (for both direct project spending and debt service) by approximately $1.3 billion. This contrasts with the 2008 – 2013 period in which inflows exceeded outflows by approximately $5.0 billion.

10.13. The $1.3 billion gap between outflows and inflows, however, is not surprising, as the Commission depended progressively on a greater degree of debt financing to support its K-Factor projects.

Table 10.3: K-Factor Inflows vs Outflows (Oct 2013-Sep 2018)

	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Total
	$'M	$'M	$'M	$'M	$'M	$'M
K-Factor (Inflow)	3,064	2,810	2,846	3,404	3,627	15,751
Direct Financing	1,925	1,859	1,639	842	1,450	7,714
Debt Service	789	1,716	1,885	1,951	3,035	9,376
Outflows	2,714	3,575	3,524	2,793	4,485	17,090

10.14. Outflows to service debt over the period increased by approximately 284%, from $789 million to $3,030 million. This in part is due to the depreciation of the Jamaican dollar against the US dollar (USD). Some K-Factor loans are denominated in USD and require payments in foreign currency.

10.15. Additionally, the high levels of outflows is also attributable to the fact that some of the earlier secured loans are now out of the moratorium period. It should be noted that a significant portion of NWC's US$ loans were refinanced during 2017 by a bond secured by the Commission.

10.16. On the other hand, outflows due to direct project spending declined by approximately 24%. This seems to also suggest that, in keeping with the OUR's stated intent, the NWC is reducing its reliance on the K-Factor to directly fund projects, while increasing its uptake of loans to be serviced by K-Factor proceeds.

10.17. Over the tariff period, 2013 October – 2018 September, $13.5 billion from the K-Factor Fund was spent in relation to 53 projects (see Table 10.4 below). Of this number, 19 were completed at a cost of $10.7 billion. Of the completed projects, 13, or 68%, were related directly to NRW reduction, with a total expenditure of $5.5 billion.

Table 10.4 K-Factor Projects Status and Expenditure

Type	Status	Count	Expenditure($M)
Non-Revenue Water (NRW)	Completed/(in Maintenance period)	13	5,519
	Ongoing	19	1,927
	Sub Total NRW	32	
Sewerage (B)	Completed/(in Maintenance period)	6	5,183
	Ongoing	15	867
	Subtotal Sewerage	21	
Total Project Expenditure *(A+B)*		*53*	*13,496*

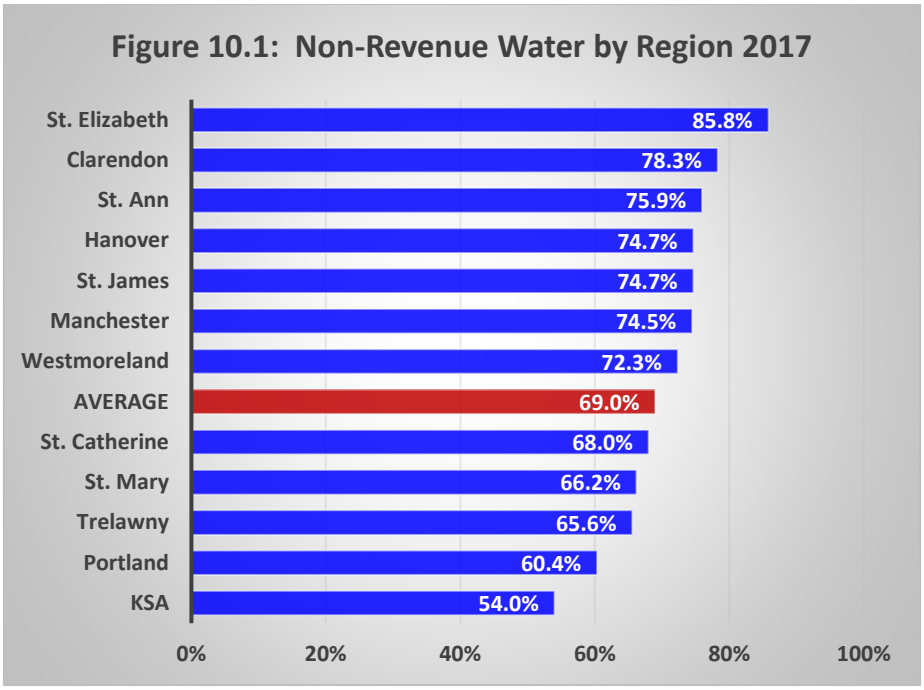
Source: NWC Status Report September 2018

10.18. At the 2013 Rate Review, the NRW reduction 2018 target was set at 55%. At the time, the NRW level was 69.9%. It was expected that the reduction would be achieved by NWC under its own capital expenditure programme, buttressed by the K-Factor projects. However, the data indicate that the NRW level moved marginally to 69.0% in 2017.

10.19. Interestingly, even though the average NRW level was 69.0% for the entire NWC water system, it was significantly higher for regions such as St. Elizabeth and Clarendon, that registered 85.8% and 78.3% respectively (see Figure 10.1 below).

10.20. In 2017 HYSTA, an Argentinian consultancy firm, was contracted by the OUR to conduct a management and operational audit of the K-Factor Programme. The audit concluded that over the eight (8) year period 2008 – 2017, $36.3 Billion was spent on K-Factor projects. In addition, the HYSTA audit found, among other things, that the NWC:

1. *Lacked the requisite financial discipline*: to follow through on its obligation to deposit customer´s funds into the K-Factor Programme's special accounts, and it further failed to comply with the OUR's Determinations regarding timeframes for making deposits to the Fund.
2. *Exercised discretionary use of the K-Factor Programme funds*: and did not always observe the rules related to the management of funds.
3. *Employed the K-Factor Programme's funds inappropriately*: by using it to pay for operational expenditures.
4. *Lacked a proper Regulatory Financial Model*: which would guide the planning of inflows and outflows of K-Factor projects.



10.21. With respect to the three (3) primary objectives for which the K-Factor Programme was established, HYSTA further concluded that:

1. Even though 88% of the K-Factor Programmes expenditure was assigned to 73 NRW projects, the NWC failed to reduce losses.
2. The objective of complying with the limits of the eight (8) quality parameters established by NEPA for WWTP effluents was not met. Six (6) projects were undertaken and 5% of the total K-Factor funds was assigned to these projects.
3. The objective to increase the entrance flow rate to the Soapberry WWTP was achieved. An estimated 7% of the K-Factor expenditure was dedicated to 28 projects linked to the Soapberry plant.

10.22. According to the HYSTA report, as at 2017, the entrance flow rate to the Soapberry WWTP was the only K-Factor objective that had been achieved. Average daily flows to the Soapberry Wastewater Treatment Plant since 2008 increased by about 230% from 17,349 m^3/d to 57,214 m^3/d in 2017. This was due partly to increased sewerage flow from the KSA.

10.23. While the HYSTA audit had revealed that the K-Factor programme was not particularly successful in reducing NRW, the arguments presented by the NWC in its Revised Tariff Proposal concerning the intensification of the K-Factor Programme is not without merit. Therefore, in consideration of the NWC's request for additional resources to the K-Factor Fund the OUR thought it was necessary to obtain an independent assessment of, and advice

on, the administrative restructuring of the K-Factor Fund as part of its evaluation of the submission.

10.24. Consequently, the OUR engaged the services of external consultants from the Public Utility Research Center (PURC), University of Florida to provide a critical assessment of the NWC's administration. This assessment was necessary in the context of the NWC's failure to achieve established targets. Further, the assessment was also to provide advice on the adjustments required to ensure that the K-Factor programme delivers on the goals and targets that are linked to its operations.

10.25. The PURC Associates Report revealed that over the past 1½ year:

- "NWC and OUR both took the (HYSTA) audit seriously. The critical nature of some of the observations led OUR to improve its own monitoring of NWC expenditures. Similarly, the issues identified by HYSTA stimulated changes in the procedures utilized by NWC."
- "The most recent rolling 12 month average of NRW in the KSA is about 48% (2019 June 2018 – 2019 May). NRW was 57% when Miya signed their contract in 2015, so a reduction to 48% is very significant. Additionally, the one month water balance for 2019 May shows NRW at approximately 43%."

10.26. It is worth noting that in 2015 the NWC commenced a five (5) year co-management partnership with Miya to reduce the NRW in the KSA region, which is budgeted to cost US$45 million (NWC/Miya NRW Reduction Co-Management Programme). The main goal being the reduction of NRW in the KSA to 30% by 2020, down from the 57% at the project start.

10.27. Buoyed by the results of the Miya co-management programme, the NWC in its Revised Proposal has stated its intent to replicate the NWC/Miya NRW Reduction Co-Management Programme rapidly throughout the island. However, its Revised Tariff Proposal did not provide any concrete targets and timelines. The issues that are critical to the OUR's approval of this new slate of projects are:

- The capabilities within the NWC's to effectively manage and execute the proposed slate of projects
- The measures required to enhance accountability and transparency with respect to the K-Factor projects.
- The changes to be implemented to improve measurements and NRW management.
- The initiatives that are required to incentivize the efforts to reduce NRW.
- The adequacy of the cash flows generated by an increase in the K-Factor from 16% to 20% to deal with the increased expenditure related to the slate of projects.

Capacity to Manage K-Factor Programme

10.28. One of the observations that emerged from the HYSTA audit is that "NWC lacks of a dedicated structure of human resources assigned to efficiently manage the K-Factor Programme". Currently, the programme is being managed by a single administrator and is "directly or indirectly assisted by technical, administrative, commercial and financial staff that collaborates with part of their time to deal with related aspects of the Programme." Given the scale and scope of the K-Factor projects, as well as the level of the capital investments involved, it is clear that the programme is under-resourced.

10.29. In its Revised Tariff Proposal, the NWC sought to address this deficiency by proposing the establishment of a new Programme Management Unit (PMU), which would be comprised of a project manager, two (2) engineers and a project analyst.

10.30. Beyond the issue of human resources, it may be argued that it is critical that the PMU is positioned so that:

a) It has the "core competencies and internal clout" required to efficiently plan, monitor and implement the projects.

b) To facilitate the transfer of knowledge from consultants such as Miya to ensure the sustainability of the NRW skills into the future.

10.31. To ensure the effectiveness of the PMU the Office takes the view that the staff cost of this unit should be financed out of the K-Factor Fund. In this regard, the NWC shall be required to present its annual PMU staff budget for the upcoming fiscal year by December 31 each year. Thereafter, the Office will be required to approve the annual PMU staff budget within six (6) weeks.

10.32. Additionally, any increase in the approved PMU staff expenditure will require the approval of the Office.

c) It has the "core competencies and internal clout" required to efficiently plan, monitor and implement the projects.

d) To facilitate the transfer of knowledge from consultants such as Miya to ensure the sustainability of the NRW skills into the future.

Measures to ensure Accountability & Transparency

10.33. HYSTA in its audit noted that one of the weaknesses associated with the K-Factor Programme was associated with the "poor quality of reports provided by NWC data systems related to financial and administration aspects of the Programme". HYSTA argued that it encountered delays (some permanent) in getting information from NWC - information it considered should be simple to retrieve in an entity of NWC's size, or even smaller.

10.34. Further, HYSTA noted that it would appear that NWC might have serious problems with its existing systems to produce accurate, comprehensive and timely K-Factor reports. HYSTA also observed that in the past "NWC failed to make timely deposits into the special accounts of the Programme of the funds collected from customers" and there was the co-mingling of K-Factor revenues with NWC's other revenues. Consequently, adequate checks and balances must be established to ensure accountability on NWC's part.

10.35. Among other things this should include:

a) The publication of formal rules to govern the project selection and approval criteria; the roles and responsibilities of the entities associated with the programme; as well as the procedures for administration and operation the Fund.

b) The introduction of appropriate and responsive information and data capture systems that will facilitate timely and accurate reporting on critical operational and regulatory variables.

c) Annual financial and operational audits to ensure that the rules of the Fund are observed, and the integrity of its operations maintained.

10.36. The link between transparency and accountability is strong. In this regard, the performance of the K-Factor programme, which is financed by customers, should be open to scrutiny. There was also a need for greater discipline in the administration of the Fund and the execution of projects. As such:

a) The NWC should give a high level of visibility to the K-Factor programme and communicate with all stakeholders, at regular intervals, regarding the cost, status, and impact of K-Factor Projects.

b) The OUR should publish the result of the annual K-Factor audit and make the summary of the programme's performance available to stakeholders at least once per year.

Measurements and Management

10.37. Accuracy of measurements is indispensable to effective management. The PURC Associates Report indicates, "NWC's understanding of NRW components has changed from 2015 to 2019 based in part on the work performed by Miya". For instance, total commercial losses in the KSA were thought to be less than 10 percent in the 2010 time frame, but through field data collection in 2015, commercial losses were determined to be approximately 18%." Furthermore, the OUR has had occasion in the past to question the data produced by the NWC as there were problems which appears to be related to measurements.

10.38. It is therefore imperative that the NWC "improve the data collection process for NRW (and other KPIs) focusing on the reliability and accuracy of information"[20]. Unreliable or inaccurate data can lead to inefficient investments and inappropriate initiatives by operators.

10.39. It is in this regard the proposal to implement a Census Mapping Project, a Water Supply Network Monitoring Programme and a Production Metering Project is a step in the right direction. The projects will enhance the NWC's capabilities to accurately capture KPIs on its system.

10.40. It is also important that the OUR and NWC agrees on the set of KPIs that will be employed in the monitoring process. Additionally, these KPIs should be reviewed from time to time to ensure that they are in alignment with the operational and regulatory data objectives.

10.41. HYSTA, in its report, noted that NWC seemed to lack a "Regulatory Financial Model for Planning Inflows and Outflows of the Programme Projects". This deficiency has apparently, adversely affected the management of the K-Factor funds. Therefore, the development of a K-Factor Regulator Model by the OUR to be used by the NWC must be a central component in the approval of additional K-Factor funds.

Incentives to stimulate Success

10.42. In order to incentivize the NWC in its NRW loss reduction effort, the OUR introduced a regulatory incentive mechanism in the 2016 Mid-Term Tariff Review which was centered on the X-Factor adjustments. This incentive mechanism established 68.5% NRW losses as a reference point and rewarded the Commission by a 1-percentage point reduction in the X-Factor for every 1-percentage point reduction in NRW it achieved. On the other hand, it imposed a 1-percentage point increase in the X-Factor for every 1-percentage point increase in NRW registered.

10.43. However, the mechanism failed to produce the intended effect. One year later the X-Factor had to be increased from 5.5% to 6.2% because the NRW level had increased.

10.44. It is also worth noting that previous incentive mechanisms did not take into account the relative benefits associated with commercial losses versus physical losses. Miya valued physical reductions at J$10.20/m3 and commercial reductions at J$306.61/m3. This translates to a commercial loss reduction being about 30 times more financially beneficial than a physical loss reduction in the KSA region.

[20] Note that Reliability refers to the decision maker's confidence regarding how the data were collected, transmitted and stored. In addition, Accuracy refers to the confidence intervals surrounding the reported numbers. Note that Reliability refers to the decision maker's confidence regarding how the data were collected, transmitted and stored. In addition, Accuracy refers to the confidence intervals surrounding the reported numbers.

10.45. It may therefore be posited that for incentives to be effective in government-owned utilities, for which the profit motive is absent, external incentives must be coupled with internal or managerial incentives. Of course, internal incentives are outside of the scope of the regulator and it would be tantamount to micro-management for the OUR to develop and impose such mechanisms.

10.46. It is in this respect it may be argued that if there are no changes in the tools used by the NWC management, then it cannot be expected that any long-term (sustainable) reductions in NRW will occur. Accordingly, the OUR urges the NWC's Board of Management to devise and implement strong incentives to align the Commission's NRW reduction activities with regulatory incentives.

10.47. In developing these internal incentives the following is important in the design:

1. Take into consideration, past trends, current NRW patterns, and best practice to establish targets and the fashioning of mechanisms capable of having a catalytic effect on the pace of NRW reductions.
2. Take into account the incentive component of the NWC/Miya contract and any other co-management programmes in place to ensure the proper alignment of rewards and targets.
3. Assign appropriate weights to the reduction of commercial NRW versus physical NRW.

Analysis of NWC's Initial Projected 5-year K-Factor Expenditure

10.48. Data provided by the NWC is summarized in Table 10.5 below. It shows the Commission's initial projected K-Factor funding requirements through to the end of the tariff in 2023.

Table 10.5: NWC Projected K-Factor Outflows/Expenditure

Outflows/Expenditure	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Total
	$M	$M	$M	$M	$M	$M
Debt Service	1,615	3,152	6,914	9,935	13,151	34,767
Direct Finance	1,248	2,096	1,796	1,809	1,537	8,488
Total Outflows/Expenditure	**2,863**	**5,248**	**8,710**	**11,744**	**14,688**	**43,255**

10.49. The NWC indicated in its initial Tariff Application that it plans to spend $43.26 billion through to 2023 in relation to K-Factor projects. Of this amount, $34.77 billion or 80% would be allotted to debt servicing, and the remainder to directly fund projects. Over the period, debt service payments are expected to increase significantly, starting in year three.

10.50. Notably under the 2013-2018 tariff, total K-Factor outflows/expenditure was $17.09 billion, averaging approximately $3.4 billion per annum. However, the projected averages in the NWC's initial Application at $6.95 billion per annum doubled the historical average expenditure.

10.51. The projected increased debt service is due primarily to the NWC's intent to seek new loans, including further funding from the IDB, as well as to fund Major Infrastructure Development Projects (MIDP) as shown in Table 10.6 below. Essentially, for the first two (2) years, all projected debt service ($4.77 billion) relates to existing loans and the NWC Bond, except for $606 million, which is to repay loans secured for MIDP Projects. Therefore, 87% of the projected debt service is in relation to existing loans and the NWC Bond. While the Tariff Application listed the MIDP projects, the NWC did not provide any details on the terms and conditions of the proposed loan funding for these projects.

10.52. In relation to direct finance from the K-Factor Fund, 70% ($5.91 billion) of projected expenditure is associated with ongoing approved projects. The remaining 30% (J$2.58 billion) is in relation to previously approved projects that have not yet been started.

10.53. Given the proposed aggressive increase in the NWC's K-Factor expenditure under its initial Tariff Application, the Commission would register a cash flow deficit over the period, in the three latter years, even with a 20% K-Factor (see Table 10.6).

Table 10.6: NWC Projected K-Factor Inflows vs. Expenditure

	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Total
	J$M	J$M	J$M	J$M	J$M	
Revenue Requirement	31,334	31,334	31,334	31,334	31,334	63,470
Required K-Factor (%)	20%	20%	20%	20%	20%	
K-Factor Billed Revenue	6,267	6,267	6,267	6,267	6,267	31,334
Deemed K-Factor Inflows (90% of Billed)	5,640	5,640	5,640	5,640	5,640	28,201
Financing Requirement (Projected)	2,863	5,248	8,710	11,744	14,688	43,253
K-Factor Surplus	2,777	392	-3,070	-6,104	-9,048	-15,052

10.54. Additionally, to ensure that expenditure is exactly equal to K-Factor inflows (or breakeven) then the Commission would have to grow its revenue annually by 21.5%.

Analysis of NWC's Revised Projected 5-year K-Factor Expenditure

10.55. As pointed out earlier the NWC submitted a Revised Tariff Proposal centered on an intensification of the K-Factor programme. Under this new proposal, the annual K-Factor expenditure would be raised from $3.4 billion to $9.98 billion annually. Roughly, three times the existing level (see Table 10.7).

Table 10.7: NWC Projected K-Factor Inflows vs. Expenditure

	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Total
	J$M	J$M	J$M	J$M	J$M	J$M
Revenue Requirement	31,334	31,334	31,334	31,334	31,334	63,470
Required K-Factor (%)	20%	20%	20%	20%	20%	
K-Factor Billed Revenue	6,267	6,267	6,267	6,267	6,267	31,334
Deemed K-Factor Inflows (90% of Billed)	5,640	5,640	5,640	5,640	5,640	28,201
Financing Requirement (Projected)	3,365	7,364	10,329	13,708	15,111	49,877
K-Factor Surplus	**2,275**	**-1,724**	**-4,689**	**-8,068**	**-9,471**	**-21,676**

10.56. Under this scenario, except for the first year of the programme, NWC would be faced with less than adequate funds to finance the proposed slate of projects in each year of the 5-year period. The cumulative deficit at the end of the period would be $21.68 billion. Consequently, the NWC would have to grow its revenues by 28.5% annually to breakeven with its cash flow, all other things being equal.

10.57. This means that even though the goals of the slate of NWC's projects are consistent with the K-Factor objectives, their reach outstrip the K-Factor resources available. The OUR therefore takes the position that the NWC should revisit the slate of projects and prioritize and sequence them in a way that allows them to yield maximum benefit within the 5-year time-frame while operating within the context of a 20% K-Factor cash flow.

10.58. *Approved Financing Requirement*: At a minimum, the K-Factor must be set to ensure that previous financial commitments are financed. It is also important that finances are made available; so that NWC can seek new loans to ensure that, it can fund projects and reduce its reliance on using K-Factor inflows for direct funding. This however must be tempered by the need to not overly burden the consumer to fund these projects. In seeking to strike this balance, while giving due recognition to the need to accelerate the reduction of NRW the Office is minded to approve the 20% K-Factor based on a deemed inflow from bill receipts of 90%.

10.59. Notwithstanding, the Office is strongly of the view that the management of the K-Factor Fund must be tightened. Regulatory prudence suggests that, going forward, the success of the K-Factor programme must be tied to the values of :

a) Accuracy and reliability based on sound measurements,

b) Accountability in the use of the Fund and the implementation of projects

c) Capacity building to ensure the sustainability of NRW gains

d) Internal and external incentives to stimulate success

10.60. Accordingly, the NWC shall not be allowed to use K-Factor funds for any new projects, including those presented in its revised proposal, until the Office approves the following:

i. A revised slate of projects that is consistent with the expected K-Factor inflows for the next 5-years;

ii. Detailed project schedules for each selected project, with justification for the priority and the logic to the sequencing of the projects;

iii. The KPIs that NWC will use in, its data capture and the strategy it will employ to improve data retrieval, reliability and accuracy.

iv. Evidence of the establishment of an adequately staffed PMU with the appropriate managerial and implementation clout;

v. The strategy for capacity building and knowledge transfer in relation to the engineering and administrative skill sets associated with NRW reduction.

10.61. The NWC shall be required to submit the above information/strategies/reports to the OUR for review within three (3) months of the date that this Determination Notice takes effect. Failure on the part of the NWC to submit all the required reports will result in the reversal of the 20% K-Factor to its previous level of 16%, six (6) months after the effective date of this Determination Notice.

10.62. The OUR shall also undertake within the next six (6) months the development of:

- A formal document that encapsulates the rules of the Fund, which shall serve as a guide to the operation and administration of the Fund;
- A K-Factor Regulator Model to be used by the NWC in the financial management of the projects associated with the Fund.

10.63. Based on the OUR's review and analysis, the Office makes the following determination:

Determination 29:

a) The Office has approved the NWC's request for the K-Factor to be increased to 20% with a deemed collection rate of 90%.

b) The staff cost for the PMU shall be financed out of the K-Factor Fund. Accordingly, the NWC shall be required to:
   i. Submit its annual staff cost budget for each upcoming year to the OUR for approval by December 31 of each year. Thereafter the Office shall be required to approve the annual PMU staff budget within six (6) weeks.
   ii. Submit to the Office for approval any increase in the PMU staff expenditure beyond the budget approved by the Office. This submission should contain the justification for the increase in expenditure.

c) This approval is conditional as the NWC shall be required, within three (3) months of the effective date of this Determination Notice, to submit the following information/strategies/reports, as the case may be, to the OUR for approval:
   i. A revised slate of projects that is consistent with the expected K-Factor inflows for the next 5-years;
   ii. Detailed project schedules for each selected project with justification for the priority and the logic to the sequencing of the project;
   iii. A description of the KPIs that NWC will use in its data capture and the strategy it will employ to improve data retrieval, reliability and accuracy.
   iv. Evidence of the establishment of an adequately staffed PMU with the appropriate managerial and implementation clout;
   v. The strategy for capacity building and knowledge transfer in relation to the engineering and administrative skill sets associated with NRW reduction.

d) Failure on the part of the NWC to submit all the required reports within the timeframe specified by the OUR will result in the reversal of the 20% K-Factor to its previous level of 16%, six (6) months after the effective date of this Determination Notice.

X-FACTOR

10.64. As indicated above, the NWC's proposal is that its X-Factor should be set at zero, on the basis that, among other things, it is reasonable and the Commission is not requesting a return on equity. The NWC did not present an X-Factor Study, which would have allowed the OUR to assess its level of efficiency, or to further justify its proposal. Nonetheless, the OUR conducted an assessment to determine the X-Factor from 2019 to 2021.

10.65. In incentive regulation, the X-Factor is a major parameter for incentivizing the utility to behave as if it were in a competitive environment. The X-Factor provides an incentive to the utility to lower its operating costs, since any cost savings above the X-Factor may be passed on to shareholders of the utility in the form of extra profits, at least until the next rate review.

10.66. The fact that the NWC based on its tariff constructs presented in the Tariff Application, would not be earning an operating profit during the two (2) year period, and does not negate the need for the X-Factor. The X-Factor could still provide an incentive for the NWC to reduce inefficient costs. In fact, the X-Factor could provide a more powerful incentive in this scenario, as cost savings could allow "shareholders" to obtain a positive return even though none was projected in the Commission's tariff construct.

10.67. The OUR however, recognizes that the inclusion of an X-Factor, if not judiciously set, may put the Commission in a precarious financial position. If the NWC is not able to quickly improve efficiency, it would be prevented from covering its operating and debt service costs.

10.68. In light of the foregoing, the short duration of the rate review period (2019 – 2021) and the limited data received from the NWC, the OUR limited its assessment of the NWC's productivity to certain aspects of its controllable operating expenditure (OPEX).

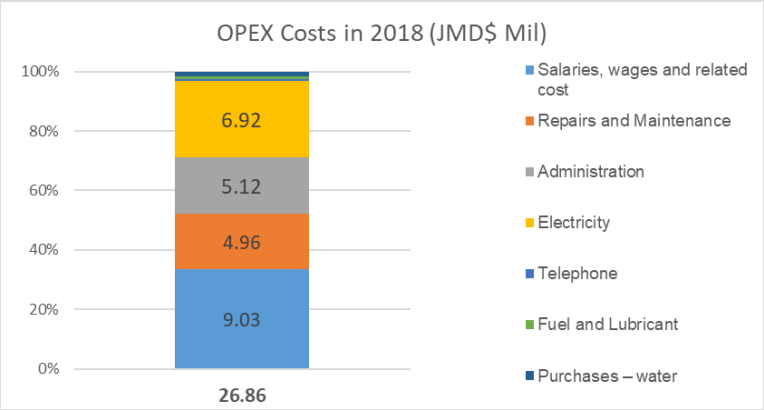
Assessment of NWC's Controllable OPEX

10.69. Based on the OUR's analysis, the NWC's controllable OPEX includes the following:

- Salaries, wages and related costs
- Repairs and Maintenance
- Administration (including bad debt)
- Electricity
- Telephone

10.70. Figure 10.2 below shows total OPEX for the 2018 financial year broken out into the major cost buckets. The figure shows that salaries and wages are NWC's biggest operating costs representing over 33% of OPEX. Electricity costs are the second largest operating cost, accounting for over 25% of OPEX in 2018. Given that salaries & wages and electricity costs are the largest components of OPEX, the OUR took the decision to narrow its focus to these two cost items.

Figure 10.2: OPEX Cost in 2018



Assessment of Salaries and Wages

10.71. Figure 10.3 below shows that salaries, wages and related items have trended upwards since 2013. A further breakout of costs (Figure 10.4 below) suggests that the primary drivers of the upward trend are salaries and pension payments.

Figure 10.3: Historical Trend in Salaries, Wages and Related Costs

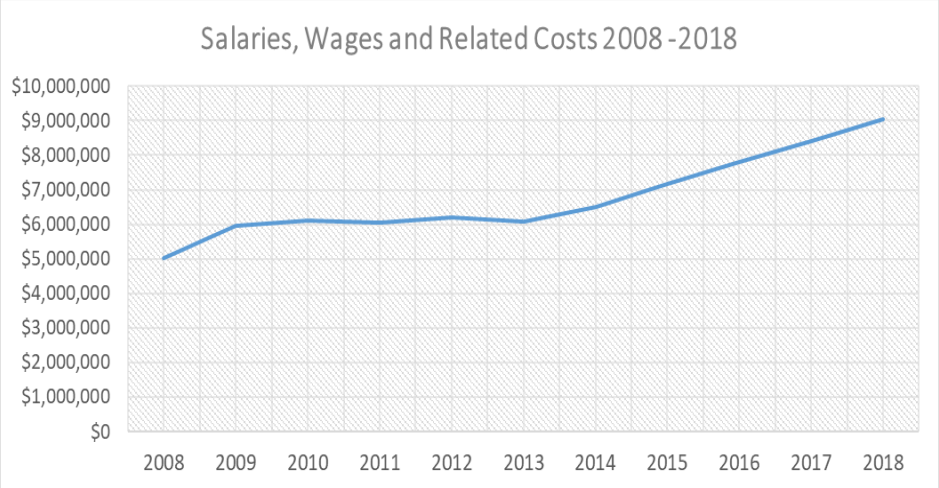
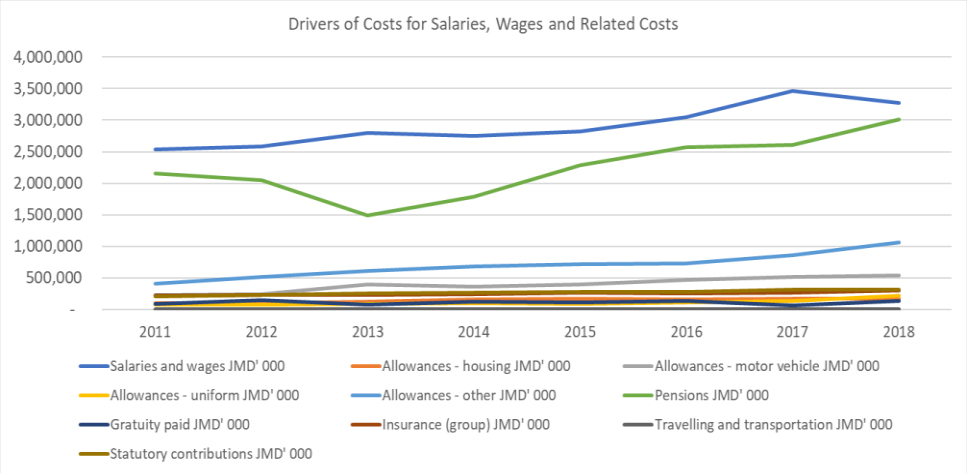
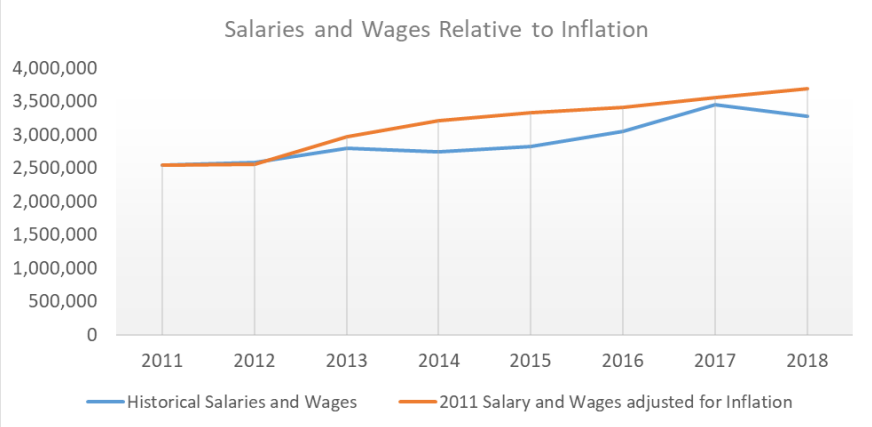


Figure 10.4: Cost Breakout of Salaries, Wages and Related Costs



10.72. The pension payments are primarily a result of legacy issues over which the NWC appears to have no control at this point. A further assessment shows (see Figure 10.5 below) that if 2011 salary and wages are inflation adjusted, it will lie above the NWC's historical salaries and wages for 2011 to 2018. This provides an indication that NWC's wage bill is not worse, in real terms, than it was in 2011. While this does not prove that NWC is using labour efficiently, this, along with the fact that NWC's production levels have more or less remained flat over the period, provides some evidence that wages are lagging behind inflation. Consequently, it may be inferred that the efficiency in regards to the wage bill, has not deteriorated since 2011.

Figure 10.5: Salaries and Wages versus Inflation



Assessment of Electricity Cost

10.73. In the 2013 Tariff Application, the NWC highlighted that it would be undertaking practical measures to address the energy issue, to induce significant efficiency improvements in its operation. The NWC indicated that it would pursue the following strategies:

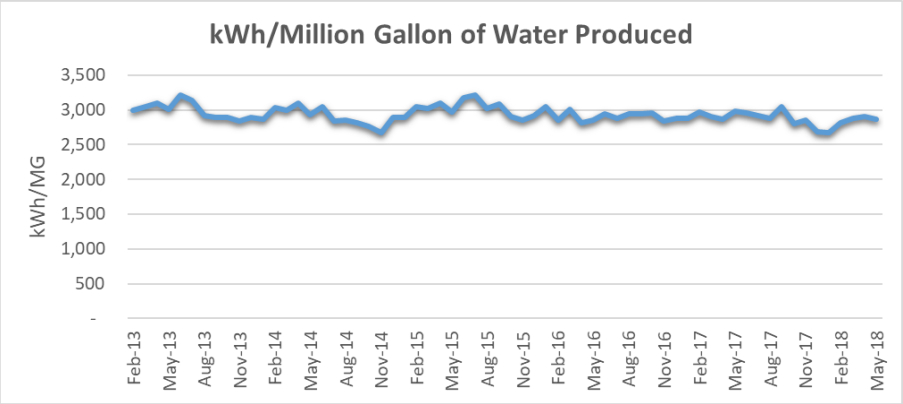
- Reinforcement and expansion of its pump and tank programme

- Pump replacement
- Power factor correction for pump motor drives
- NRW reduction

10.74. The NWC projected that it would reduce its electricity usage per IG of water produced from 3kWh/1000 IG in 2013 to 2.1 kWh/1000 IG at the end of 2018, even though, electricity consumption per IG of water remained flat throughout the period at 1.6kWh/1000 IG. Figure 10.6 below depicts the total electricity usage per million IG water produced between 2013 February and 2018 June. The graph shows that the Commission has more or less maintained its electricity usage per million IG water produced at around 3000kWh/million IG (3kWh/1000 IG) and hence, the Commission did not achieve the electricity usage target in 2013.

10.75. For this current review, the OUR requested the NWC to provide information on the initiatives that it undertook during the 2013 – 2018 Rate Review period to address energy efficiency. The NWC did not provide the information to the OUR as requested. The NWC also did not provide the requested information on its plans to reduce electricity consumption and cost during the 2018 – 2023 period.

Figure 10.6: Total Electricity Usage per Million IG water produced



10.76. An analysis of the NWC's billing data for 2018 September indicates that of 308 Rate 40 and Rate 50 electricity accounts the Commission possesses, 140 or 45% have power factors below 0.85. The billing data provides some evidence that the NWC has not done any meaningful work towards improving the power factor of its pumps.

10.77. Therefore, the OUR concluded that the statistics indicate that the NWC has seemingly not done enough to address its electricity consumption and cost. In this regard, the OUR takes the view that the NWC is still some distance from the efficiency frontier. Consequently, the NWC needs to make greater inroads into its manageable OPEX, before consideration may reasonably be given to reduce the X-Factor, let alone setting it at zero.

10.78. In the NWC's 2016 Mid-Tariff Review Determination Notice, the OUR had determined that NWC's X-Factor should be set at 5.5% throughout the remainder of the rate review period (2016 – 2018), however, the X-Factor mechanism was modified to ensure that it sufficiently incentivized non-revenue water reduction. Because of this modification, the X-Factor now stands at 6.2% rather than 5.5%.

10.79. In the absence of information from the NWC that would allow the OUR to conduct a productivity assessment, and given that it is normal to set the X-Factor at zero at the beginning of a new rate review period, the OUR takes the view that:

- The 0.7 percentage point penalty imposed at the Mid-Tariff Review Determination Notice should be removed, since it is not particularly helpful in the absence of a proper internal incentive mechanism to drive efficiency improvements;
- Given that the efficiency gains for the NWC was negligible, if not non-existent, it would not be reasonable to re-set the X-Factor to zero. Nevertheless, the NWC exhibited pockets of successes in its effort to reduce NRW. This was evident in the gains it registered in the Miya co-management initiative over the past three (3) years. In light of this the OUR takes the view that the X-Factor should be set at 5% rather than 5.5%.

10.80. Further, since the NWC may be operating without a profit and may be under pressure to meet its operating obligations, the OUR is willing to further reduce the X-Factor to 5%.

Determination 30:

The Office has determined that the X-Factor shall be set at 5% for each year from 2019 to 2021.

Z-FACTOR

10.81. The NWC has requested that a Z-Factor be included in its tariff mechanism. The Commission has posited that the Z-Factor should be a special adjustment to the PAM, and ought to address exogenous factors that satisfy the following criteria:

- They affect NWC's costs
- They are not due to NWC's managerial decisions
- They are not captured by the other elements of the price regime

10.82. However, the NWC has added no insights as to how the mechanism would work, for example, the materiality threshold, the source of funding, the potential tariff impact of the Z-Factor, and the components of the network that would be covered by the Z-Factor.

10.83. Notwithstanding, the OUR recognizes the Commission's vulnerability to natural disasters, and takes the view that the request is not unreasonable. However, the NWC needs to provide much more information on the proposal before it may be considered implementable. Consequently, the OUR, in principle, endorses the concept of a Z-Factor.

10.84. The NWC shall, within six (6) months from the effective date of this Determination Notice present a detailed proposal for the OUR's assessment and approval. This is to facilitate the implementation of a Z-Factor twelve (12) months after the effective date of this Determination Notice. The NWC's Z-Factor proposal shall, among other things, examine:

- How the Z-Factor mechanism will work
- The range of assets to be covered by the Z-Factor
- The minimum threshold required to trigger a Z-Factor claim
- How the Z-Factor would be financed
- How would the problems of moral hazard and adverse selection be minimized
- Utility record-keeping and data requirements for claim verification
- Procedure for the submission of claims
- Process for investigating claims
- Principles for settling claims
- Principles for the investment e.g. should there be a disaster fund
- Procedures for approvals and withdrawals, should there be a disaster fund

Determination 31:

The Office has determined that the NWC shall submit a detailed proposal for the implementation of a Z-factor mechanism within six (6) months of the effective date of this Determination Notice. Subject to approval of the proposal by the Office, the Z-Factor mechanism may be implemented twelve (12) months after the effective date of this Determination Notice.

11. PUBLIC CONSULTATION

11.1. Consistent with its practice and in keeping with its mandate, the OUR convened public consultations as part of its process to review the Tariff Application. In an effort to garner a wide a cross-section of customers' views and experiences, six (6) public meetings were held across several parishes, namely: Kingston & St. Andrew, St. Catherine, St. Thomas, Clarendon, Portland, and Hanover. Additionally, meetings were held with members of the business community in Kingston & St. Andrew, St. James and Manchester.

11.2. One of the objectives for hosting the meetings, is for the OUR to provide a medium for customers to be made aware of the aspects of the Tariff Application and for them to provide feedback as well as to share their quality of service experiences. Several written submissions were received from various stakeholders and in arriving at its determinations regarding the operation of the NWC; the Office considered these.

SUMMARY OF NWC'S PRESENTATION

11.3. The NWC, in its presentation, outlined that the primary basis for its tariff submission was to meet the revenue requirement needed to improve on its operations and service delivery. The highlights of its presentation also included proposals to:

- Consolidate the residential block from the current six (6) tiers to a three (3) tier structure;
- Introduce a standby charge for major commercial users who only retain an NWC supply as a contingency;
- Introduce a sewerage service charge which is intended to recover the fixed costs incurred to provide sewerage services; and
- Increase operational efficiency through a continued thrust to reduce non-revenue water. In this regard, the current non-revenue water reduction efforts in Kingston & St. Andrew are to be extended to other parishes during the ensuing tariff period.

11.4. The NWC also highlighted the service improvement activities undertaken over the last five (5) years, specifically to the parishes in which the consultations were held.

CUSTOMERS' VIEWS ON THE PROPOSED TARIFF

General Views

11.5. Customers' general sentiments coalesced around the view that if the NWC operated more efficiently then there would not be the need for a rate increase. They cited the length of time it took the NWC to effect repairs to broken mains, resulting in high levels of waste in potable water, which could have otherwise been delivered and billed to customers.

11.6. Another area of customers' discontent related to the proper restoration of roads and repairs to premises, after the NWC effected repairs to broken mains and other infrastructure.

Customers also complained about the lengthy delays in having these restoration works completed.

11.7. Customers suggested that the Commission needed to increase its use of technology in areas such as leak detection and delivery of customer service, so that action could be effected in a timely manner.

Frequent Service Interruption/Irregular Supply

11.8. Customers – particularly in Kingston, St. Thomas, Portland, St. James, Clarendon and Manchester– complained about the frequency of service interruptions in several areas throughout each parish. Coupled with the frequent service interruption, was the lack of timely notifications about these outages, whether planned or unplanned (see Table 11.1 below).

Table 11.1- Frequent Service Interruption/Irregular Supply

Parish	Affected Areas
Kingston & St. Andrew	Havendale, Meadowbrook Estates, Swade Spring – Red Hills and Forrest Gardens – Red Hills
St. Thomas	Yallahs, Seaforth, Port Morant, Golden Valley, Spring Garden and Retreat
Portland	Port Antonio, Manchoineal, Fair Prospect and Rose Garden – Long Bay
St. James/Hanover	Knockpatrick, Eastern Hanover, Haughton Grove, Bamboo, Cacoon Castle and Ramble
Clarendon	May Pen and Salem
Manchester	Mandeville and Porus

Water Quality

11.9. With the exception of St. Catherine, customers in all other parishes visited raised the issue of the quality of potable water. Customers in the Fairy Hill area of Portland, Queensborough in St. Andrew and Longville Park in Clarendon described the water as having a salty taste. Customers from Trinityville in St. Thomas; Catherine Hall in Montego Bay; and Salem District in Clarendon complained of the water being discoloured and sometimes containing 'dirt' and other foreign particles.

11.10. The NWC advised that maintaining a high water quality was important and as such, sampling was done on a daily basis. It committed to investigating these concerns and addressing them.

Lack of Access to NWC's Supply

11.11. Another issue highlighted by customers related to the lack of access to the NWC's supply. Areas that were not currently being served by the NWC include; Dublin Castle and Zion Hill in St. Andrew; sections of Islington in St. Mary; Gutters and Retirement in St. James; and, Freetown and Rose Hall areas of Clarendon.

11.12. In some of these affected areas, the customers advised that the NWC infrastructure was actually in close proximity and as such, persons were able to tap into the NWC's supply without authorization. They suggested that the NWC should explore the possibility of serving those areas.

11.13. It is noted that since the issue was raised by residents of Zion Hill, a Gleaner article – published on 2018 November 27 – advised that the NWC, in collaboration with the Member of Parliament, had *"installed a water supply connection for which the residents will take responsibility for the monthly charges"* …

Assistance for Vulnerable Customers

11.14. At the meetings held in Kingston & St. Andrew, St. Catherine and St. James, customers queried whether any special consideration would be made for the vulnerable customers, defined as, those customers who were pensionable and/or Persons with Disabilities registered with the Jamaica Council for Persons with Disabilities (JCPD), given the proposed rate increases.

11.15. While the NWC advised that it was not averse to establishing a mechanism to assist vulnerable customers, it is advised that these considerations should correctly be made through the responsible government Ministries/agencies. The Commission further noted that its proposed increase for the first 2,000 gallons was only 5%. As such, customers who used no more than 2,000 gallons would realize a minimal increase, if granted.

Customer Service Concerns

11.16. Customers in Kingston, St. Thomas and St. James noted issues relating to the quality of customer service delivered by the NWC. In particular, they complained about the completeness and accuracy of the information provided by the NWC's customer service personnel. In their view, the customer service representatives were not sufficiently knowledgeable to adequately respond to their queries.

Applicability of Service & Related Charges Without Service

11.17. Customers queried the applicability of the Service Charge and any other associated charges in instances where they did not receive a supply from the NWC for an extended period. Customers were of the view that it was unreasonable for these charges to be levied when the NWC itself was aware that no water had been supplied to the area for an extended period.

11.18. In response, the NWC advised that where it did not provide service for more than half of the billing period, then the service charges were written off.

Maintenance Issues

11.19. Issues related to the maintenance of pumps, pump houses and sewerage systems were raised at the meetings in St. Thomas, Portland and St. Catherine. In relation to the pumps, customers said that a lack of adequate maintenance had contributed to faults, which resulted in frequent service interruptions. In relation to the pump houses, customers complained that the premises are often unkempt, resulting in overgrowth of vegetation, thereby posing health and safety risks. Customers also complained that the sewerage systems in their area were not being properly maintained resulting in their communities being overwhelmed with stench, and vector borne health related issues due to sewerage overflows. Customers in Bridgeport, St. Catherine pointed out that sewer lines were frequently blocked and this resulted in sewerage overflow.

11.20. While the NWC did not agree with the concerns raised specific to the maintenance of the sewerage system, it committed to conducting an investigation to address the concerns, where necessary.

Guaranteed Standards

11.21. The Guaranteed Standards (GS) Scheme prescribes service levels to be met by the NWC in areas, which include; billing, metering and complaints handling. The Scheme also provides a mechanism for individual customers to be compensated where the NWC fails to adhere to any of the prescribed standards.

11.22. An assessment of the NWC's reports on its performance against the Guaranteed Standards indicates that it committed 12,594 breaches during the period January 2014 - June 2018. However, in spite of the total breaches committed, the NWC attained an average compliance rating of 95% over the same period.

11.23. In its Tariff Application, the NWC proposed that the existing GS be maintained. The Office takes the view that the existing slate of standards is adequate in addressing critical quality service for the water/sewerage sector.

11.24. In light of this, the OUR has acceded to the NWC's request. Notwithstanding, the OUR intends to undertake a comprehensive review of its approach to revising the GS Scheme in its 2020/2021 work-plan. The Office will therefore defer any revisions of the existing NWC GS until the next tariff review period. Accordingly, Table 11.2 below outlines the GS to be adhered to by the NWC.

Table 11.2 Guaranteed Standards

CODE	FOCUS	DESCRIPTION	PERFORMANCE
WGS1	Access	Connection to supply	Maximum time of ten (10) working days to connect supply and install meter after establishment of the contract. **Compensation type: Claim**
WGS2	Delivery of bills	Issue of first bill	Maximum time of forty (40) working days after connection of supply and installation of meter **Compensation type: Claim**
WGS3	Appointments	Keeping appointments	Must make and keep an appointment at customer's request and must notify customer within 24 hours prior to the appointed time, if the appointment will not be kept. **Compensation type: Claim**
WGS 4(a)	Complaints	Acknowledgement	Maximum of five (5) working days to acknowledge customer's written complaints, after receipt. **Compensation type: Claim**
WGS (4b)	Complaints	Investigations	Maximum time of thirty (30) working days from the date of receipt of complaint to complete investigation and respond or provide an update. **Compensation type: Claim**
WGS 5	Disconnection	Wrongful Disconnection	Where the NWC disconnects a supply that has no overdue amount or is currently under investigation by the OUR or the NWC and only the disputed amount is in arrears. **Compensation type: Automatic**
WGS 6	Account status	Issue of account status	Meter to be read on same day customer is moving if on a weekday or within two (2) working days of move if on a weekend, provided five (5) working days' notice of move is given. Maximum time of 15 working days to provide final bill after move and 45 days to refund the credit balances. **Compensation type: Claim**

CODE	FOCUS	DESCRIPTION	PERFORMANCE
WGS 7	Water meters	Meter installation	Maximum of thirty (30) working days to install meter on customer's written request. **Compensation type: Claim**
WGS 8	Water meters	Repair or replacement of faulty meters	Maximum time of twenty (20) working days to verify and repair or replace meter after defect is identified by, or reported to the NWC. **Compensation type: Automatic**
WGS 9	Water Meters	Changing Meters	NWC must provide customer with details of the date of the change, meter reading on the day and serial number of the new meter. **Compensation type: Claim**
WGS 10	Water meters	Meter reading	Should NOT be more than two (2) consecutive estimated bills (where company has access to meter). **Compensation type: Automatic**
WGS10(b) **(NEW)**	Water Meters	Exceptional Meter Readings	Where the NWC obtains a reading that falls within its exceptions criteria (60% high and 40% low), it is to be verified, the customer alerted upon verification and the reading applied to the customer's account within one (1) billing period. **Compensation Type: Claim**
WGS11	Reconnection	Reconnection after payment of overdue amount	Maximum of 24 hours to restore supply. **Compensation type: Automatic**
WGS12	Reconnection	Reconnection after wrongful disconnection	NWC must reconnect a supply it inadvertently disconnected within 8 hours of being notified of the error. **Compensation type: Automatic**
WGS13	Compensation	Payment of compensation	Maximum of thirty (30) working days to process and apply credit to customer's account. **Compensation Type: Automatic**

CODE	FOCUS	DESCRIPTION	PERFORMANCE
WGS 14 **(NEW)**	Estimation of Consumption	Method of Estimation	An estimated bill should be based on the average of the last three (3) actual readings. **Compensation type: Automatic**
WGS 15 **(NEW)**	Billing Adjustment	Timeliness of adjustment to customer's account	Where necessary, customer must be billed for adjustment within three (3) months of: (i) identification of error, or (ii) subsequent to replacement of faulty meter **Compensation Type: Claim**

Compensation Mechanism

11.25. Compensation for breaches of the Guaranteed Standards shall be maintained as follows:

General Compensation

The Office has determined that the compensation for breach of a Guaranteed Standards will be four (4) times the applicable service charge.

Special Compensation

In the case of Reconnection after payment of Overdue Amounts, Wrongful Disconnection and Reconnection after Wrongful Disconnection, the compensation will be six (6) times the applicable service charge.

11.26. Where applicable, customers must submit claims within one hundred and twenty (120) working days after the breach is committed.

11.27. Breaches of individual standards will attract compensation of up to six (6) periods of non-compliance. For clarity, where a standard is breached and is not remedied within the stipulated time, compensation is to be applied to the affected account for that particular breach for up to 6 periods within which it goes un-remedied. The stipulated timeline for each breach is to be used to determine the periods of non-compliance.

ANNEXES

ANNEX 1: TABLE SHOWING OPERATING EXPENSES/COSTS

		OUR Approved Costs JA$'000				
Categories	**UNITS**	**Total**	**% Water**	**Potable Water**	**% Sewerage**	**Sewerage**
SALARIES, WAGES & related expenses						
Salaries and related costs	J$'000	3,405,664.08	81.13%	2,763,112.56	18.87%	642,551.52
Allowances — housing	J$'000	173,615.00	82.31%	142,901.00	17.69%	30,714.00
Allowances — motor vehicle	J$'000	540,861.00	81.43%	440,444.00	18.57%	100,417.00
Allowances — uniform	J$'000	224,660.00	79.61%	178,859.00	20.39%	45,801.00
Allowances — other	J$'000	1,057,879.48	79.72%	843,340.82	20.28%	214,538.66
Pensions	J$'000	3,006,734.00	80.01%	2,405,690.00	19.99%	601,044.00
Gratuity paid	J$'000	131,501.00	80.09%	105,324.00	19.91%	26,177.00
Insurance (group)	J$'000	297,777.00	80.96%	241,083.00	19.04%	56,694.00
Travelling and transportation	J$'000	8,491.00	92.29%	7,836.00	7.71%	655.00
Statutory contributions	J$'000	327,487.68	80.88%	264,871.36	19.12%	62,616.32
Expense	J$'000	**9,174,670.24**		**7,393,461.74**		**1,781,208.50**
REPAIRS AND MAINTENANCE						
General repairs (pipes)	J$'000		71.98%		28.02%	
Materials and supplies	J$'000		20.08%		79.92%	
Motor vehicles	J$'000		81.84%		18.16%	
Plant and equipment	J$'000		0.00%		31.61%	
Building	J$'000		74.90%		25.10%	
Chemicals	J$'000		92.41%		7.59%	
Equipment rental	J$'000		83.23%		16.77%	
Reinstatement of roads	J$'000		85.46%		14.54%	
Office furniture and equipment	J$'000		80.36%		19.64%	
Claims and contingencies			78.44%		21.56%	
Total R&M	**J$'000**	**3,227,255.17**		**2,339,665.91**		**887,589.26**
Administration						
Bad Debt Expenses	J$'000	3,269,772.00	76.94%	2,515,772.00	23.06%	754,000.00
Rent, rates and taxes	J$'000	277,593.82	79.61%	220,994.19	20.39%	56,599.64
Security services	J$'000	344,510.03	82.50%	284,232.64	17.50%	60,277.39
Insurance charges	J$'000	218,319.18	79.36%	173,263.40	20.64%	45,055.78
Computer services	J$'000	128,212.74	78.59%	100,766.48	21.41%	27,446.26
Printing and stationery	J$'000	53,300.22	79.26%	42,243.39	20.74%	11,056.84
Consultancy fees	J$'000	484,784.40	95.56%	463,241.82	4.44%	21,542.58
Postage and cables	J$'000	134,694.69	75.28%	101,398.07	24.72%	33,296.62
Overseas travel	J$'000	3,904.34	84.85%	3,312.74	15.15%	591.60
Audit and accounting fees	J$'000	17,216.84	78.31%	13,481.67	21.69%	3,735.17
Staff welfare	J$'000	95,991.66	80.20%	76,989.78	19.80%	19,001.88
Legal expenses	J$'000	8,744.78	78.31%	6,847.98	21.69%	1,896.81
Advertising	J$'000	16,799.54	78.02%	13,106.41	21.98%	3,693.13
Miscellaneous expenses	J$'000	112,619.98	83.80%	94,376.81	16.20%	18,243.16
Meter Administration Cost	J$'000	*24,943.55*	100%	24,943.55	0%	0.00
Water Abstraction Fee	J$'000	11,660.48	100%	11,660.48	0%	0.00
Wastewater Discharge Fee	J$'000	8,645.00	0%	0.00	100%	8,645.00
Total Administration	**J$'000**	**5,211,713.25**		**4,146,631.40**		**1,065,081.84**
Electricity	**J$'000**	**6,355,943.70**	**94.78%**	**6,024,008.48**	**5.22%**	**331,935.27**
Telephone	**J$'000**	**143,699.90**	**79.15%**	**113,731.40**	**20.85%**	**29,968.49**
Fuel and Lubrication	**J$'000**	**278,621.17**	**90.54%**	**252,270.96**	**9.46%**	**26,350.21**
Regulatory fees	**J$'000**	**176,587.55**	**83.80%**	**147,982.36**	**16.20%**	**28,605.19**
Water Purchase	**J$'000**	**414,419.00**		**414,419.00**		
Soapberry Cost	**J$'000**	**1,441,688.34**	**0%**	**0.00**	**100%**	**1,441,688.34**
TOTAL Operating Cost	**J$'000**	**26,424,598.32**		**20,832,171.26**		**5,592,427.11**

ANNEX 2: Summary of the Bill Impact of the OUR's Approved Rates (Water)

CUSTOMER TYPE	USAGE CATEGORY	AVERAGE CONSUMPTION MONTHLY	TOTAL BILL IMPACT (%)	WEIGHTED AVERAGE CHANGE (%)
Residential	For up to 14,000 litres	14,000	1.83%	4.31%
	For the next 13,000 litres	13,000	2.69%	
	For the next 14,000 litres	12,000	3.29%	
	For the next 14,000 litres	14,000	15.05%	
	For the next 36,000 litres	36,000	13.56%	
	Over 91,000 litres	20,000	6.52%	
Commercial	5/8 inch / 15mm	100,000	4.41%	4.43%
	3/4 inch / 20mm	100,000	4.61%	
	1 inch / 25mm	100,000	4.65%	
	1 1/4 inch / 30mm	100,000	4.77%	
	1 1/2 inch / 15mm	100,000	4.77%	
	2 inch / 50mm	100,000	4.88%	
	3 inch / 100mm	100,000	5.12%	
	4inch / 150mm	100,000	5.67%	
	6 inch / 150mm	12,100,000	-6.24%	
Condominium	5/8 inch / 15mm	200,000	4.41%	4.28%
	3/4 inch / 20mm	200,000	4.61%	
	1 inch / 25mm	200,000	4.65%	
	1 1/4 inch / 30mm	200,000	4.77%	
	1 1/2 inch / 15mm	200,000	4.77%	
	2 inch / 50mm	200,000	4.88%	
	3 inch / 100mm	200,000	5.13%	
	4 inch / 100mm	200,000	5.40%	
	6 inch / 150mm	200,000	5.68%	
Primary School	5/8 inch / 15mm	155,530	3.41%	3.70%
	3/4 inch / 20mm	155,530	3.77%	
	1 inch / 25mm	155,530	3.84%	
	1 1/4 inch / 30mm	155,530	4.09%	
	1 1/2 inch / 15mm	155,530	4.09%	
	2 inch / 50mm	155,530	4.28%	
	3 inch / 100mm	155,530	4.71%	
	4 inch / 100mm	155,530	5.14%	
	6 inch / 150mm	155,530	5.55%	

ANNEX 3: ESTIMATED BILL IMPACT OF OUR'S RATE TARIFF ADJUSTMENT (WATER)

Residential	November 2019 Bill - Before			November 2019 Bill - After				
Below 14,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
For up to 14,000 litres	14	103.72	1,452.01	14	108.90	1,524.62	72.60	-5.00%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**2,282.01**	**Sub Total**		**2,379.52**	**97.50**	**4.27%**
PAM		7.29%	166.36		0.00%	-		
X-Factor		-6.20%	(151.80)		-5.00%	(118.98)		
K-Factor		16.00%	367.45		20.00%	452.11		
Total Bill Charges			**2,664.03**			**2,712.65**	**48.62**	**1.83%**

Residential	November 2019 Bill - Before			November 2019 Bill - After				
Below 27,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
For up to 14,000 litres	14	103.72	1,452.01	14	108.90	1,524.62	72.60	-5.00%
For the next 13,000 litres	13	182.84	2,376.98	13	193.81	2,519.59	142.62	6.00%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**4,658.99**	**Sub Total**		**4,899.11**	**240.12**	**5.15%**
PAM		7.29%	339.64		0.00%	-		
X-Factor		-6.20%	(309.92)		-5.00%	(244.96)		
K-Factor		16.00%	750.19		20.00%	930.83		
Total Bill Charges			**5,438.91**			**5,584.98**	**146.07**	**2.69%**

Residential	November 2019 Bill - Before			November 2019 Bill - After				
Below 41,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
For up to 14,000 litres	14	103.72	1,452.01	14	108.90	1,524.62	72.60	-5.00%
For the next 13,000 litres	13	182.84	2,376.98	13	193.81	2,519.59	142.62	6.00%
For the next 14,000 litres	12	197.42	2,369.09	12	211.24	2,534.93	165.84	7.00%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**7,028.08**	**Sub Total**		**7,434.04**	**405.96**	**5.78%**
PAM		7.29%	512.35		0.00%	-		
X-Factor		-6.20%	(467.51)		-5.00%	(371.70)		
K-Factor		16.00%	1,131.67		20.00%	1,412.47		
Total Bill Charges			**8,204.59**			**8,474.80**	**270.21**	**3.29%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Below 55,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
For up to 14,000 litres	14	103.72	1,452.01	14	108.90	1,524.62	72.60	-5.00%
For the next 13,000 litres	13	182.84	2,376.98	13	193.81	2,519.59	142.62	6.00%
For the next 14,000 litres	14	197.42	2,763.94	14	211.24	2,957.41	193.48	7.00%
For the next 14,000 litres	14	251.99	3,527.81	14	360.34	5,044.77	1,516.96	43.00%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**10,950.74**	**Sub Total**		**12,901.29**	**1,950.55**	**17.81%**
PAM		7.29%	798.31		0.00%	-		
X-Factor		-6.20%	(728.44)		-5.00%	(645.06)		
K-Factor		16.00%	1,763.30		20.00%	2,451.25		
Total Bill Charges			**12,783.90**			**14,707.47**	**1,923.57**	**15.05%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Below 91,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
For up to 14,000 litres	14	103.72	1,452.01	14	108.90	1,524.62	72.60	-5.00%
For the next 13,000 litres	13	182.84	2,376.98	13	193.81	2,519.59	142.62	6.00%
For the next 14,000 litres	14	197.42	2,763.94	14	211.24	2,957.41	193.48	7.00%
For the next 14,000 litres	14	251.99	3,527.81	14	360.34	5,044.77	1,516.96	43.00%
For the next 36,000 litres	36	313.83	11,297.87	36	360.34	12,972.26	1,674.39	14.82%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**22,248.61**	**Sub Total**		**25,873.55**	**3,624.94**	**16.29%**
PAM		7.29%	1,621.92		0.00%	-		
X-Factor		-6.20%	(1,479.97)		-5.00%	(1,293.68)		
K-Factor		16.00%	3,582.49		20.00%	4,915.97		
Total Bill Charges			**25,973.05**			**29,495.84**	**3,522.80**	**13.56%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Over 91,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
For up to 14,000 litres	14	103.72	1,452.01	14	108.90	1,524.62	72.60	-5.00%
For the next 13,000 litres	13	182.84	2,376.98	13	193.81	2,519.59	142.62	6.00%
For the next 14,000 litres	14	197.42	2,763.94	14	211.24	2,957.41	193.48	7.00%
For the next 14,000 litres	14	251.99	3,527.81	14	360.34	5,044.77	1,516.96	43.00%
For the next 36,000 litres	36	313.83	11,297.87	36	360.34	12,972.26	1,674.39	14.82%
Over 91,000 litres	20	403.96	8,079.23	20	360.34	7,206.81	(872.42)	-10.80%
Service Charge			830.00		854.90	854.90	24.90	3.00%
Sub Total			**30,327.84**	**Sub Total**		**33,080.36**	**2,752.52**	**9.08%**
PAM		7.29%	2,210.90		0.00%	-		
X-Factor		-6.20%	(2,017.40)		-5.00%	(1,654.02)		
K-Factor		16.00%	4,883.41		20.00%	6,285.27		
Total Bill Charges			**35,404.75**			**37,711.61**	**2,306.85**	**6.52%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
5/8 inch / 15mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**39,721.33**	**Sub Total**		**42,468.63**	**2,747.29**	**6.92%**
PAM		7.29%	2,895.69		0.00%	-		
X-Factor		-6.20%	(2,642.26)		-5.00%	(2,123.43)		
K-Factor		16.00%	6,395.96		20.00%	8,069.04		
Total Bill Charges			**46,370.73**			**48,414.23**	**2,043.51**	**4.41%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
3/4 inch / 20mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		1,700.00	1,700.00		1,870.00	1,870.00	170.00	10.00%
Sub Total			**40,591.33**	**Sub Total**		**43,483.73**	**2,892.39**	**7.13%**
PAM		7.29%	2,959.11		0.00%	-		
X-Factor		-6.20%	(2,700.13)		-5.00%	(2,174.19)		
K-Factor		16.00%	6,536.05		20.00%	8,261.91		
Total Bill Charges			**47,386.36**			**49,571.45**	**2,185.08**	**4.61%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
1 inch / 25mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		2,220.00	2,220.00		2,442.00	2,442.00	222.00	10.00%
Sub Total			**41,111.33**	**Sub Total**		**44,055.73**	**2,944.39**	**7.16%**
PAM		7.29%	2,997.02		0.00%	-		
X-Factor		-6.20%	(2,734.72)		-5.00%	(2,202.79)		
K-Factor		16.00%	6,619.78		20.00%	8,370.59		
Total Bill Charges			**47,993.41**			**50,223.53**	**2,230.12**	**4.65%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
1 1/4 inch / 30mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		4,180.00	4,180.00		4,598.00	4,598.00	418.00	10.00%
Sub Total			**43,071.33**	**Sub Total**		**46,211.73**	**3,140.39**	**7.29%**
PAM		7.29%	3,139.90		0.00%	-		
X-Factor		-6.20%	(2,865.10)		-5.00%	(2,310.59)		
K-Factor		16.00%	6,935.38		20.00%	8,780.23		
Total Bill Charges			**50,281.52**			**52,681.37**	**2,399.85**	**4.77%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
1 1/2 inch / 40mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		4,180.00	4,180.00		4,598.00	4,598.00	418.00	10.00%
Sub Total			**43,071.33**	**Sub Total**		**46,211.73**	**3,140.39**	**7.29%**
PAM		7.29%	3,139.90		0.00%	-		
X-Factor		-6.20%	(2,865.10)		-5.00%	(2,310.59)		
K-Factor		16.00%	6,935.38		20.00%	8,780.23		
Total Bill Charges			**50,281.52**			**52,681.37**	**2,399.85**	**4.77%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
2 inch / 50mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		5,920.00	5,920.00		6,512.00	6,512.00	592.00	10.00%
Sub Total			**44,811.33**	**Sub Total**		**48,125.73**	**3,314.39**	**7.40%**
PAM		7.29%	3,266.75		0.00%	-		
X-Factor		-6.20%	(2,980.84)		-5.00%	(2,406.29)		
K-Factor		16.00%	7,215.56		20.00%	9,143.89		
Total Bill Charges			**52,312.80**			**54,863.33**	**2,550.53**	**4.88%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
3 inch / 75mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		10,750.0	10,750.00		11,825.0	11,825.00	1,075.00	10.00%
Sub Total			**49,641.33**	**Sub Total**		**53,438.73**	**3,797.39**	**7.65%**
PAM		7.29%	3,618.85		0.00%	-		
X-Factor		-6.20%	(3,302.13)		-5.00%	(2,671.94)		
K-Factor		16.00%	7,993.29		20.00%	10,153.36		
Total Bill Charges			**57,951.34**			**60,920.15**	**2,968.80**	**5.12%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
4 inch / 100mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		17,370.0	17,370.00		19,107.0	19,107.00	1,737.00	10.00%
Sub Total			**56,261.33**	**Sub Total**		**60,720.73**	**4,459.39**	**7.93%**
PAM		7.29%	4,101.45		0.00%	-		
X-Factor		-6.20%	(3,742.49)		-5.00%	(3,036.04)		
K-Factor		16.00%	9,059.25		20.00%	11,536.94		
Total Bill Charges			**65,679.54**			**69,221.63**	**3,542.09**	**5.39%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After			Change	
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	416.14	41,613.73	2,722.39	7.00%
Service Charge		26,460.0	26,460.00		29,106.0	29,106.00	2,646.00	10.00%
Sub Total			**65,351.33**	**Sub Total**		**70,719.73**	**5,368.39**	**8.21%**
PAM		7.29%	4,764.11		0.00%	-		
X-Factor		-6.20%	(4,347.16)		-5.00%	(3,535.99)		
K-Factor		16.00%	10,522.93		20.00%	13,436.75		
Total Bill Charges			**76,291.21**			**80,620.49**	**4,329.27**	**5.67%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After			Change	
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	9100	388.91	3,539,111.31	9100	416.14	3,786,849.10	247,737.79	7.00%
Above 9,100,000	3000	388.91	1,166,739.99	3000	242.56	727,683.94	(439,056.05)	-37.63%
Service Charge		26,460.0	26,460.00		29,106.0	29,106.00	2,646.00	10.00%
Sub Total			**4,732,311.30**	**Sub Total**		**4,543,639.04**	**(188,672.26)**	**-3.99%**
PAM		7.29%	344,985.49		0.00%	-		
X-Factor		-6.20%	(314,792.40)		-5.00%	(227,181.95)		
K-Factor		16.00%	762,000.70		20.00%	863,291.42		
Total Bill Charges			**5,524,505.09**			**5,179,748.51**	**(344,756.59)**	**-6.24%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After			Change	
5/8 inch / 15mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**39,415.13**	**Sub Total**		**42,140.99**	**2,725.86**	**6.92%**
PAM		7.29%	2,873.36		0.00%	-		
X-Factor		-6.20%	(2,621.89)		-5.00%	(2,107.05)		
K-Factor		16.00%	6,346.66		20.00%	8,006.79		
Total Bill Charges			**46,013.26**			**48,040.73**	**2,027.46**	**4.41%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After			Change	
3/4 inch / 20mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		1,700.00	1,700.00		1,870.00	1,870.00	170.00	10.00%
Sub Total			**40,285.13**	**Sub Total**		**43,156.09**	**2,870.96**	**7.13%**
PAM		7.29%	2,936.79		0.00%	-		
X-Factor		-6.20%	(2,679.76)		-5.00%	(2,157.80)		
K-Factor		16.00%	6,486.75		20.00%	8,199.66		
Total Bill Charges			**47,028.90**			**49,197.94**	**2,169.04**	**4.61%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
1 inch / 25mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		2,220.00	2,220.00		2,442.00	2,442.00	222.00	10.00%
Sub Total			**40,805.13**	**Sub Total**		**43,728.09**	**2,922.96**	**7.16%**
PAM		7.29%	2,974.69		0.00%	-		
X-Factor		-6.20%	(2,714.35)		-5.00%	(2,186.40)		
K-Factor		16.00%	6,570.48		20.00%	8,308.34		
Total Bill Charges			**47,635.95**			**49,850.02**	**2,214.07**	**4.65%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
1 1/4 inch / 30mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		4,180.00	4,180.00		4,598.00	4,598.00	418.00	10.00%
Sub Total			**42,765.13**	**Sub Total**		**45,884.09**	**3,118.96**	**7.29%**
PAM		7.29%	3,117.58		0.00%	-		
X-Factor		-6.20%	(2,844.73)		-5.00%	(2,294.20)		
K-Factor		16.00%	6,886.08		20.00%	8,717.98		
Total Bill Charges			**49,924.06**			**52,307.86**	**2,383.80**	**4.77%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
1 1/2 inch / 40mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		4,180.00	4,180.00		4,598.00	4,598.00	418.00	10.00%
Sub Total			**42,765.13**	**Sub Total**		**45,884.09**	**3,118.96**	**7.29%**
PAM		7.29%	3,117.58		0.00%	-		
X-Factor		-6.20%	(2,844.73)		-5.00%	(2,294.20)		
K-Factor		16.00%	6,886.08		20.00%	8,717.98		
Total Bill Charges			**49,924.06**			**52,307.86**	**2,383.80**	**4.77%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
2 inch / 50mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		5,920.00	5,920.00		6,512.00	6,512.00	592.00	10.00%
Sub Total			**44,505.13**	**Sub Total**		**47,798.09**	**3,292.96**	**7.40%**
PAM		7.29%	3,244.42		0.00%	-		
X-Factor		-6.20%	(2,960.47)		-5.00%	(2,389.90)		
K-Factor		16.00%	7,166.25		20.00%	9,081.64		
Total Bill Charges			**51,955.33**			**54,489.82**	**2,534.49**	**4.88%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After			Change	
3 inch / 75mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		10,750.0	10,750.00		11,825.0	11,825.00	1,075.00	10.00%
Sub Total			**49,335.13**	**Sub Total**		**53,111.09**	**3,775.96**	**7.65%**
PAM		7.29%	3,596.53		0.00%	-		
X-Factor		-6.20%	(3,281.76)		-5.00%	(2,655.55)		
K-Factor		16.00%	7,943.98		20.00%	10,091.11		
Total Bill Charges			**57,593.88**			**60,546.64**	**2,952.76**	**5.13%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After			Change	
4 inch / 100mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		17,370.0	17,370.00		19,107.0	19,107.00	1,737.00	10.00%
Sub Total			**55,955.13**	**Sub Total**		**60,393.09**	**4,437.96**	**7.93%**
PAM		7.29%	4,079.13		0.00%	-		
X-Factor		-6.20%	(3,722.12)		-5.00%	(3,019.65)		
K-Factor		16.00%	9,009.94		20.00%	11,474.69		
Total Bill Charges			**65,322.08**			**68,848.12**	**3,526.05**	**5.40%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After			Change	
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	206.43	41,286.09	2,700.96	7.00%
Service Charge		26,460.0	26,460.00		29,106.0	29,106.00	2,646.00	10.00%
Sub Total			**65,045.13**	**Sub Total**		**70,392.09**	**5,346.96**	**8.22%**
PAM		7.29%	4,741.79		0.00%	-		
X-Factor		-6.20%	(4,326.79)		-5.00%	(3,519.60)		
K-Factor		16.00%	10,473.62		20.00%	13,374.50		
Total Bill Charges			**75,933.75**			**80,246.98**	**4,313.23**	**5.68%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
5/8 inch / 15mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		830.00	830.00		854.90	854.90	24.90	3.00%
Sub Total			**25,026.79**	**Sub Total**		**26,503.49**	**1,476.71**	**5.90%**
PAM		7.29%	1,824.45		0.00%	-		
X-Factor		-6.20%	(1,664.78)		-5.00%	(1,325.17)		
K-Factor		16.00%	4,029.83		20.00%	5,035.66		
Total Bill Charges			**29,216.30**			**30,213.98**	**997.69**	**3.41%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
3/4 inch / 20mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		1,700.00	1,700.00		1,870.00	1,870.00	170.00	10.00%
Sub Total			**25,896.79**	**Sub Total**		**27,518.59**	**1,621.81**	**6.26%**
PAM		7.29%	1,887.88		0.00%	-		
X-Factor		-6.20%	(1,722.65)		-5.00%	(1,375.93)		
K-Factor		16.00%	4,169.92		20.00%	5,228.53		
Total Bill Charges			**30,231.94**			**31,371.20**	**1,139.26**	**3.77%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
1 inch / 25mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		2,220.00	2,220.00		2,442.00	2,442.00	222.00	10.00%
Sub Total			**26,416.79**	**Sub Total**		**28,090.59**	**1,673.81**	**6.34%**
PAM		7.29%	1,925.78		0.00%	-		
X-Factor		-6.20%	(1,757.24)		-5.00%	(1,404.53)		
K-Factor		16.00%	4,253.65		20.00%	5,337.21		
Total Bill Charges			**30,838.98**			**32,023.28**	**1,184.29**	**3.84%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
1 1/4 inch / 30mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		4,180.00	4,180.00		4,598.00	4,598.00	418.00	10.00%
Sub Total			**28,376.79**	**Sub Total**		**30,246.59**	**1,869.81**	**6.59%**
PAM		7.29%	2,068.67		0.00%	-		
X-Factor		-6.20%	(1,887.62)		-5.00%	(1,512.33)		
K-Factor		16.00%	4,569.25		20.00%	5,746.85		
Total Bill Charges			**33,127.09**			**34,481.12**	**1,354.03**	**4.09%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
1 1/2 inch / 40mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		4,180.00	4,180.00		4,598.00	4,598.00	418.00	10.00%
Sub Total			**28,376.79**	**Sub Total**		**30,246.59**	**1,869.81**	**6.59%**
PAM		7.29%	2,068.67		0.00%	-		
X-Factor		-6.20%	(1,887.62)		-5.00%	(1,512.33)		
K-Factor		16.00%	4,569.25		20.00%	5,746.85		
Total Bill Charges			**33,127.09**			**34,481.12**	**1,354.03**	**4.09%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
2 inch / 50mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		5,920.00	5,920.00		6,512.00	6,512.00	592.00	10.00%
Sub Total			**30,116.79**	**Sub Total**		**32,160.59**	**2,043.81**	**6.79%**
PAM		7.29%	2,195.51		0.00%	-		
X-Factor		-6.20%	(2,003.36)		-5.00%	(1,608.03)		
K-Factor		16.00%	4,849.43		20.00%	6,110.51		
Total Bill Charges			**35,158.37**			**36,663.08**	**1,504.71**	**4.28%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
3 inch / 75mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		10,750.0	10,750.00		11,825.0	11,825.00	1,075.00	10.00%
Sub Total			**34,946.79**	**Sub Total**		**37,473.59**	**2,526.81**	**7.23%**
PAM		7.29%	2,547.62		0.00%	-		
X-Factor		-6.20%	(2,324.65)		-5.00%	(1,873.68)		
K-Factor		16.00%	5,627.16		20.00%	7,119.98		
Total Bill Charges			**40,796.91**			**42,719.90**	**1,922.98**	**4.71%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
4 inch / 100mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		17,370.0	17,370.00		19,107.0	19,107.00	1,737.00	10.00%
Sub Total			**41,566.79**	**Sub Total**		**44,755.59**	**3,188.81**	**7.67%**
PAM		7.29%	3,030.22		0.00%	-		
X-Factor		-6.20%	(2,765.01)		-5.00%	(2,237.78)		
K-Factor		16.00%	6,693.12		20.00%	8,503.56		
Total Bill Charges			**48,525.11**			**51,021.38**	**2,496.27**	**5.14%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	164.91	25,648.59	1,451.81	6.00%
Service Charge		26,460.0	26,460.00		29,106.0	29,106.00	2,646.00	10.00%
Sub Total			**50,656.79**	**Sub Total**		**54,754.59**	**4,097.81**	**8.09%**
PAM		7.29%	3,692.88		0.00%	-		
X-Factor		-6.20%	(3,369.68)		-5.00%	(2,737.73)		
K-Factor		16.00%	8,156.80		20.00%	10,403.37		
Total Bill Charges			**59,136.79**			**62,420.24**	**3,283.45**	**5.55%**

ANNEX 4: SUMMARY OF THE BILL IMPACT OF THE NWC'S PROPOSED RATES (WATER)

CUSTOMER TYPE	USAGE CATEGORY	AVERAGE CONSUMPTION MONTHLY	TOTAL BILL IMPACT (%)	WEIGHTED AVERAGE CHANGE (%)
Residential	For up to 14,000 litres	14,000	34.47%	33.65%
	For the next 13,000 litres	13,000	30.98%	
	For the next 14,000 litres	12,000	42.17%	
	For the next 14,000 litres	14,000	46.88%	
	For the next 36,000 litres	36,000	35.23%	
	Over 91,000 litres	20,000	24.85%	
Commercial	5/8 inch / 15mm	100,000	38.62%	35.98%
	3/4 inch / 20mm	100,000	38.86%	
	1 inch / 25mm	100,000	38.75%	
	1 1/4 inch / 30mm	100,000	38.34%	
	1 1/2 inch / 15mm	100,000	38.34%	
	2 inch / 50mm	100,000	37.99%	
	4 inch / 100mm	100,000	36.27%	
	6 inch / 150mm	100,000	35.32%	
	6 inch / 150mm	12,100,000	21.32%	
Condominium	5/8 inch / 15mm	200,000	38.61%	37.73%
	3/4 inch / 20mm	200,000	38.86%	
	1 inch / 25mm	200,000	38.75%	
	1 1/4 inch / 30mm	200,000	38.33%	
	1 1/2 inch / 15mm	200,000	38.33%	
	2 inch / 50mm	200,000	37.98%	
	3 inch / 100mm	200,000	37.16%	
	4 inch / 100mm	200,000	36.25%	
	6 inch / 150mm	200,000	35.31%	
Primary School	5/8 inch / 15mm	155,530	38.23%	37.12%
	3/4 inch / 20mm	155,530	38.63%	
	1 inch / 25mm	155,530	38.47%	
	1 1/4 inch / 30mm	155,530	37.85%	
	1 1/2 inch / 15mm	155,530	37.85%	
	2 inch / 50mm	155,530	37.36%	
	3 inch / 100mm	155,530	36.29%	
	4 inch / 100mm	155,530	35.21%	
	6 inch / 150mm	155,530	34.18%	

ANNEX 5: ESTIMATED BILL IMPACT OF NWC'S PROPOSED RATE ADJUSTMENT (WATER)

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Below 14,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
For up to 14,000 litres	14	103.72	1,452.01	14	151.09	2,115.20	663.19	45.67%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**2,282.01**	**Sub Total**		**2,985.20**	**703.19**	**30.81%**
PAM		7.29%	166.36		0.00%	-		
X-Factor		-6.20%	(151.80)		0.00%	-		
K-Factor		16.00%	367.45		20.00%	597.04		
Total Bill Charges			**2,664.03**			**3,582.24**	**918.21**	**34.47%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Below 27,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
For up to 14,000 litres	14	103.72	1,452.01	14	151.09	2,115.20	663.19	-45.67%
For the next 13,000 litres	13	182.84	2,376.98	13	227.02	2,951.24	574.26	24.16%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**4,658.99**	**Sub Total**		**5,936.44**	**1,277.45**	**27.42%**
PAM		7.29%	339.64		0.00%	-		
X-Factor		-6.20%	(309.92)		0.00%	-		
K-Factor		16.00%	750.19		20.00%	1,187.29		
Total Bill Charges			**5,438.91**			**7,123.73**	**1,684.82**	**30.98%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Below 41,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
For up to 14,000 litres	14	103.72	1,452.01	14	151.09	2,115.20	663.19	-45.67%
For the next 13,000 litres	13	182.84	2,376.98	13	227.02	2,951.24	574.26	24.16%
For the next 14,000 litres	12	197.42	2,369.09	12	315.30	3,783.64	1,414.55	59.71%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**7,028.08**	**Sub Total**		**9,720.07**	**2,692.00**	**38.30%**
PAM		7.29%	512.35		0.00%	-		
X-Factor		-6.20%	(467.51)		0.00%	-		
K-Factor		16.00%	1,131.67		20.00%	1,944.01		
Total Bill Charges			**8,204.59**			**11,664.09**	**3,459.50**	**42.17%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Below 55,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
For up to 14,000 litres	14	103.72	1,452.01	14	151.09	2,115.20	663.19	-45.67%
For the next 13,000 litres	13	182.84	2,376.98	13	227.02	2,951.24	574.26	24.16%
For the next 14,000 litres	14	197.42	2,763.94	14	315.30	4,414.24	1,650.31	59.71%
For the next 14,000 litres	14	251.99	3,527.81	14	378.36	5,297.09	1,769.28	50.15%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**10,950.74**	**Sub Total**		**15,647.77**	**4,697.04**	**42.89%**
PAM		7.29%	798.31		0.00%	-		
X-Factor		-6.20%	(728.44)		0.00%	-		
K-Factor		16.00%	1,763.30		20.00%	3,129.55		
Total Bill Charges			**12,783.90**			**18,777.33**	**5,993.43**	**46.88%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Below 91,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
For up to 14,000 litres	14	103.72	1,452.01	14	151.09	2,115.20	663.19	-45.67%
For the next 13,000 litres	13	182.84	2,376.98	13	227.02	2,951.24	574.26	24.16%
For the next 14,000 litres	14	197.42	2,763.94	14	315.30	4,414.24	1,650.31	59.71%
For the next 14,000 litres	14	251.99	3,527.81	14	378.36	5,297.09	1,769.28	50.15%
For the next 36,000 litres	36	313.83	11,297.87	36	378.36	13,621.09	2,323.22	20.56%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**22,248.61**	**Sub Total**		**29,268.87**	**7,020.26**	**31.55%**
PAM		7.29%	1,621.92		0.00%	-		
X-Factor		-6.20%	(1,479.97)		0.00%	-		
K-Factor		16.00%	3,582.49		20.00%	5,853.77		
Total Bill Charges			**25,973.05**			**35,122.64**	**9,149.59**	**35.23%**

Residential	November 2019 Bill - Before			November 2019 Bill - After			Change	
Over 91,000 litres	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
For up to 14,000 litres	14	103.72	1,452.01	14	151.09	2,115.20	663.19	-45.67%
For the next 13,000 litres	13	182.84	2,376.98	13	227.02	2,951.24	574.26	24.16%
For the next 14,000 litres	14	197.42	2,763.94	14	315.30	4,414.24	1,650.31	59.71%
For the next 14,000 litres	14	251.99	3,527.81	14	378.36	5,297.09	1,769.28	50.15%
For the next 36,000 litres	36	313.83	11,297.87	36	378.36	13,621.09	2,323.22	20.56%
Over 91,000 litres	20	403.96	8,079.23	20	378.36	7,567.27	(511.96)	-6.34%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**30,327.84**	**Sub Total**		**36,836.14**	**6,508.30**	**21.46%**
PAM		7.29%	2,210.90		0.00%	-		
X-Factor		-6.20%	(2,017.40)		0.00%	-		
K-Factor		16.00%	4,883.41		20.00%	7,367.23		
Total Bill Charges			**35,404.75**			**44,203.37**	**8,798.61**	**24.85%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After			Change	
5/8 inch / 15mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**39,721.33**	**Sub Total**		**53,564.17**	**13,842.83**	**34.85%**
PAM		7.29%	2,895.69		0.00%	-		
X-Factor		-6.20%	(2,642.26)		0.00%	-		
K-Factor		16.00%	6,395.96		20.00%	10,712.83		
Total Bill Charges			**46,370.73**			**64,277.00**	**17,906.27**	**38.62%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After			Change	
3/4 inch / 20mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		1,700.00	1,700.00		2,140.00	2,140.00	440.00	25.88%
Sub Total			**40,591.33**	**Sub Total**		**54,834.17**	**14,242.83**	**35.09%**
PAM		7.29%	2,959.11		0.00%	-		
X-Factor		-6.20%	(2,700.13)		0.00%	-		
K-Factor		16.00%	6,536.05		20.00%	10,966.83		
Total Bill Charges			**47,386.36**			**65,801.00**	**18,414.64**	**38.86%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
1 inch / 25mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		2,220.00	2,220.00		2,800.00	2,800.00	580.00	26.13%
Sub Total			**41,111.33**	**Sub Total**		**55,494.17**	**14,382.83**	**34.99%**
PAM		7.29%	2,997.02		0.00%	-		
X-Factor		-6.20%	(2,734.72)		0.00%	-		
K-Factor		16.00%	6,619.78		20.00%	11,098.83		
Total Bill Charges			**47,993.41**			**66,593.00**	**18,599.59**	**38.75%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
1 1/4 inch / 30mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		4,180.00	4,180.00		5,270.00	5,270.00	1,090.00	26.08%
Sub Total			**43,071.33**	**Sub Total**		**57,964.17**	**14,892.83**	**34.58%**
PAM		7.29%	3,139.90		0.00%	-		
X-Factor		-6.20%	(2,865.10)		0.00%	-		
K-Factor		16.00%	6,935.38		20.00%	11,592.83		
Total Bill Charges			**50,281.52**			**69,557.00**	**19,275.48**	**38.34%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
1 1/2 inch / 40mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		4,180.00	4,180.00		5,270.00	5,270.00	1,090.00	26.08%
Sub Total			**43,071.33**	**Sub Total**		**57,964.17**	**14,892.83**	**34.58%**
PAM		7.29%	3,139.90		0.00%	-		
X-Factor		-6.20%	(2,865.10)		0.00%	-		
K-Factor		16.00%	6,935.38		20.00%	11,592.83		
Total Bill Charges			**50,281.52**			**69,557.00**	**19,275.48**	**38.34%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
2 inch / 50mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		5,920.00	5,920.00		7,460.00	7,460.00	1,540.00	26.01%
Sub Total			**44,811.33**	**Sub Total**		**60,154.17**	**15,342.83**	**34.24%**
PAM		7.29%	3,266.75		0.00%	-		
X-Factor		-6.20%	(2,980.84)		0.00%	-		
K-Factor		16.00%	7,215.56		20.00%	12,030.83		
Total Bill Charges			**52,312.80**			**72,185.00**	**19,872.20**	**37.99%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
3 inch / 75mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		10,750	10,750.00		13,550	13,550.00	2,800.00	26.05%
Sub Total			**49,641.33**	**Sub Total**		**66,244.17**	**16,602.83**	**33.45%**
PAM		7.29%	3,618.85		0.00%	-		
X-Factor		-6.20%	(3,302.13)		0.00%	-		
K-Factor		16.00%	7,993.29		20.00%	13,248.83		
Total Bill Charges			**57,951.34**			**79,493.00**	**21,541.66**	**37.17%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
4 inch / 100mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		17,370.0	17,370.00		21,890	21,890.00	4,520.00	26.02%
Sub Total			**56,261.33**	**Sub Total**		**74,584.17**	**18,322.83**	**32.57%**
PAM		7.29%	4,101.45		0.00%	-		
X-Factor		-6.20%	(3,742.49)		0.00%	-		
K-Factor		16.00%	9,059.25		20.00%	14,916.83		
Total Bill Charges			**65,679.54**			**89,501.00**	**23,821.46**	**36.27%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	100	388.91	38,891.33	100	526.94	52,694.17	13,802.83	35.49%
Service Charge		26,460.0	26,460.00		33,340.0	33,340.00	6,880.00	26.00%
Sub Total			**65,351.33**	**Sub Total**		**86,034.17**	**20,682.83**	**31.65%**
PAM		7.29%	4,764.11		0.00%	-		
X-Factor		-6.20%	(4,347.16)		0.00%	-		
K-Factor		16.00%	10,522.93		20.00%	17,206.83		
Total Bill Charges			**76,291.21**			**103,241.00**	**26,949.79**	**35.32%**

Commercial	November 2019 Bill - Before			November 2019 Bill - After				
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
Below 9,100,00	9100	388.91	3,539,111.31	9100	526.94	4,795,169.16	1,256,057.85	35.49%
Above 9,100,000	3000	388.91	1,166,739.99	3000	252.24	756,727.37	(410,012.62)	-35.14%
Service Charge		26,460.0	26,460.00		33,340.0	33,340.00	6,880.00	26.00%
Sub Total			**4,732,311.30**	**Sub Total**		**5,585,236.53**	**852,925.23**	**18.02%**
PAM		7.29%	344,985.49		0.00%	-		
X-Factor		-6.20%	(314,792.40)		0.00%	-		
K-Factor		16.00%	762,000.70		20.00%	1,117,047.31		
Total Bill Charges			**5,524,505.09**			**6,702,283.84**	**1,177,778.74**	**21.32%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
5/8 inch / 15mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**39,415.13**	**Sub Total**		**53,149.29**	**13,734.16**	**34.84%**
PAM		7.29%	2,873.36		0.00%	-		
X-Factor		-6.20%	(2,621.89)		0.00%	-		
K-Factor		16.00%	6,346.66		20.00%	10,629.86		
Total Bill Charges			**46,013.26**			**63,779.15**	**17,765.88**	**38.61%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
3/4 inch / 20mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		1,700.00	1,700.00		2,140.00	2,140.00	440.00	25.88%
Sub Total			**40,285.13**	**Sub Total**		**54,419.29**	**14,134.16**	**35.09%**
PAM		7.29%	2,936.79		0.00%	-		
X-Factor		-6.20%	(2,679.76)		0.00%	-		
K-Factor		16.00%	6,486.75		20.00%	10,883.86		
Total Bill Charges			**47,028.90**			**65,303.15**	**18,274.25**	**38.86%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
1 inch / 25mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		2,220.00	2,220.00		2,800.00	2,800.00	580.00	26.13%
Sub Total			**40,805.13**	**Sub Total**		**55,079.29**	**14,274.16**	**34.98%**
PAM		7.29%	2,974.69		0.00%	-		
X-Factor		-6.20%	(2,714.35)		0.00%	-		
K-Factor		16.00%	6,570.48		20.00%	11,015.86		
Total Bill Charges			**47,635.95**			**66,095.15**	**18,459.20**	**38.75%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
1 1/4 inch / 30mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		4,180.00	4,180.00		5,270.00	5,270.00	1,090.00	26.08%
Sub Total			**42,765.13**	**Sub Total**		**57,549.29**	**14,784.16**	**34.57%**
PAM		7.29%	3,117.58		0.00%	-		
X-Factor		-6.20%	(2,844.73)		0.00%	-		
K-Factor		16.00%	6,886.08		20.00%	11,509.86		
Total Bill Charges			**49,924.06**			**69,059.15**	**19,135.09**	**38.33%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
1 1/2 inch / 40mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		4,180.00	4,180.00		5,270.00	5,270.00	1,090.00	26.08%
Sub Total			**42,765.13**	**Sub Total**		**57,549.29**	**14,784.16**	**34.57%**
PAM		7.29%	3,117.58		0.00%	-		
X-Factor		-6.20%	(2,844.73)		0.00%	-		
K-Factor		16.00%	6,886.08		20.00%	11,509.86		
Total Bill Charges			**49,924.06**			**69,059.15**	**19,135.09**	**38.33%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
2 inch / 50mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		5,920.00	5,920.00		7,460.00	7,460.00	1,540.00	26.01%
Sub Total			**44,505.13**	**Sub Total**		**59,739.29**	**15,234.16**	**34.23%**
PAM		7.29%	3,244.42		0.00%	-		
X-Factor		-6.20%	(2,960.47)		0.00%	-		
K-Factor		16.00%	7,166.25		20.00%	11,947.86		
Total Bill Charges			**51,955.33**			**71,687.15**	**19,731.81**	**37.98%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
3 inch / 75mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		10,750.0	10,750.00		13,550.0	13,550.00	2,800.00	26.05%
Sub Total			**49,335.13**	**Sub Total**		**65,829.29**	**16,494.16**	**33.43%**
PAM		7.29%	3,596.53		0.00%	-		
X-Factor		-6.20%	(3,281.76)		0.00%	-		
K-Factor		16.00%	7,943.98		20.00%	13,165.86		
Total Bill Charges			**57,593.88**			**78,995.15**	**21,401.27**	**37.16%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After				
4 inch / 100mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		17,370.0	17,370.00		21,890.0	21,890.00	4,520.00	26.02%
Sub Total			**55,955.13**	**Sub Total**		**74,169.29**	**18,214.16**	**32.55%**
PAM		7.29%	4,079.13		0.00%	-		
X-Factor		-6.20%	(3,722.12)		0.00%	-		
K-Factor		16.00%	9,009.94		20.00%	14,833.86		
Total Bill Charges			**65,322.08**			**89,003.15**	**23,681.07**	**36.25%**

Condominium	November 2019 Bill - Before			November 2019 Bill - After			Change	
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	200	192.93	38,585.13	200	261.40	52,279.29	13,694.16	35.49%
Service Charge		26,460.0	26,460.00		33,340.0	33,340.00	6,880.00	26.00%
Sub Total			**65,045.13**	**Sub Total**		**85,619.29**	**20,574.16**	**31.63%**
PAM		7.29%	4,741.79		0.00%	-		
X-Factor		-6.20%	(4,326.79)		0.00%	-		
K-Factor		16.00%	10,473.62		20.00%	17,123.86		
Total Bill Charges			**75,933.75**			**102,743.15**	**26,809.40**	**35.31%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
5/8 inch / 15mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		830.00	830.00		870.00	870.00	40.00	4.82%
Sub Total			**25,026.79**	**Sub Total**		**33,654.41**	**8,627.63**	**34.47%**
PAM		7.29%	1,824.45		0.00%	-		
X-Factor		-6.20%	(1,664.78)		0.00%	-		
K-Factor		16.00%	4,029.83		20.00%	6,730.88		
Total Bill Charges			**29,216.30**			**40,385.30**	**11,169.00**	**38.23%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
3/4 inch / 20mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		1,700.00	1,700.00		2,140.00	2,140.00	440.00	25.88%
Sub Total			**25,896.79**	**Sub Total**		**34,924.41**	**9,027.63**	**34.86%**
PAM		7.29%	1,887.88		0.00%	-		
X-Factor		-6.20%	(1,722.65)		0.00%	-		
K-Factor		16.00%	4,169.92		20.00%	6,984.88		
Total Bill Charges			**30,231.94**			**41,909.30**	**11,677.36**	**38.63%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
1 inch / 25mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		2,220.00	2,220.00		2,800.00	2,800.00	580.00	26.13%
Sub Total			**26,416.79**	**Sub Total**		**35,584.41**	**9,167.63**	**34.70%**
PAM		7.29%	1,925.78		0.00%	-		
X-Factor		-6.20%	(1,757.24)		0.00%	-		
K-Factor		16.00%	4,253.65		20.00%	7,116.88		
Total Bill Charges			**30,838.98**			**42,701.30**	**11,862.31**	**38.47%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After				
1 1/4 inch / 30mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		4,180.00	4,180.00		5,270.00	5,270.00	1,090.00	26.08%
Sub Total			**28,376.79**	**Sub Total**		**38,054.41**	**9,677.63**	**34.10%**
PAM		7.29%	2,068.67		0.00%	-		
X-Factor		-6.20%	(1,887.62)		0.00%	-		
K-Factor		16.00%	4,569.25		20.00%	7,610.88		
Total Bill Charges			**33,127.09**			**45,665.30**	**12,538.21**	**37.85%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After				
1 1/2 inch / 40mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		4,180.00	4,180.00		5,270.00	5,270.00	1,090.00	26.08%
Sub Total			**28,376.79**	**Sub Total**		**38,054.41**	**9,677.63**	**34.10%**
PAM		7.29%	2,068.67		0.00%	-		
X-Factor		-6.20%	(1,887.62)		0.00%	-		
K-Factor		16.00%	4,569.25		20.00%	7,610.88		
Total Bill Charges			**33,127.09**			**45,665.30**	**12,538.21**	**37.85%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After				
2 inch / 50mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		5,920.00	5,920.00		7,460.00	7,460.00	1,540.00	26.01%
Sub Total			**30,116.79**	**Sub Total**		**40,244.41**	**10,127.63**	**33.63%**
PAM		7.29%	2,195.51		0.00%	-		
X-Factor		-6.20%	(2,003.36)		0.00%	-		
K-Factor		16.00%	4,849.43		20.00%	8,048.88		
Total Bill Charges			**35,158.37**			**48,293.30**	**13,134.93**	**37.36%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After				
3 inch / 75mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$			Change	
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		J$	%
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		10,750.0	10,750.00		13,550.0	13,550.00	2,800.00	26.05%
Sub Total			**34,946.79**	**Sub Total**		**46,334.41**	**11,387.63**	**32.59%**
PAM		7.29%	2,547.62		0.00%	-		
X-Factor		-6.20%	(2,324.65)		0.00%	-		
K-Factor		16.00%	5,627.16		20.00%	9,266.88		
Total Bill Charges			**40,796.91**			**55,601.30**	**14,804.38**	**36.29%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
4 inch / 100mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		17,370.0	17,370.00		21,890.0	21,890.00	4,520.00	26.02%
Sub Total			**41,566.79**	**Sub Total**		**54,674.41**	**13,107.63**	**31.53%**
PAM		7.29%	3,030.22		0.00%	-		
X-Factor		-6.20%	(2,765.01)		0.00%	-		
K-Factor		16.00%	6,693.12		20.00%	10,934.88		
Total Bill Charges			**48,525.11**			**65,609.30**	**17,084.19**	**35.21%**

Primary School	November 2019 Bill - Before			November 2019 Bill - After			Change	
6 inch / 150mm	2013 - 2019 Rates J$			2019 _ 2021 Rates J$				
Description	Usage: litres "000"	Rate (J$)		Usage: litres "000"	Rate (J$)		**J$**	**%**
All Quantities	155.53	155.58	24,196.79	155.53	210.79	32,784.41	8,587.63	35.49%
Service Charge		26,460.0	26,460.00		33,340.0	33,340.00	6,880.00	26.00%
Sub Total			**50,656.79**	**Sub Total**		**66,124.41**	**15,467.63**	**30.53%**
PAM		7.29%	3,692.88		0.00%	-		
X-Factor		-6.20%	(3,369.68)		0.00%	-		
K-Factor		16.00%	8,156.80		20.00%	13,224.88		
Total Bill Charges			**59,136.79**			**79,349.30**	**20,212.51**	**34.18%**

ANNEX 6: LIST OF WASTEWATER PROJECTS COMPLETED

Parish	Project Name	Expenditure (J$M)
St. Mary	Boscobel (CREW)	341
KSA	Harbour View WWTP Replacement	1,122
KSA	Lot F, Downtown Kingston Sewerage Extension	1,275
St. Catherine	Portmore Sewerage Reconfiguration Project	2,368
KSA	Sanitary Collection Sewers Barbican Road/Cedar Valley/Standpipe Lane/Ravinia/College Green	33
St. Thomas	Yallahs Wastewater Stabilization Ponds	45
	Total	*5,183*

ANNEX 7: LIST OF NRW REDUCTION PROJECTS COMPLETED

Parish	Project Name	Expenditure (J$M)
St. Elizabeth	Brucefield to Babury Hill	63
St. Elizabeth	Burnt Savanna/Knoxwood Water Supply Mains Replacement and Upgrading	80
Islandwide	Consumer Metering Installation/ según Work In Progress Meters	553
Trelawny	Georgia to Silversand/ Según NWC Clarks Town Duncans Pipeline Project	45
KSA	Jamaica Water Supply Improvement Project - Category B	3,936
Portland	Port Antonio Water Supply Sewage and Drainage	358
Islandwide	Production Metering - Phase 1/ NWC KSA-Bulk Meter Installation Lot 1a	130
St. Thomas	Prospect Pen	8
St. Mary	Retreat Phase 1 - St. Mary	69
St. Elizabeth	Santa Cruz Water Supply Phase 1B	20
St. Ann	Seville Water Supply – Tank Replacement	15
Westmoreland	Whitehouse Pipeline Replacement	208
Clarendon	Woodside to Guinep Tree/ May Pen W/S Rehabilitation & Upgrading Project	35
	Total	*5,519*

ANNEX 8: LIST OF ONGOING WASTEWATER PROJECTS

Parish	Project Name	Expenditure (J$M)
KSA	Acadia (CReW)	37
KSA	Bay Farm Villa (CReW)	57
St. Catherine	Blackwood Gardens (CReW)	119
KSA	Constant Spring Sewers	200
St. Catherine	De La Vega City Housing (CReW)	59
KSA	Dillsbury/Millsborough Avenue Sewer Extension Project - KSA	19
St. Catherine	Greater Portmore Ponds & Constructed Wetlands	100
Clarendon	Horizon Park	2
KSA	Hughenden (CReW)	89
Clarendon	Lionel Town Housing Scheme (CReW)	107
Clarendon	Mineral Heights	2
KSA	Papine-Mona Sewerage Project	62
KSA	Rehabilitation of the Old Hope Road Sanitary Collector Sewer	5
KSA	Sewerage of Seymour Lands/Trafalgar Park/New Kingston - The construction of Fair View/Seymour/Retreat Avenue Collector Sewer	3
Trelawny	Vanzie Lands	5
	Total	867

ANNEX 9: LIST OF ONGOING NRW REDUCTION PROJECTS

Parish	Project Name	Expenditure (J$M)
St. Mary	Agualta Vale Supply Mains Replacement & Upgrading	105
St. Elizabeth	Black River and Greater Black River Pipeline Replacement	4
Hanover	Cascade/Claremon/Jericho W/S	313
Hanover	Chichester Shettlewood Water Supply - Hanover	14,64
Trelawny	Clarks Town to Georgia Mains Replacement	163
Trelawny	Dornoch to Baron Hill Water Supply	2
Westmoreland	Eastern Westmoreland Water Supply Upgrading	91
Manchester	Greater Mandeville Water supply	10
KSA	Hope High Level - St Andrew	9
Clarendon	Mason River/Kellits/Sandy River Water Supply Scheme	177
Manchester	Melrose Mews –Manchester	8
St. Catherine	Mount Royal Estate Housing Development -St Catherine	8
Westmoreland	Non-Pariel Water Supply Mains Replacement and Upgrading	395
St. Elizabeth	Parklee/Mountainside -St James	8
St. Elizabeth	Phoenix Park Housing Development	9
Westmoreland	Roaring River/Savanna-la-Mar and Greater Savanna-la-Mar Water Supply	6
Trelawny	Sherwood Content	7
Islandwide	Tanks and Pump Rehabilitation for Operational Efficiency	613
Hanover	Western Hanover Water Supply	1
	Total	*1,927*

ANNEX 10: LIST OF MIDP PROJECTS

Parish	Project Name	Type	Project Cost J$m
Clarendon	MIDP - Clarendon Water Supply	Water	361
KSA	MIDP - Constant Spring Road Water Supply & Sewerage	Water & Sewerage	1,264
KSA	MIDP - Hagley Park Road Water Supply & Sewerage	Water & Sewerage	756
KSA	MIDP - Mandella Highway Water Supply (Pipeline Replacement)	Water	1,000
KSA	MIDP - Other KSA Water Supply	Water	118
St. Elizabeth	MIDP - St. Elizabeth Water Supply	Water	144
Westmoreland	MIDP - Westmoreland Water Supply	Water	84
Total			3,726