Schedule of Audit : 1st March 2017 – 10th May 2017

Date of Issue: 14th August 2017

Period covered by Audit: 2010 to 2016

Name of Agency

and National Environment Commission Secretariat (NECS)

No.	Recommendations	Action taken (as per the detailed action plan/report submitted by Thimphu Thromde)	Status/progress of corrective actions taken by the auditee agency (RAA's further Comments)	Reasons for non- completion of action (RAA's further Comments)
4.1	Thimphu Thromde should provide reliable and equitable water supply to its population Analyzing the water received in each zone of Thimphu Municipality as against the required amount, it was noted that the zones received varying amount of drinking water ranging from 28% to 94% of the requirement depicting inequity in water supply. Further, some areas do not have Thromde's water connection at all	For area - IX: Thimphu Thromde has already initiated the construction of adequate number of service tanks in the following locations which are in conformation with RAA's findings and recommendations. NIT has been floated for construction of a 230cum capacity tank at Zilukha. Kawajangsa is already supplied from tank located at Kuengacohling and additionally, there is already an existing 50cum tank for Kawajangsa which is fed from Dzong tank by	Partially Implemented While the RAA is appreciative of the various actions taken by the management through the construction of water tanks it is to reiterate that there is still a need to have a strategic plan to provide reliable and equitable water supply.	The RAA has noted that various water supply tanks are being constructed to provide reliable and equitable water supply to its population. However, with regard to some areas that do not have Thromde's water connection at all despite having enough
	despite having enough water produced to meet the required amount of water.	pumping. Area -VII: Process for construction of 230 cum tank at Changedaphu and 100 cum tank at		water produced to meet the required amount of water, nothing has been

: Thimphu Thromde, RCDC, Ministry of Health (MoH), Ministry of Works and Human Settlement (MoWHS)

	Changzamtog has already been initiated. Two	intimated on the action
The RAA also noted inadequate	tanks have been recently constructed for	taken on this matter.
storage capacity of service tanks	Changzamtog and Changedaphu located at	And at the same time to
leading to water shortages in certain	Karisha above old RICB colony and at	ensure reliable and
areas. Strategic water distribution	Changedaphu. The capacities are 100 and 50cum	equitable drinking
plan considering the size and	respectively.	water considering the
density of population, area and		size and density of
different user groups to ascertain	Area - V: A new 230cum tank has been	population, area and
the amount of water supply required	constructed at Langjuphaka under the World	different user groups to
for each zone in order to ensure	Bank funding. Further enhancement of the	ascertain the amount of
reliable and equitable drinking	storage capacity by another 230cum for the whole	water supply required
water. Thromde should also	Langjuphaka area is included in the scope of the	for each zone, nothing
construct adequate numbers of	ongoing central water supply project.	has been mentioned in
service tanks proportionate to water		the reply to RAA.
requirement.	Area - IV: A 100 cum tank is being constructed	W7L-11- di-
	which will be located at Sunday market to	While the
	enhance the service tank storage capacity.	recommendation is also
	Area - II: A 230cum service tank is being	to have adequate
	constructed at Changjiji to increase the existing	number of service
	storage capacity.	tanks, it is partially also
		to formulate a strategic
	Thimphu Thromde is in the process of	water distribution plan.
	implementing the work of providing extended	Therefore, para has
	new distribution pipelines in Changzamtog,	been treated as partially
	Yangchenphu, Zilukha, in the core city areas of	implemented since a thorough study still
	Changlam, Norzinlam including old pipe	thorough study still
	replacement works covering the areas of	needs to be carried out
	Changzamtog, Changangkha and Kawajangsa.	to have equitable and

				reliable water supply.
4.2	ThimphuThromdeshouldestablisharobustsystemtomonitorandsupervisethewaterdistributionnetworkAbsenceofmonitoringsystemforwatersourcesandthedistributionnetworkhasledtohugelossofwater,waterrevenueandinterruptioninwatersupply.Toensurequalityandreliablesupply.Toensuredistributionnetwork, thereshouldberobustmonitoringsystemestablishedforwaterdistributionnetworks.TheThromdeshouldcomeupwithcomponentsofmonitoringsystemsuchasmonitoringsystemsuchasmonitoringsystemsuchasmonitoringsystemsuchasmonitoringsystemsuchas	Refer letter No. TT/ID/WSS/2017-2018/3087 dated 11/1/2018. Thromde appreciates and recognizes the need for a robust water supply distribution monitoring system. Realizing this, Thromde has already requested and discussed with the World Bank mission in July 2017 to conduct a diagnostic study of Thromde water services. Based on the outcome result of the diagnostic study, necessary monitoring system shall be set up which shall include all aspects of water supply distribution monitoring components with appropriate institutional setup, standards and protocol, monitoring on a sustainable basis.	Partially Implemented The RAA noted that works are already under progress through a diagnostic study to ensure established monitoring system in place including monitoring standards and protocol, formation of monitoring team, schedule and reporting, etc.	reliable water supply. The recommendation shall be treated as partially implemented until the aforementioned study is completed and measures appropriately implemented in relation to the monitoring and supervision of the water distribution network.
	formation of monitoring team, schedule and reporting, etc. to have established system in place.			
4.3	Thimphu Thromde should	Refer letter No. TT/ID/WSS/2017-2018/3087	Partially Implemented	The RAA has noted
	maintain and safeguard water	dated 11/1/2018.	.	that the issue shall be
	distribution network	The proposal for diagnostic study of Thromde	It has been noted that geo-coordinated	addressed through the diagnostic study on

Several inadequacies were noted in	water services include all the components	network data of the	Thromde Water
the water distribution network	mentioned under recommendation 4.3 that	water distribution	services conducted by
relating to infrastructure and water	Thromde should maintain and safeguard water	system for use in GIS is	the World Bank. Since
protection such as inappropriate	distribution network. The specific issues to be	being developed.	the issue has already
laying of water distribution pipes	considered are developing geo-coordinated		been conceptualized
and Installation of water meters,	network data of the water distribution system for		and measures initiated
improper fencing at water source	use in GIS, metering of all the water production		to maintain and
and service tanks and non-	outlets from water treatment plants, service tanks		safeguard water
functional bulk meters . In order to	including metering all service connections to		distribution network
address the inadequacies noted,	monitor and take remedial measures to reduce the		the para shall be treated
Thimphu Thromde should develop	non-revenue water and to facilitate water audit.		as partially
blueprint of water network system,	Fencing of intake/intake structures, service tank		implemented.
conduct periodic maintenance of	compounds including compound lightings to		However, the Thromde
water distribution network	ensure water safety shall be implemented on		should intimate RAA
infrastructure and develop	priority. Active leak detection system, monitoring		until actual
guidelines on water meter	of distribution network based on the best		implementation is
installation.	practices, standard operating procedures,		done.
	guidelines on water meter installations shall be		
	developed and implemented. The need to make		
	provision of facilities such as meter test bench for		
	testing and calibration of water meters, meter		
	repairing workshop etc. the need to set up a		
	dedicated workshop for operation and		
	maintenance of water supply infrastructure are		
	being considered.		

4.4	Irregularities noted in water	Refer letter No. TT/ID/WSS/2017-2018/3087	Not Implemented	No substantial action
	network system should be	dated 11/1/2018.		has been taken to
	corrected		The RAA has noted that	implement the
		Actions have already been initiated by the	the customer service	recommendation.
	Instances of irregularities such as	customer service centre to streamline the	centre has initiated	Irregularities such as
	unauthorized tapping of water,	deficiencies in line with the water regulation of	discussion to streamline	unauthorized tapping of
	water connection bypassing	Bhutan 2014. It has already been discussed that a	the deficiencies by	water, water connection
	meters, water connection from	separate rules and regulations need to be prepared	coming up with a	bypassing meters,
	transmission lines, allowing more	specific to Thromde based on the water regulation	separate rules and	water connection from
	than one connection per dwelling	to address the irregularities and institute	regulations specific to	transmission lines,
	and diversion of water supply to	corrective measures with regard to water	Thromde. However, the	allowing more than one
	community tanks were noted in the	connections and metering.	Thromde has not taken	connection per
	process of audit.		any appropriate actions	dwelling and diversion
			on the irregularities	of water supply to
	Thimphu Thromde should further		noted in the report	community tanks needs
	investigate and take appropriate		because Customer	to be corrected and
	action immediately. In addition, the		Service centre was	intimated to RAA.
	Thromde should also institute		already there in place.	
	corrective measures in order to		Therefore, proper action	Until Thimphu
	prevent such cases in the future.		plan with document	Thromde intimates
			evidences are required	RAA with proper
			in order to implement	implementation status,
			the recommendation.	it shall remain as not
				implemented.
4.5	Thimphu Thromde should	Refer letter No. TT/ID/WSS/2017-2018/3087	Partially Implemented	
	develop comprehensive and	dated 11/1/2018.		The RAA has noted
	accurate database on buildings		The RAA has noted that	that the Thromde has
	and water meters	Development of accurate database on buildings is	the Thromde intends to	requested the World

	long overdue and is being considered for a	address the issue	Bank to carry out
Maintaining a comprehensive and	detailed survey. Development of comprehensive	through World Bank	diagnostic study on
up to date database on property	and accurate data with regard to water meters	conducted diagnostic	Thromde Water
holdings and issuance of water	shall be addressed as recommended. The	study on Thromde	services.
	C	study on Thromde	
Thromde in effective planning and			
decision making in water supply			
management. Thus, Thimphu			
Thromde should develop			
comprehensive and accurate			
database on building and water			
meters.			

4.6	Thimphu Thromde should	Refer letter No. TT/ID/WSS/2017-2018/3087	Not Implemented	Thimphu Thromde is
	develop clear job roles and	dated 11/1/2018.		yet to come up with
	responsibilities for the officials		Until Thimphu Thromde	clear job roles and
	working in Water Supply Section	One of the components identified in the proposed	intimates RAA with	responsibilities for the
		diagnostic study of Thromde water services is to	proper implementation	officials working in
	To ensure efficient and effective	review the institutional capacity. In particular, the	status, it shall remain as	Water Supply Section.
	delivery of mandates of	human resource requirement to enable effective,	not implemented.	
	organization, divisions and sections	efficient and professional delivery of water		Therefore, the
	should clearly understand their	supply services. Thromde management shall		recommendation shall
	roles and responsibilities. There	seriously review the issue of the need to develop		remain as not
	should be formal instructions for all	clear job roles and responsibilities. Assess and		implemented.
	units in the organization on how	review the existing capacity of human resource		
	businesses are to be conducted. It	with emphasis on the qualification and experience		
	shall be the collective responsibility	of Thromde engineers, technicians, operators,		
	of officials in the organization to	plumbers and other staff engaged in the		
	facilitate achievement of	management, operation and maintenance of water		
	Organizational goal.	supply. The available strength of existing		
		technical staff under Thromde shall be reviewed		
	Thimphu Thromde should develop	and necessary changes shall be implemented to		
	clear job roles and responsibilities	ensure effective delivery of water services.		
	for each position in Water Supply			
	Section with accountability to			
	address many inadequacies noted in			
	this audit such as ineffective			
	monitoring of the water network			
	system, delay in providing water			
	related services, inefficiency in			
	addressing complaints,			

	inadequacies in monitoring of water quality, etc.			
4.7	Water meter needs to be installed	Refer letter No. TT/ID/WSS/2017-2018/3087	Partially Implemented	
	for every water connection	dated 11/1/2018.		However, there were
	provided by Thromde and		Thimphu Thromde	no justifications
	accordingly charged.	The water metering has been completed and the	reported that water	provided for the
		bills have been raised for Babesa, Lungtenphu	meters are installed and	forgone government
	Thromde's drinking water supplied	and Olakha areas. Meters have been installed for	billings started in	revenue of Nu. 20.37
	to Babesa, Lungtenphu and Olakha	commercial car washing units having Thromde	Babesa, Lungtenphu and	million.
	from Megaypang water treatment	water supply and bills are raised.	Olakha areas and	
	plant since November 2014 was		commercial car washing	Hence, RAA awaits
	never charged. Furthermore,		units.	justifications from
	commercial car washing units did			Thimphu Thromde and
	not have water meters installed			accountability for the
	despite having Thromde's water			revenue forgone from
	supply. As a result, there was a loss			the Thromde. Until
	of government revenue amounting			then the
	to Nu. 20.37 million. Thimphu			recommendation shall
	Thromde should ensure to install			remain partially
	water meter for every water			implemented.
	connection provided and also			
	justify for the forgone revenue.			
4.8	Thimphu Thromde should	Refer letter No. TT/ID/WSS/2017-2018/3087	Partially Implemented	
	provide adequate water supply in	dated 11/1/2018.		
	order to discontinue private and		Thimphu Thromde has	
	community connections	Implementation process has already been initiated	initiated to centralise the	initiated and still under
		to facilitate gradual discontinuation of private and	water sources and there	process, the
	The residents in Thimphu Thromde	community water connections through provision	are also plans to	recommendation shall

currently gets water supply from	of adequate water supply by Thromde.	gradually discontinue	remain as partially
three sources viz. Thromde's water		usage of private and	implemented. Thimphu
supply, privately and community	a. Improvement in system input include the	community connections	Thromde should
obtained water supply. Some	ongoing central water supply scheme funded by	by providing adequate	complete the works as
residents just have one of the three	world Bank, enhancement of existing storage	water supply from	assured and intimate
water connections while the others	capacities through construction of tanks, network	Thromde.	RAA.
have combination of two or all	extension for coverage and replacement of		
three of them. As per the Section 90	pipelines including rehabilitation of existing		
of the Water Regulation of Bhutan	water infrastructure.		
2014, Thromde's water supply			
should be the only source of potable	b. Improvement in demand management such as		
water supply and all other water	monitoring of distribution network, connections,		
supply should be discontinued	active leak detection, waste control and metering		
when Thromde supplies adequate	water supplied from the water treatment plants		
water. Therefore, the Thromde	and service tanks and ensuring 100% metering		
should have plans to provide	all connections.		
adequate water supply to all and	c. Ensuring the quality of drinking water supply		
eventually discontinue the private	through enhanced coordination with RCDC		
and community water supply	which include taking prompt actions to remedy		
connections.	and minimize the risk and hazards associated		
Franken melter of trialing moder	with contamination of water supplies.		
Further, quality of drinking water	5 11		
from the private and community			
source are grossly polluted, thus the			
concerns for human health also warrants discontinuation.			
warrants discontinuation.			

4.9	Coordination amongst the	Refer letter No. TT/ID/WSS/2017-2018/3087	Not Implemented	
	relevant agencies and authorities	dated 11/1/2018.		
	should be strengthened		Until Thimphu Thromde	Action taken if any has
		Thromde shall initiate and coordinate the revival	intimates RAA with	not been intimated to
	The Water Act of Bhutan 2011	of National Water Resource Board (NWRB)	proper implementation	RAA.
	envisions the holistic management	comprising MoWHS, NECS, MoH and Thimphu	status, it shall remain as	
	of water resources requiring	Thromde for making informed decision on water	not implemented.	
	collaboration and cooperation of all	and its development.		
	key stakeholders for making			
	informed decision on water and its			
	development. The main agencies			
	involved in provision of drinking			
	water in Thimphu Municipality			
	include Ministry of Works and			
	Human Settlement (MoWHS),			
	Ministry of Health (MoH), National			
	Environment Commission			
	Secretariat (NECS), and Thimphu			
	Thromde. Recognizing the			
	importance of effective			
	coordination, National Environment			
	Commission formed the National			
	Water Resources Board (NWRB)			
	comprising of all the stakeholders.			
	Since NWRB was inactive from			
	2014, the NECS should initiate to			
	revive the NWRB and ensure they			
	function as per the Water			

	Regulation of Bhutan 2014.			
4.10	The Ministry of Works and Human Settlement (MoWHS) should develop the master plan for drinking water supply As required by the Water Regulation of Bhutan 2014, the MoWHS should develop master plan for the national drinking water and wastewater management system for Thromde in consultation with local government in order to identify available options to ensure sufficient water for future generations. The plan would also provide clear strategic direction and holistic approach in the management of water supply system in the country.	Refer letter No. TT/ID/WSS/2017-2018/3087 dated 11/1/2018. Thimphu Thromde has prepared a Draft Water Master Plan for Thimphu Thromde water supply. Since the Ministry of Works and Human Settlement is mandated to develop the national drinking water management system for Thromde in consultation with local government, Thimphu Thromde shall make an official request to the Ministry to develop the drinking water master plan for Thimphu Thromde.	Partially Implemented The audit follow up team on 28 th March 2018 verified that a Draft Water Master Plan for Thimphu Thromde water supply was drafted by Thimphu Thormde in consultation with MoWHS.	The para shall remain partially implemented until a comprehensive Water Master Plan is prepared, approved and the actions taken in accordance to the plans.
4.11	TheNationalEnvironmentCommissionSecretariat (NECS)shouldfinalizetheWaterWaterNeentoryWaterResourcesInventoryWaterResourcesInventoryisthe	ReferletterNo.TT/ID/WSS/2017-2018/3087dated 11/1/2018.TheNationalEnvironmentCommissionSecretariat shall be officially requested to finalizethewaterresourceinventoryforThimphuThromde.ThimphuThromde isprepared to	<u>Not Implemented</u>	Action taken if any has not been intimated to RAA. Until Thimphu Thromde intimates RAA with proper

	study carried out on the availability of water from different sources and its quality aspects. Having water resources inventory would help in providing information in proper allocation of water from various sources to meet the current and future water needs. Till the date of audit, the inventory on water resources conducted by the NECS was found to be in the draft form. Thus, the NECS should immediately finalize the Water Resources Inventory.	render all necessary inputs that may be required for finalizing the water resource inventory.		implementation status, the status shall remain as not implemented.
4.12	Thimphu Thromde and the Royal Centre for Disease Control (RCDC) should ensure routine testing of the water quality The Thromde does not carry out the water quality tests on regular basis especially in the South Thimphu. Further, there was no test conducted for the private and community water supply by the Thromde, except for few tests in schools and institutes by Royal Centre for Disease Control (RCDC). Absence	Refer letter No. TT/ID/WSS/2017-2018/3087 dated 11/1/2018. Thromde carries out regular water quality tests at the water treatment plants for raw as well as treated water and at the service tanks. Although water quality tests are done at the Megaypang/ Chamgang water treatment plant, there is no water quality testing done at the service tanks under this treatment plant as mentioned in the findings. The RCDC has been testing the water quality for schools and institutions and the reports are shared with Thimphu Thromde. Thimphu Thromde shall pursue in institutionalizing and enhancing the existing coverage of water quality	<u>Partially Implemented</u>	 While water testing is conducted, there is a lack of systematic process for carrying out the testing, monitoring and reporting on water quality. Therefore, Thimphu Thromde should ensure compliance to Bhutan Drinking Water Quality Standard 2016 and Water Safety Plan.

	of regular testing could lead to	testing for water supplied by Thromde including		Until such actions are
	0			
	provision of unsafe drinking water	schools and institutions within its jurisdiction.		taken and status
	which in turn could trigger outbreak	Schools and institutions which do not have access		informed to RAA with
	of water-borne diseases. Therefore,	to Thromde water supply are being reviewed for		documentary evidence,
	the Thromde and the RCDC should	actions to be taken to ensure safety of drinking		the recommendation
	institute system to conduct water	water supply for which, Thromde Education		shall be treated as
	quality testing regularly as required	Office shall be spearheading the necessary		partially implemented.
	by the WSP to ensure that the water	actions to be taken in collaboration with operation		
	supplied is safe at all times. Special	and maintenance of water supply. The water tests		
	attention should be given to test the	shall then be conducted regularly as required by		
	water quality of schools, institutes	the Bhutan Drinking Water Quality Standard		
	and hospitals irrespective of the	2016. Thimphu Thromde shall also increase and		
	water supply source.	establish water sampling stations within the water		
		distribution system to monitor water quality.		
		Besides, these sampling stations shall facilitate		
		RCDC to carry out their surveillance effectively.		
		Implementation of activities identified in the		
		water safety plan shall be carried out on priority.		
4.13	Thimphu Thromde in		Not Implemented	
	collaboration with the Royal	dated 11/1/2018.		
	Centre for Disease Control		The RAA has noted that	1
	(RCDC) should institute		the Bhutan Drinking	Royal Centre for
	monitoring and reporting	There was no institutionalized system of	Water Quality Standards	Disease Control
	mechanism on water quality	reporting and action taken reports on the water	2016 will be	(RCDC) has not
		quality test results conducted by RCDC.	implemented with effect	instituted monitoring
	The report on the water quality tests	However, the water service providers are required	from July 2017.	and reporting
	conducted by technicians was	to comply with the Bhutan Drinking Water	However, Thimphu	mechanism on water
	neither monitored nor the result was	Quality Standards 2016 with effect from July	Thromde & RCDC has	quality.

	submitted for review. Furthermore, there was no action taken on the test results despite showing high presence of faecal coliform and residual chlorine. In absence of monitoring and reporting mechanism, appropriate treatment	2017. Monitoring and reporting system shall be implemented as required by the standard.	not instituted monitoring and reporting mechanism on water quality.	Hence, the recommendation shall remain as not implemented until Thimphu Thromde intimates RAA with
	and timely actions cannot be taken if the water is contaminated. Therefore, Thromde in collaboration with RCDC should institute proper monitoring and reporting mechanism on water quality.			proper implementation status.
4.14	Thimphu Thromde should	Refer letter No. TT/ID/WSS/2017-2018/3087	Partially Implemented	Thimphu Thromde has
	strengthen the storage facilities for water treatment chemicals It was observed there was lack of proper storage facilities for the chemicals used for water treatment, thereby deteriorating the chemical stability by exposing to direct sunlight. In some cases, it was also found stored at Caretakers' house posing risks to the families' of the	dated 11/1/2018. Storage facilities have been provided for chemicals at Motithang, Jungshina and at Megaypang/Chamgang water treatment plants. However, the storage facility provided at Dechencholing treatment plant is inadequate. The provision of necessary facilities shall be made for safe storage of chemicals at the treatment plants. In addition to the above, it is required to develop adequate space for conducting laboratory tests including safe storage of laboratory equipment	Storage facilities for chemicals were provided in many water treatment plants. However, few were found to be inadequate. Until such time the recommendation has been implemented and intimated to RAA, it shall remain as partially	provided storage facilities for chemicals at Motithang, Jungshina and Chamgang water treatment plants. However, storage treatment plant at Dechencholing and reservoir tank at YHSS was found inadequate.

caretakers. Therefore, Thimphu
Thromde should have appropriate
storage facilities for the chemicals.
.15 Thromde should ensure that
 113 Inromae should ensure that expiry and manufactured dates are labelled on the chemicals/reagents and refrain from using expired chemicals It was observed that most disinfectants and chemicals used for water treatment and quality testing were not labelled with expiry and manufactured dates. In the case of Megaypang WTP, expired reagents were used for water quality testing. The expired reagents could lead to generation of wrong reports and it may not have the intended potency to affect the level of Contamination in the water. Therefore, the Thromde should ensure that the expiry and manufactured dates are labelled on the disinfectants and reagents.