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ROYAL AUDIT AUTHORITY



Audit on Waste Management



Environment

Audit  
Report

Reporting on Economy, Efficiency & Effectiveness

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reuse  
reduce  
reuse  
recycle





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**ROYAL AUDIT AUTHORITY**  
*Bhutan Integrity House*

Reporting on Economy, Efficiency & Effectiveness in the use of Public Resources



RAA (TAD-EAS) Trans/2007-08/8813

27<sup>th</sup> June 2008

**The Hon'ble Minister**  
**Ministry of Health**  
**Thimphu**

**Subject: Environmental Audit Report on Medical Waste Management (JDWNRH, Thimphu and Phuentsholing General Hospital)**

Your Excellency,

As mandated by the Audit Act of Bhutan 2006, the Royal Audit Authority conducted the environment audit of the medical wastes of JDWNRH, Thimphu and Phuentsholing General Hospital. The audit was conducted using the concepts of performance auditing. Accordingly, the Royal Audit Authority is pleased to enclose herewith a report on the **Environmental Audit of Medical Wastes in JDWNRH, Thimphu and Phuentsholing General Hospital** for Your Excellency's kind perusal and appropriate action.

The report contains executive summary, observations (common and specific to the respective hospitals) and the recommendations thereof.

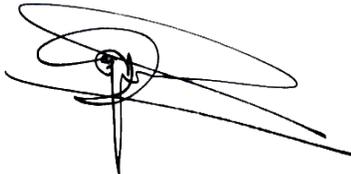
The audit was conducted to review and assess the management of medical wastes in the Thimphu and Phuentsholing hospitals. Based on the review of documents, physical observations, discussions, interviews and comparison with best practices around the world, the RAA has made recommendations that may be desirable for the efficient and effective management of wastes in these two hospitals. With the similar nature of problem, the report is also expected to benefit other hospitals and Basic Health Units in the country. Therefore, an effort has been made to forward copies of report to other major hospitals in Bhutan.

The RAA would appreciate if Your Excellency could kindly direct the respective hospitals to submit a detailed action plan report with clear and definite time frame for studying and implementing the audit recommendations and initiating any other corrective measures to streamline the management of wastes in these two hospitals, on or before 25<sup>th</sup> August 2008.

*"Every individual must strive to be principled. And individuals in positions of responsibility must even strive harder."*  
- His Majesty The King Jigme Khesar Namgyel Wangchuck

We would like to acknowledge the cooperation and assistance extended to the audit team by the officials of the two hospitals and other relevant agencies which facilitated the timely completion of audit.

Yours respectfully,



(Ugen Chewang)

**Auditor General**

**Copy to:**

1. The Hon'ble Prime Minister, Royal Government of Bhutan, Thimphu;
2. The Hon'ble Minister, Ministry of Works and Human Settlement, Thimphu
3. The Hon'ble Minister, Ministry of Finance, Tashi chho Dzong, Thimphu;
4. The Hon'ble Minister, Ministry of Home and Cultural Affairs, Tashi chho Dzong, Thimphu;
5. The Hon'ble Deputy Minister, National Environment Commission, Thimphu;
6. The Secretary, Ministry of Health, Thimphu;
7. The Secretary, GNH Commission, Thimphu;
8. The Secretary, Ministry of Works and Human Settlement;
9. Dasho Dzongdags of all 20 Dzongkhags;
10. Executive Secretary, Thimphu City Corporation
11. Thrompon, Phuentsholing City Corporations
12. Chief Medical Officer, RBA (HQ), Lungtenphu
13. The Medical Superintendent, JDWNRH, Thimphu;
14. The Medical Superintendent, Phuentsholing General Hospital, Phuentsholing;
15. The Medical Superintendent, Regional Referral Hospital, Mongar;
16. The Medical Superintendent, Gelephu General Hospital, Gelephu;
17. The Medical Superintendent, Samtse General Hospital;
18. District Medical Officers (DMO), Bumthang, Tsimalakha, Lhuentse, Paro, Pemagatshel, Punakha, Samdrupjongkhar, Samtse, Gomtu, Sipsoo, Sarpang, Gidakom, Trashigang, Riserboo, Trashiyangtse, Trongsa, Tsirang, Yebilaptsa
19. The Chief Audit Officer, SCID, RAA, Thimphu.
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Every Bhutanese is a trustee of the Kingdom's natural resources and environment for the benefit of the present and future generations and it is the fundamental duty of every citizen to contribute to the protection of the natural environment, conservation of the rich biodiversity of Bhutan and prevention of all forms of ecological degradation including noise, visual and physical pollution through the adoption and support of environment friendly practices and policies”.

***The Constitution of the Kingdom of Bhutan***

#### **DISCLAIMER NOTE**

The coverage of this audit does not include financial auditing. The audit was confined to management of waste within two municipalities of Thimphu and Phuentsholing and does not include chemical, agricultural and electronic wastes. The audit was conducted in conformity with economy, efficiency & effectiveness of the activity. This audit was based on Audit Planning set by the Royal Audit Authority and facts & information made available and accessible to the audit team by the City Corporations, Thimphu and Phuentsholing.

This is also to state that the auditors during the audit had neither yielded to pressure, nor dispensed any favor or resorted to any unethical means that would be considered as violation of the Royal Audit Authority's Code of Good Conduct, Ethics and Secrecy.

**TITLE SHEET**

1. REPORT : Report on Waste Management of Thimphu and Phuentsholing Municipalities

2. EXECUTING AGENCY : Thimphu and Phuentsholing City Corporations, Ministry of Works and Human Settlement, Thimphu.

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4. PERIOD COVERED BY AUDIT : January 2004 to December 2007

5. SCHEDULE OF AUDIT : December 2007 to February 2008

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## 1

## Executive Summary

*Why audit waste?*

Bhutan is situated within top ten global hotspots of eastern Himalayas. We are today known to the outside world more for the contributions we have made towards environment than for any other modern developments and inventions. It is in this respect that Bhutan has earned the image of ‘*Champions of the Earth*’ for preserving its pristine Environment. What more can one hope for in the area of conservation when the Constitution of the Kingdom of Bhutan in itself ensures maintenance of a minimum of sixty percent of Bhutan’s total land under forest cover for all time to come.

While we can take pride in achieving such monumental heights, we can not afford to remain complacent. Today the reality is that we are faced with many environmental challenges. One such pressing issue is the waste management.

Generation of waste is an inevitable aspect of modern development. With rapid urbanisation, change in consumption pattern and drifting rural-urban migration, the challenges in managing waste has far surpassed the municipal authority’s capacity and competency to manage it. Generation and composition of waste has increased by manifolds over the last decades.

Therefore, the Royal Audit Authority embarked on auditing this critical issue hoping to add value by recommending best practices of waste management. The audit was focused on two growing municipalities of Thimphu and Phuentsholing. Nevertheless, RAA hopes that these recommendations, if practical can be replicated to other emerging municipalities and aid them in managing solid waste in much systematic and scientific manner.

**The main objectives of the audit were:**

- To establish the composition and quantities of generation of wastes;
- To measure the effectiveness of existing waste management systems; and
- To identify opportunities for improving waste management systems and strategies.

*What RAA found?*

The team visited Thimphu and Phuentsholing City Corporations and applied the normal auditing techniques such as review of documents, interviewing, personal observation and walk-through tests of the system. Audit findings are categorized into common and specific observations. The common ones are those which are common to both the municipalities and others are specific to individual municipality. The significant findings are briefly stated below;

- ↻ Both the municipalities have not maintained any records on solid waste. In absence of such records RAA was not able to conduct proper audit of the waste management system.
- ↻ There were multiple agencies involved in framing policies, rules and regulations with no proper co-ordination among themselves. The rules and regulations at times were found to be inconsistent and vague.
- ↻ The existing Rules and Regulations on solid waste, despite being inadequate, were not enforced. They were also found to be more of punitive nature.
- ↻ Thimphu and Phuentsholing municipalities though independent administratively, did not have information sharing system which could be mutually beneficial to each other.
- ↻ Generally, people lack appreciation on management of solid waste and are of the notion that it is the municipalities sole responsibility to manage wastes.
- ↻ Landfill at Memelakha, Thimphu has crossed its estimated life by almost 7 years and currently operating more as an open dump site than a landfill.
- ↻ There are several areas within the Phuentsholing municipality where wastes are being dumped illegally. Some of the glaring examples are the areas near sewage plant, below truck parking, storm water drain and the backyards.
- ↻ Phuentsholing City Corporation had not formed a Municipal Committee as of date. The mandate is pronounced in Bhutan Municipal Act of 1999.
- ↻ Of all wastes, construction waste is the most neglected one. Contractors dump the unwanted materials at the place of their convenience; often on road side, in the construction site vicinity and river sides.

*What RAA recommends?*

The Royal Audit Authority would like to recommend the following measures in light of above observations:

- Maintain proper records on management of solid wastes. Appropriate formats could be worked out to facilitate easy and timely recording of data.
- To have continual and synchronized co-ordination amongst agencies framing environmental policies and emulate the policies through appropriate rules and regulations. These agencies also need to work very closely with implementing agencies such as Municipal Corporations and Royal Bhutan Police. Municipalities in the country should have some form of information sharing platform on management of solid waste.
- Municipal authorities need to strictly enforce the existing rules.
- Co-ordinated campaigns on solid waste need to be initiated to educate people. As of now only ad-hoc campaigns by Non-Governmental Organisations were found initiated.
- The municipal authorities in collaboration with the related agencies should come out with appropriate policies or regulations to deal with the growing problems of disposing obsolete/out of date stocks and goods.
- Thimphu Municipal Corporation should identify a new site for landfill with utmost urgency.
- Breakdown of sewer lines across Dooti river should be repaired immediately
- The Phuentsholing City Corporation should make concerted efforts to stop illegal dumping of wastes at non approved sites.
- The Phuentsholing Municipal Corporation should also work with Jaigoan town authorities to stop illegal dumping of waste unto Bhutanese territory.
- Construction and Demolition(C&D) wastes need better management strategies. Municipal Corporation or National Environment Commission could draft a guideline or rules on managing C&D waste.

*The detailed recommendations are given in Chapter 7 of this report.*

## 2

## Introduction

Management of solid waste is one of the many challenges being faced by the municipalities around the world. With the overall quantities of waste generally increasing day by day, it is becoming increasingly difficult to develop and implement new strategies in managing solid wastes. Growing urbanization, rapid rural- urban migration and change in consumption pattern are some of the unavoidable causes of increasing the generation and composition of solid wastes.

Urban solid waste management is considered to be one of the most serious environmental problems confronting urban areas in developing countries. Bhutan is no exception to the situation. Thimphu City Corporation (TCC) is

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***The Constitution of the Kingdom of Bhutan***

responsible for the management of solid waste in Thimphu City. With a total population of eighty thousand people, which is approximately 15% of the total population in the country, the Thimphu City generates about 27 metric tons of municipal solid waste daily. With the increase in population and horizontal expansion of the city, it has become difficult to find waste disposal sites within easy access for shorter haulage and reduced transportation costs. Inadequate collection and uncontrolled disposal of solid wastes have become threats to both the inhabitants and the environment.

Currently, Phuentsholing Municipality is the second largest municipal area after Thimphu. While the concerns and the problems of the municipality are very similar to that of Thimphu, some issues like problem associated with open dumping by the residents across the border are unique to itself. Phuentsholing City Corporation also faces the problem of backyard waste unlike Thimphu.

The wastes generated from two municipalities are of similar types and compositions. It mainly consisted of vegetables wastes, food wastes, cardboards, polythene bags and other packing materials.

## **Achievements**

The Thimphu City Corporation under the Ministry of Works and Human Settlement (MOWHS) published rules and regulations on waste management called the “Thimphu Municipal Solid Waste Management Rules and Regulations 2007”. With an effort to create awareness on waste generation and management issues, the MoWHS prepared a television programme and was screened through the BBS TV. Besides, certain awareness and cleaning campaigns were also undertaken by the two City Corporations in the last few years.

The Royal Audit Authority also observed that besides drastic increase in the municipal waste in the recent years particularly in Thimphu and Phuentsholing, the two municipal authorities had tried their best to manage it with their limited human resource, though unscientifically. In the field of human resource, environment officers have been trained both within and outside the country. Recently, an environmental officer had been appointed by Thimphu City Corporation. Environment inspectors are also recruited to keep strict vigilance of indiscriminate littering.

Despite all these efforts by the Ministry of Works and Human Settlement and the two city authorities, there were neither worthy accomplishments nor impacts. There were several areas where improvements were desirable.

## 3

## Overall Common Observations

**3.1. Lack of reliable data on solid waste**

The municipal authorities of Thimphu and Phuentsholing do not have reliable data on the quantity of solid waste generated from different waste generators, amount of waste segregated, kind of separable wastes etc.

Phuentsholing City Corporation does have the system of weighing the waste by means of Weigh Bridge before disposing off to landfill. However, no meaningful conclusions could be drawn from the record of the total solid waste that goes into landfill. Perhaps this could be one of the reasons why the scholars, writers and even the government published papers had dissimilar data on solid waste. Maintaining complete and reliable data on the quantity of solid waste could facilitate studies, research and help the government in framing better policies of waste management.

In absence of such data, the RAA was constrained to conduct proper study of solid waste management.

**3.2. Lack of Co-ordination amongst/ between policy making and implementing agencies**

National Environment Commission is the nodal agency mandated to oversee the management of Environmental issues in the country. Nevertheless, issues on waste being a cross cutting one, involvement of multiple agencies is unavoidable. For instance, review of policy documents unfurled that almost all Ministries were somehow involved in setting environment policies and framing rules on environment in general and solid waste in particular. A few of the Non- Governmental Organizations such as Royal Society for Protection of Nature and World Wild Life Fund were also actively involved. Implementing these policies and rules finally rests on the Municipal Authorities and the Dzongkhag Authorities in cases of smaller municipalities.

While the involvement of multiple agencies apparently, is a sound system of managing solid waste, the purpose of involving multiple agencies gets defeated in absence of proper *coordination amongst them and between the implementing* agencies. More often than not, the rules are vague and

inconsistent indicating lack of synchronization amongst the agencies. For instance, The Water and Sanitation Rules, 1995 specifies that “no collection, storage or sale of scrap or other recyclable material shall be allowed unless operated under a scrap dealing license”. In contrary, according to Department of Trade, Ministry of External Affairs, under Trade Licensing Policy, there is no specific limit for dealership of scrap/waste materials. As long as one is in micro trading business, one can deal in any line of business. Therefore, a clear case of contrast can be seen in these two policies.

The National Environment Commission may like to revisit the existing rules and regulations and amend them accordingly. The missing links amongst the agencies may be established and holistic view on the over all system of solid waste management could be looked into.

### **3.3 Lack of Enforcement plus Inadequate Rules**

Review of waste management systems in two municipalities of Thimphu and Phuentsholing revealed that there were only few relevant rules and regulations on the subject. The concerns on solid waste management reflected in some of the government documents like *Action Plan for Thimphu 1992*, *Bhutan Municipal Act 1999*, *Environmental Assessment Act 2000*, *The Middle Path 'National Environment Strategy' 1998*, *Ninth Plan Main Document (2002-2007)*, *Bhutan 2020- A Vision for Peace, Prosperity and Happiness etc.* are broad, vague and at times inconsistent. A few documents specifically drafted for managing solid waste are *Water and Sanitation Rules July 1995*, *Environmental Codes of Practice for Hazardous Waste Management 2002*, *Ban of use and sale of plastic bags and wrappers and Notification Banning Car Washing in Streams and Rivers, 1994*. The most comprehensive document amongst them is the *Water and Sanitation Rules, July 1995*. While the document covered general issues on waste management, it failed to capture specific procedure on '**how to manage**' waste. Further, these rules seemed more of punitive than positive, wherein, people were only punished for defaulting but no motivation for upholding them.

*As of now, these policy frameworks remained largely in letter than in spirit.* The Municipal Authorities stated that they were constrained by numerous factors such as lack of trained manpower, paucity of fund and lack of co-operation from the residents.

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### **3.4 Urban roads maintenance to be handed over to the respective Municipal authorities.**

Proper management of urban roads plays a vital role in maintaining a clean town. Phuentsholing town especially the lower market area was found very dusty and thus dirty. The urban roads had developed lots of potholes and the pedestrians' footpath and the drains along the road were not properly maintained, thereby generating lot of dusts and making the area dirty.

Presently, the maintenance of urban roads is mandated to be carried out by the Department of Roads, Ministry of Works and Human Settlement besides their overall jurisdiction of Samtse, Darla and Phuentsholing area with an annual budget of Nu.187.00 millions (FY-2006-07).

Given these and the fact that it is the responsibility of the municipal authority to maintain the overall cleanliness of the town, it is felt appropriate that the maintenance of urban roads of Phuentsholing municipality to be handed over to the Phuentsholing Municipal Authority. The *Municipal authority would be able to plan and focus better on maintenance of urban roads which eventually leads to the cleanliness of town.*

Similar approach could also be adopted for Thimphu Municipal Corporation in the light of above justifications.

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### **3.5 Non-existence of regulations and procedures for disposing obsolete goods**

The Phuentsholing City Corporation and the Regional Revenue and Customs Office (RRCO) receive a number of requests from the business units to dispose off the obsolete goods at the landfill. The obsolete goods include anything from edibles to cosmetics and liquors.

Firstly it was noted that out of so many business establishments and dealers in consumables, only a few had come forward with such requests to dispose off the obsolete items. In absence of any regulations and procedures for disposing off the obsolete goods, the business establishments, dealers and the shopkeepers have the liberty to dispose anywhere at their convenience and ease. The few requests that had come forward seemed more for the purpose of tax benefits than with the intention for scientific disposal.

*Phuentsholing City Corporation, realizing the ill effects of dumping those goods at landfill site and also to reduce the burden on the site had stopped entertaining disposal of such goods.* With the increased consumerism, it is only expected that such chemically induced goods in Bhutan will increase from year to year.

While the TCC did not receive requests to dump such obsolete goods at landfill, it was stated that such items were often dumped into the community bins and finally disposed off at the landfill.

Therefore, it is imperative for municipal authorities to come out with proper procedures and appropriate regulations to deal with such growing problems of disposing obsolete goods.

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### **3.6 Lack of awareness on solid waste management**

The residents in the municipalities generally lacked awareness on good management of solid waste and sense of cleanliness and respect for the environment around them. *It is not uncommon to find wastes littered at nooks and corners of the town.* Spitting of doma (beetle nut) in all corners is yet another concrete example. People in general did not have the appreciation of well managed system of solid waste in the municipality.

Municipal Authorities stated that they could not control the littering of rubbish despite their best efforts. While TCC had recently initiated more stringent rules and heavy penalty system, PCC was only doing informal policing and were conducting occasional clean up campaign to curb the situation. The fleeting population and the porous border of the town is a unique problem to PCC.

While RAA shares similar view on the difficulty of maintaining cleanliness of the towns, Municipal authorities are suggested to attempt approaches that are practical and more integrated.

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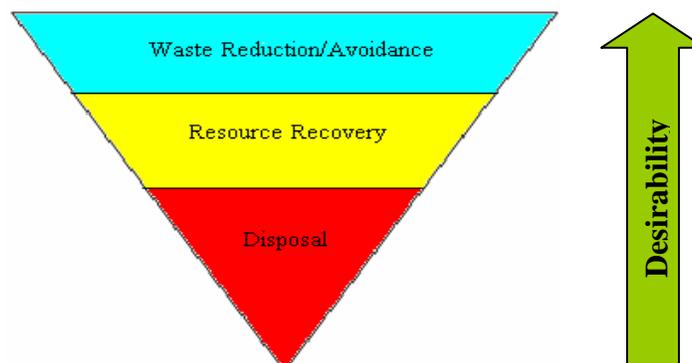
### **3.7 Inadequate measures and policies on reducing, reusing and recycling wastes.**

Most municipal waste components could be managed in sustainable manner by applying the principle of ‘*reduce, reuse and recycle*’ commonly referred as “3Rs”. Reducing waste means choosing to use things with care to minimize

the amount of waste generated. Reusing involves the repeated use of items or parts of items which shall have usable aspects. Recycling means the use of waste itself as resources.

As of date, the municipal authorities do not have any specific measures and policy settings for motivating general public to initiate 3Rs. Although, the Bhutanese households and industries, at this stage may not be able to take up these initiatives on their own, but the government at national level could initiate projects related to 3Rs. Such initiative would not only help in managing the wastes but also reap economic benefits, if managed properly. *At present, except for few scrap dealers and informal waste pickers, there are not many industries which dedicate themselves for recycling purpose.* Recently initiated awareness programme on solid waste on the BBS television do not seem to focus much on these three crucial aspects of waste management. PCC does have a system of *end-of-pipe* waste separation system manually at the landfill site. Plastics and bottles were some of the major items segregated at the landfill. However, the exercise of segregating waste at the landfill site seemed more with the intent of economic benefits than for any scientific purpose.

The “Waste Management Hierarchy” is an internationally recognized strategy for management of municipal solid wastes. It places greatest emphasis on strategies and programs for avoiding and reducing waste, with treatment and disposal being the least favored options. The diagrammatic representation of the waste management hierarchy is given below:



### 3.8 Unscientific waste collection system

The physical observation of the waste collection system at Phuentsholing and Thimphu Municipal areas revealed some deficiencies as highlighted below:

### 3.8.1 Waste collectors without Personal Protective Equipments

The solid waste collectors who are the paid employees of the corporations were not found wearing personal protective equipments while handling the waste. As could be seen from the picture they handle the waste without any basic protective equipment like gloves and gum boots.



*Phuentsholing City Corporation workers without the basic protective equipment*

Upon enquiry, it was found that they were not aware of such health hazards except for the foul smell. They also said that a pair of gum boot and gloves provided on annual basis wears out within a few months time.

### 3.8.2 Receptacles unable to contain waste spill

In most of the locations, the solid wastes are manually carried and loaded into the waste collection vehicle. At times, the distances between the community bins (temporary storage) to the collection point are quite far. It was noted that the workers are provided with crude bamboo made containers (*picture below*) for carrying and loading into the vehicle. ***These containers were not able to contain waste spillage which caused menace on the road side.***

The municipal authority explained that sophisticated carrying equipments could not be provided due to paucity of funds.



While the scarcity of funds is an issue, the RAA is of the opinion that the authority could procure waste carrying carts which could readily solve the problem of spillage. The municipal authorities could carry out cost benefit analysis of using different waste containers and select an appropriate one.

### **3.8.3 Collection of waste**

While visiting some of the waste collection points, the team found that most of the waste disposal bins were over flowing and were often scavenged by dogs and scrap dealers.

There is a need to provide sufficient community waste bins located conveniently for the general public to dispose their domestic waste. This would, to some extent; help in reducing road side litter and indiscriminate dumping.

Authorities should also focus on the importance of segregating waste at source into biodegradable and non-biodegradable components. Door-to-door collection services are being provided by the authority but this does not solve the problem. There is no segregation of waste at source, both during collection and disposal. Further, some of the trucks have open tops which are susceptible to spillage and also easily blown by winds on roadside. This would create menace on roadside spoiling the visual beauty of the community and affecting the environment.

## 4

## Observations - Phuentsholing Municipal

### 4.1 Illegal dumping of waste at non approved sites and areas.

The audit team visited several locations at Phuentsholing town to observe the waste collection and storage system. Some of the locations with major problems are being explained as hereunder;

#### 4.1.1 Below Sewage Treatment Plant

This area is an open space between the Indo-Bhutan border and the sewage treatment plant with an approximate area of 1500 square meters.

The team observed that this site is being used as waste dumping area. ***The wastes were dumped indiscriminately by the people across the border*** which was also confirmed by the solid waste in-charge, Sonam Tobgye. The waste dumped at the site varied from the cloth rags, plastics, bottles and animal carcasses. In absence of any records, it is not certain when and how this area became a waste dumping area. Solid waste in-charge stated that the practice prevailed when he took over the charge in 2006. Therefore, it is apparent that the practice of dumping in this area has been there for very long period.

As it could be seen from the picture below, the wastes are either dumped into the river (Toorsa) or onto the land near to it. In all respects, these wastes will pollute the river and consequently affect all forms of marine life. The polluted water, if used for drinking purpose, would pose health hazards for humans residing downstream. Dump site being an unregulated one, animals especially cattle and pigs feed on to it on regular basis which has repercussions on them directly and humans consequently.



Wastes dumped into river Toorsa

People across the border scavenging waste

People also scavenge the site to segregate items which has commercial values and they do not care to use protective equipments as could be seen from the picture above.

On enquiry on the whole state of affairs, the municipal authority explained that they had made efforts to stop dumping by constructing barbed wire fencing which was later vandalized by the perpetrators. Audit team did find the traces of barbed wire fencing at the site.

#### **4.1.2 Storm water drain near the Indo-Bhutan Border**

A storm water drain near Indo- Bhutan border is another glaring case of illegal dumping of waste. The drain that runs from the Bhutan gate to river *Toorsa* is invariably used as easy and comfortable way of disposing off wastes by the residents living across the border. ***Heaps of wastes dumped very close to the Indo-Bhutan wall are indicative of the fact that the wastes are being disposed off from other side of the drain.*** Wastes dumped at the site included all types of wastes including animal carcasses.



*Indo-Bhutan drain filled with waste*

Superficially, the impacts of such indiscriminate dumping are an unsightly scene generating foul odour thereby spoiling the aesthetic beauty of the town. In consequence, the economy of the immediate vicinity seems to be already suffering because of the uncongenial shopping atmosphere created by the waste deposit. Keeping the problem unattended could lead to severe irreversible environmental damage and to mend it would lead to a very high cost.

#### **4.1.3 Below truck parking**

The area below truck parking is another such location for open dumping of solid waste. *(Picture on the right)* Here, the wastes are either dumped into the *Toorsa* River or on its



bank. *Significant portion of the waste dumped were automobile workshop wastes.*

**4.2 Inadequate and inappropriate waste bins**

One of the vital factors, amongst many, for indiscriminate littering by the passerby and others is the lack of facility to throw the rubbish. While the facilities could range from simple cartoon box to sophisticated waste collection bins, such facilities were found lacking in the Phuentsholing Municipal area. Areas near and in front of Mig cinema hall, as can be seen from the picture below, are some of the glaring examples.



The Municipal Authority maintained that the swing bins that were initially provided were not appropriate since they were not very user friendly and people litter near and around the bins instead of throwing into the bins. It was also found that the swing bins were fixed with taller stands and people found it inconvenient to use. The RAA is of the opinion that the municipal authority should have found an alternative by now since it is almost eight months from the time they removed those swing bins.

Besides, the authority had also placed several bigger size community steel bins at strategic locations of the towns. Such bins were found easily accessible by scavengers, waste pickers and animals. Easy accessibility to humans and animals posed immense public health and environmental risks which the authority had neglected till date.

**4.3**  
**Indiscriminate**  
**dumping of waste in**  
**the Backyards**

Commonly referred to as backyard waste, where the residents throw their garbage irresponsibly in their surroundings, is an area where wastes have been piling up over the years. It was found that Phuentsholing town area, especially the lower market area have lots of buildings with backyard wastes, as can be seen from the pictures below:



Backyards have become a convenient place for dumping the wastes since they are hidden from the general scene of the town. ***The solid waste in charge stated that such practices are common among residents who do not care for the cleanliness and hygiene.*** While this could be true, having no other convenient place to dump the wastes have also attributed to the situation. Providing sufficient waste bins could have facilitated in reducing the backyard wastes.

A few informal clean up campaigns by the Phuentsholing City Corporation did not create much impact due to low turnout and the usual ‘who cares’ attitude of the residents. The tenants and the building owners often shift their responsibility on each other for keeping the surrounding clean.

**4.4 Problems with**  
**the drains from**  
**Jaigaon which are**  
**connected to the**  
**storm water drain in**  
**Bhutan**

During the site verification, the RAA observed that one of the drains of adjacent Jaigaon (West Bengal) town is connected to the storm water drain at Phuentsholing, located near Bhutan gate. It was found that besides the normal sewage that the drain carries, it also brings in waste water from Jaigaon and adds to the already overloaded waste dumps.

Further, as it could be seen from the picture below, the buildings across the border which are located close to the storm water drains release their waste

water openly into the drain. The outlet pipes can be seen propping into the storm water drain. It was learnt that the Jaigoan town do not have proper sewerage system and therefore all their waste water flows into the storm water drain.



*The waste water from neighboring town (Jaigoan) making its way into the storm water drain in Bhutan.*

The RAA failed to understand as to why the drain from across the border was connected to storm water drainage system. If at all it was done with the consent of both the parties, then proper agreement should have been drawn on the maintenance of clean drainage system. The Phuentsholing municipal authority failed to provide any response to this effect.

**4.5** Easy  
accessibility to  
sewage plant

Though the sewage plant is protected with barbed wire fence, people can still trespass through it. The barbed wire fencings have no ends, as shown in the picture below, and the people can easily access the treatment plant.



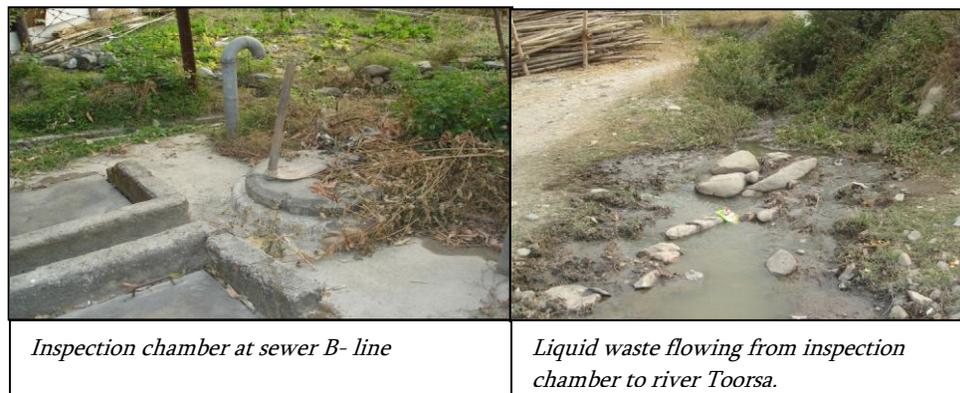
During the physical verification, it was noticed that the laborers were using the pond water for construction purpose. The workers were not aware of the occupational health and safety issues. Further, the presence of huge number

of fishes in the pond (picture below) attracts lot of people who want to feed these fishes. Until the recent incident of a boy drowning in Thimphu sewage pond, PCC used to allow adults and children to visit the pond area. Still, there is every possibility for the people to cross over the fence to feed or catch the fish. Young children are more likely to be tempted to go into the pond. Besides, alluring people to the pond, the presence of fish could have other scientific consequences on the over all functioning of the sewage plant. The study of the same could be carried out by the Municipal Authority.

**4.6 Breakdown of sewer line across Dooti River and near the workshop area**

Liquid waste (waste water) of the Phuentsholing municipality is managed through the system of sewerage network and is being managed and operated by Phuentsholing City Corporation.

*The sewer line which was laid underneath the Dooti river and catering to NPPF colony and Dhamdara was hit by heavy monsoon during the last summer.* On verification of an inspection chamber across Dooti river, it was found that the effluents from the aforementioned area flowed into river Toorsa in an uncontrolled manner. There is almost a distance of 200 meters between the inspection chamber and river Toorsa where the waste water flows in open land.



Discharge of waste water into the river will certainly pollute the river besides blemishing the area between the inspection chamber and the river. There are all the possibilities of humans and animals contacting diseases if they come in contact with the effluents. The sewerage in charge stated that the management had put up a budget proposal to government for repairing the line which did not come through.

The audit team also came across another sewer line below the automobile workshop area which was non-functional. This sewer line caters to the need of lower Phuentsholing town and the workshop area. The effluents in this case flow into the storm water drain. Although the risk of effluents getting into contact with humans and animals is very less, the foul odor in the area and pollution of the river water could not be avoided.

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## **4.7. Landfill management**

It is laudable to note that Phuentsholing City Corporation has been managing its solid waste disposal site in quite a scientific manner in comparison to the only other landfill in the capital.

The most notable feature of the landfill site is the leachate management system. Though very simple, it seemed to have served the purpose of not contaminating the surface and the ground water. However, some inadequacies as observed and agreed during the physical verification are highlighted as hereunder;

### **4.7.1 Landfill fire**

The landfill is always on fire. Due to lack of data, the audit could not ascertain the precise date of occurrence of the fire. The solid waste in charge himself did not remember the date and cause of the fire.

The probability of the cause of fire at any landfill can generally be due to two reasons, namely self ignition due to heavy presence of methane and carbon dioxide while the other being the intentional setting of fire by the landfill workers to reduce the volume of waste. Apparently, the fire at Phuentsholing landfill seems to have been set by the workers to reduce the volume of waste. Regardless of the cause of fire, the effect on the environment and public health remains fairly similar. Therefore, the municipal authorities should take appropriate measures to extinguish the landfill fire, since fires in the landfill have serious environmental effects due to the presence of harmful and toxic elements in the wastes.

### **4.7.2 Improper gradient posing risk of stream pollution**

The Phuentsholing landfill is protected from the spillage by constructing concrete walls in all directions (*picture on the right*). However, the gradient

of the landfill is not capable of containing surface water run-offs which finally drains into the stream below the landfill. As discussed and agreed the Municipal Authority should raise the height of wall at the lower end of the landfill to avoid any run-offs to the stream.



#### 4.8. Parallel efforts on waste management for Jaigoan & Phuntsholing

India and Bhutan being friendly neighbours, there are not many restrictions on movement of people and vehicles crossing the border. Obviously, the littering habits of people of one town affect the cleanliness of the other town and vice versa. For instance, there is an area (picture on the right) where the Jaigoan residents dump their waste on their territory but very close to border where Pemaling housing complex is located on Bhutanese side. The dumping though on the Indian Territory will affect health of the people living in Bhutan besides spoiling the visual beauty from the unpleasant site and odour.



Waste dumped near Pemaling housing

#### 4.9 Absence of Municipal committee (Throm gi Tshogpa)

As stipulated in Part II, subpart 2 clause 9 of The Bhutan Municipal Act of 1999 *'The Committee (Municipal) shall be the highest decision making body of the Municipal Corporation'*.

Clause 10 and 11 states the functions and the modus operandi respectively for the appointment of town committee.

Town Committee is the organ of any Municipal Corporations vested with all important functions including framing of policies and rules. Phuentsholing City Corporation, however, is yet to have a Town Committee as of date.

## 5

## Observations – Thimphu Municipal

### 5.1. Problems with the Compost Plant

A Compost plant was initially planned by the then Ministry of Trade and Industry (MTI) and the National Environment Commission Secretariat (NEC) with the Thimphu City Corporation (TCC) as an executing agency of the project with a budget of Nu.8.1 million. The plant was initially planned at much smaller scale to be constructed at the Royal Botanical Garden to handle waste generated from Bhutan Agro Industry Limited. With the availability of funds and involvement of the Thimphu City Corporation (TCC), the project was later taken up at a larger scale. Accordingly, the site was shifted to Serbithang. The plant was part of the assistance given to Bhutan Agro Industries Ltd. from component six of the Environment Sector Programme Support (ESPS) project on cleaner technology and environment management.

The plant enables managing solid waste in a more scientific manner and reduces the burden on the only landfill of the capital. The audit team visited the plant site on 6<sup>th</sup> March 2008 along with environmental officer. The following inadequacies were observed by the team during the above site visit;

#### 5.1.1 Non-operation of the plant

The construction of the plant and staff quarters were completed and officially taken over on 1<sup>st</sup> August 2005. ***The plant however remained non operational till the date of physical verification i.e. for nearly two and half years.*** The environment officer attributed the delay of operation to non-availability of power supply. This indicates lack of planning by the management.

#### 3.1.2 Lack of adequate space for storing non-composite waste

As could be seen from the picture, there seem to be no provision for storing the non-degradable waste after segregation. The only other alternative to solve the storage problem would be to have continuous transportation system which would be practically difficult and cost ineffective.

Further, it was noted that the segregated organic waste have to be manually loaded into the shredder for which the RAA is of the opinion that a simple conveyor belt could be installed to have cleaner and efficient operation of the plant.

**3.1.3 Easy accessibility for trespassers:**

As of now there does not exist any physical control over trespassing by humans and animals inside the premises. It is suggested that TCC looks into the possibility of having a barbed wire fence for the plant.



*The Compost plant at Serbithang*

Further, during the last routine audit it was pointed out that the plant was situated just 20-30 meters below the open drinking water channel for Babesa area, thus making the drinking water susceptible to contamination. However, no action has been taken in this regard.

**5.2. Non-availability of design and drawings of landfill**

The Memelakha landfill located around 12 Kms from Thimphu was constructed under DANIDA funding during 1992-1993. The landfill started its operation in 1994.

Audit team could not verify the design and the drawings of the landfill since the documents were not available with the municipal authority. As such it was difficult to ascertain as to how the landfill was initially designed and constructed. The facility does not have a leachate management or the gas management system. ***By the look of it, the landfill appears more as an open dumping site let alone a sanitary landfill.***

**5.2.1 Designed capacity of landfill exceeded by 7 years.**

Initially, the designed capacity of the landfill was estimated for 8 years with a waste projection of 8MT per day. Going by the projection, the landfill reached its capacity by the end of 1998. During 1998-99, the waste collection increased between 12 to 14 MT a day and reached 22-23 MT a day in 2003. At present between 26 -27 MT of waste is being transported to the landfill.

The TCC carried out some extension work in 1999 and another one in 2003 i.e. widening the road, surfacing and underground piping of the surface drainage with an objective to cater for another three additional years.



*Landfill is now overburdened for more than 8 years with almost treble the quantity of daily waste being generated than initially forecasted.* Therefore, landfill is presently overflowing with wastes as could be seen from the photograph above. However, recently the municipal authority initiated to find new landfill site. Perhaps after the identification of the site, its approval construction and development could take few more years.

The present scenario in terms of daily recyclable waste quantity found at Memelakha is as given hereunder:

Detail	Organic	Paper	C/board	Composites	Plastics	Glass	Metal	Total
% Recyclable	10.9	5.5	4.79	2.86	3.13	2.66	1.04	<b>30.88</b>
Wt. (tones)	2.9	1.5	1.3	0.76	0.84	0.71	0.28	<b>8.29</b>

*Source: findings of segregated waste data collection in Memelakha and potential 3R options for management, 2007.*

The RAA is of the opinion that due to the hazardous components of the wastes, its collection, treatment and disposal should be given utmost priority by the municipal authority.

### 5.2.2 Fire at landfill:

As could be seen from the picture, heavy billows of smokes hang over the landfill area all the time. The cause and the exact date of ignition were not on record. The probability of the cause of fire at any landfill can generally be due



to two reasons, namely self ignition due to heavy presence of methane and carbon dioxide while the other being the intentional setting of fire by the landfill workers to reduce the volume of waste. Regardless of the cause of fire, the effect on the environment and public health remains the same. Therefore, the management should take appropriate measures to extinguish the fire at the earliest possible time and take measures to prevent such fires in future.

### ***5.2.3 Occupational Health and Safety of the workers***

The workers at the landfill are unmindful of protecting themselves from numerous health hazards. Though they are provided with few personal protective equipments like gum boots, hand gloves and face masks, they are not very aware of the hazards associated with working in such



*Worker at the landfill site in Thimphu.*

atmosphere. It is a clear indication that the oversight function of National Environment Commission is lacking and more so that the municipal authority had failed to look after the health and safety of the workers.

## 6

## Observations – Others

**6.1. Construction and Demolition waste**

Construction and demolition waste is generated from construction, remodeling, renovation & repair, demolition of houses, building structures, roads, bridges and any other form of structure. Construction and demolition waste generally comprise of wood, steel, concrete, dry wall, gypsum, masonry, roofing, structural metal, wire, plaster, etc.

The primary purpose of the construction and demolition (C&D) waste audit was:

1. To correctly establish the composition of C&D waste disposed of in the landfill or any other designated area;
2. To find the trends over the time;
3. Sources of construction and demolition waste; and
4. Quantities that could be recovered.

However, due to unavailability of records and absence of focal person, the audit could not achieve some of its objectives. During the filed visits, audit came across some observations as detailed below:

**6.1.1 Illegal dumping of Construction and Demolition Waste**

By definition, “*illegal dumping is the depositing of solid waste at other than the approved facility*”. The normal practice of disposing off these wastes is that the waste generator reports to the municipal authority and the latter designates a place to dump. The environmental officer stated that generally the constructions and demolition wastes are utilized for reclaiming of land and filling up the depressions. However, on visiting the Thimphu and Phuntsholing municipal area, it was observed that Construction waste was found dumped on the road side, drains, buildings passage and the rivers. The waste generally included wood, sand/soil, bricks, steel, concrete, dry wall, metal and wire. ***City officials are aware of the fact that illegal dumping exists***

*in the urban centers but nothing very concrete has been done to stop such dumping. Thimphu Municipal Solid Waste Management Rules and Regulations 2007* prepared by Ministry of Works and Human Settlement do contain a provision of a fine of Nu. 20,000.00 for illegal dumping of construction materials, but the impacts are yet to be seen.

Some of the areas where C&D waste are dumped are as shown in the picture below:



*C&D waste dumped on road side (way to Memelkha) and C&D waste between buildings (near Kuenga hotel, P/ling)*



*C&D waste lying near the house after construction*

*Waste dumped in town area near Changlam. (Changzamtog, Thimphu)*

After visiting some sites in the capital city as shown in the picture above, the audit could not understand as to how the construction completion certificate was issued by the city Corporation to the house owner.

House Owner and Real-estate business person are of the view that City Corporation has long procedural formalities for dumping the C&D waste.

### **6.1.2 Non-Existence of Occupational Health and Safety at workplace**

General Rules and Regulations on Occupational Health and Safety (OHS) in Construction, Manufacturing, Mining and Service industries 2006 issued by

Ministry of Labour and Human Resources contains the most comprehensive set of rules and regulations regarding the Occupational Health and Safety of the Workers. It clearly delineated the functions and roles of both the Ministry and the Employers. The purpose of the OHS Rules and Regulations is to assure safe and healthy working conditions for working men and women as well as other persons present at workplaces from work related risks to their health, safety and well being.

Nevertheless, physical verification of some selected construction sites revealed that both the workers and employers were not aware of the existence of such rules and regulations. ***Currently, construction workers and employers maintained more of a master-servant relation than employer-employee relations.***

So far as the role of the Ministry to conduct regular monitoring is concerned, it remained only in the paper.

There is a need for the Ministry of Labour and Human Resources to coordinate with relevant agencies or by itself to implement the rules and regulations effectively.

### **6.1.3 Other forms of pollution**

The visual beauty of municipalities is often found to be deteriorated by the disorganized construction sites. Construction materials were found stored haphazardly in open area. Vehicles carrying construction materials did not have proper cover to avoid overflowing and blowing by winds thus causing public health risks and cleanliness.

Construction workers and machineries are deployed till odd hours causing noise pollution in the construction vicinity.

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## **6.2. Automobile waste**

As of date there are no specific rules and regulations regarding management of automobile wastes. Most of the automobile workshops in Thimphu (*figure 1*) and Phuentsholing (*figure 2*) were found constructed near rivers and the effluents discharged into water without any treatment. Workshops located away from the river also discharged the effluents into the storm water drains which finally flow into the rivers.



Figure 1.

Figure 2.

There were no workers safety boards in workshops' premises nor were workers aware of hazards associated while working in such conditions. The Municipal authorities were also not very aware of managing automobile waste and they felt that they had no control over the issue.

Thimphu Municipal Authorities explained that the automobile waste will be managed properly after shifting to new locations at Semtokha.

## 7

## Recommendations

All the recommendations put forth by the Royal Audit Authority are the results of what has been observed during the course of audit. Some of the best practices around the globe which were found relevant and practical were also referred, compared and analysed during the audit and accordingly recommended. Techniques applied in audit included physical verifications, site visits, walk-through tests, review of records and interviewing stakeholders at various levels.

It is acknowledged that despite the exponential increase in volume and composition of wastes, two municipalities have strived to manage solid waste within the given limited resources. Human and financial resources were a few bottlenecks for managing solid wastes effectively.

Based on the results of what has been observed, analysed and studied during the audit, the RAA recommends the following;

**1. The Phuentsholing City Corporation to work in close cooperation with the authorities of West Bengal Government**

The Phuentsholing City Corporation should work in close co-operation with the Authorities of West Bengal Government to stop the practice of illegal and open dumping inside Bhutanese territories. Cross border transfer of wastes is illegal as per Basel convention to which both Bhutan and India are party to. Some of the specific measures which Phuentsholing City Authority could take are to fence the affected area with stronger structure unlike the past barbed wire fencing. PCC could also tie up with the police authorities of both the countries to curb illegal dumping of wastes. Ideally, police personnel would be best to be able to help in reducing the practice since they man the area round the clock as their normal duty.

**2. Maintain proper documentation on the management of solid wastes**

Both the Municipalities should strive to maintain proper documentation on management of solid waste. The issue on solid waste can no more be looked as a secondary issue by the Municipal Authorities. Unless proper records on solid waste are archived it is difficult to manage waste in systematic and scientific manner.

**3. Sewage plants should have better physical control over access to their plant sites**

Sewage plants of both municipalities should have better physical control over access to their plant premises. The present barbed wire fence is easily trespassed by humans and animals. Signboards with appropriate messages and cautions could be installed at the plant site.

**4. Propagate the concept of 3Rs – Reduce, Reuse and Recycle**

Today, almost all the solid wastes generated by Thimphu and Phuentsholing Municipalities are disposed off at landfills. It is suggested that City Authorities propagate the concept of three Rs i.e. Reduce, Reuse and Recycle. Many scrap dealers and informal waste pickers export the recyclable wastes across the border. Therefore institutionalisation of the system is of paramount importance for sustaining the practice and reducing the burden on the landfill.

Recycling initiatives could be undertaken within country considering the kind of waste disposed off at Memelakha landfill. The recyclable wastes of papers, cardboard boxes, composites, glasses and metals are the most disposed off wastes at the landfill site. Municipal Corporations may also explore possibilities of Private Public Partnerships (PPP) for waste management. In doing so, managements have to conduct a thorough study since it is a new venture for both the parties.

**5. Awareness on the occupational health and safety issues to be created among the workers**

Workers involved in the collection, disposal and those working at the landfills should be made aware of the occupational health and safety issues in handling solid wastes. They should also be provided with sufficient working kits like gum boots, hand gloves, masks and sweeping equipments. The waste carrying containers should be replaced with receptacles that can contain spillage of waste. The present steel community bins should be replaced with better bins so that humans and animals do not scavenge.

**6. Maintenance of Urban Roads could be handed over to the respective municipal authorities**

Maintenance of roads within the municipalities could be handed over to the respective Municipal authorities for keeping the city clean and for the synchronized management of public utilities like electricity and telephones. Presently, the urban roads are maintained by the Department of Roads.

**7. Appropriate policies or procedures for disposing obsolete goods should be formulated**

The City Authorities in consultation with Ministry of Economic Affairs or other relevant authorities should come up with appropriate procedures for disposing off obsolete goods. Instituting other policies such as surrendering such goods to the manufacturer or the dealers could also be looked into.

**8. Appropriate rules should be framed to curb dumping of wastes at backyards**

Phuentsholing City Authority should hold discussions with tenants and building owners to have a better synchronization in managing the backyard wastes. Appropriate rules should be framed curb dumping of wastes at backyards.

**9. Appropriate measure to be taken to curb landfill fires**

Both the municipalities should take immediate measures to extinguish the fire at respective landfills. Appropriate measures should also be taken to curb such fires in future. Thimphu Municipal Authority should find an alternative site for disposing waste with utmost urgency.

**10. NEC to take lead role in synchronising rules and regulations on management of solid waste**

National Environment Commission as a nodal agency should take lead role in synchronizing rules and regulations on management of solid waste. Co-ordination amongst agencies concerned should be prioritized and rules should be enforced strictly;

**11. The Phuentsholing City Corporation to instate Municipal Committee**

Phuentsholing Municipal Authority should instate Municipal Committee. Such a committee would assist municipal management in reducing the gap between them and the residents, thereby smoothening the problems in managing solid waste.

**12. City authorities to come up long term solutions to curb illegal dumping of construction wastes**

Besides the current practice of designating a site to dispose construction and demolition waste, RAA would like to recommend the city authorities to come up with long term solutions to solve the illegal dumping of ever-increasing construction wastes.

Wood waste, generated as a result of construction or demolition activity, could be allowed to be dumped in a permitted solid waste disposal area since it is considered as municipal waste.

All construction and demolition waste should be properly disposed off at a separate transfer station or landfill regardless of whether it was generated from a commercial or residential structure. Before a regulated renovation or demolition project begins, the business or entity requesting the work should make the waste disposal a part of the contract. This will deflect liability if the waste is not properly managed and should be included in the contract terms and conditions with fines and penalties for the violators.

**13. Rules on occupational health & safety of workers to be enforced**

Ministry of Labour and Human Resources should ensure that the Rules and Regulations on Occupational Health and Safety of workers is monitored and implemented as laid down; and

**14. Construction with due care and diligence**

Construction sites especially in the town area could have barricades of reasonable height till the construction is fully completed to protect the visual beauty and avoid spread of dusts and other materials from the site. Vehicles plying in the construction sites should have speed limits so that the dusts emitted are minimal. Vehicles carrying construction materials should have proper cover to avoid spillage.



# Appendix



## **Sources of Audit Criteria for Municipal Waste:**

1. Thimphu Municipal Solid Waste Management Rules and Regulations 2007 (Draft);
2. Water and Sanitation Rules, July 2007;
3. Policy Framework for Solid Waste Management, 2006;
4. Bhutan Municipal Act 1999;
5. Environment Act 2004;
6. Action Plan for Thimphu 1992;
7. Notification Banning Car washing in streams and rivers, 1994;
8. Environment Assessment Act 2000;
9. Environmental codes of practice for Hazardous waste management 2002;
10. The middle path “National Environment strategy” 1998;
11. Ban of use and sale of Plastic bags and wrappers;
12. Ninth plan Document (2002-2007);
13. Bhutan 2020 – A vision for peace, prosperity and Happiness;
14. The Penal Code of Bhutan; and
15. National strategy and Action Plan, Integrated solid waste Management, 2007

## **Sources of Audit Criteria for Construction Waste:**

1. Bhutan Municipal Act 1999;
2. Environment Act 2004;
3. Action Plan for Thimphu 1992;
4. Environment Assessment Act 2000;
5. Environmental codes of practice for Hazardous waste management 2002;
6. The middle path “National Environment strategy” 1998;
7. Ninth plan Document (2002-2007);
8. Bhutan 2020 – A vision for peace, prosperity and Happiness; and
9. The Penal Code of Bhutan

## **Methodology:**

The aim of the audit was to review and assess the management of wastes (municipal and construction) in Thimphu and Phuentsholing municipal areas. Due to lack of records on waste, interviews and site visits were the main methods of seeking information and views of both the management and the beneficiaries. In order to gather additional information, the team has also taken participatory observation in the operation and management of waste in municipal areas. Questionnaires were also distributed to management and stakeholders at various levels.

## **Scope:**

There was no specific time period to review the waste management system, therefore the current system of managing waste in Thimphu and Phuentsholing City corporations were reviewed.





*Every individual must strive to be principled.  
And individuals in positions of responsibility must even strive harder*

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