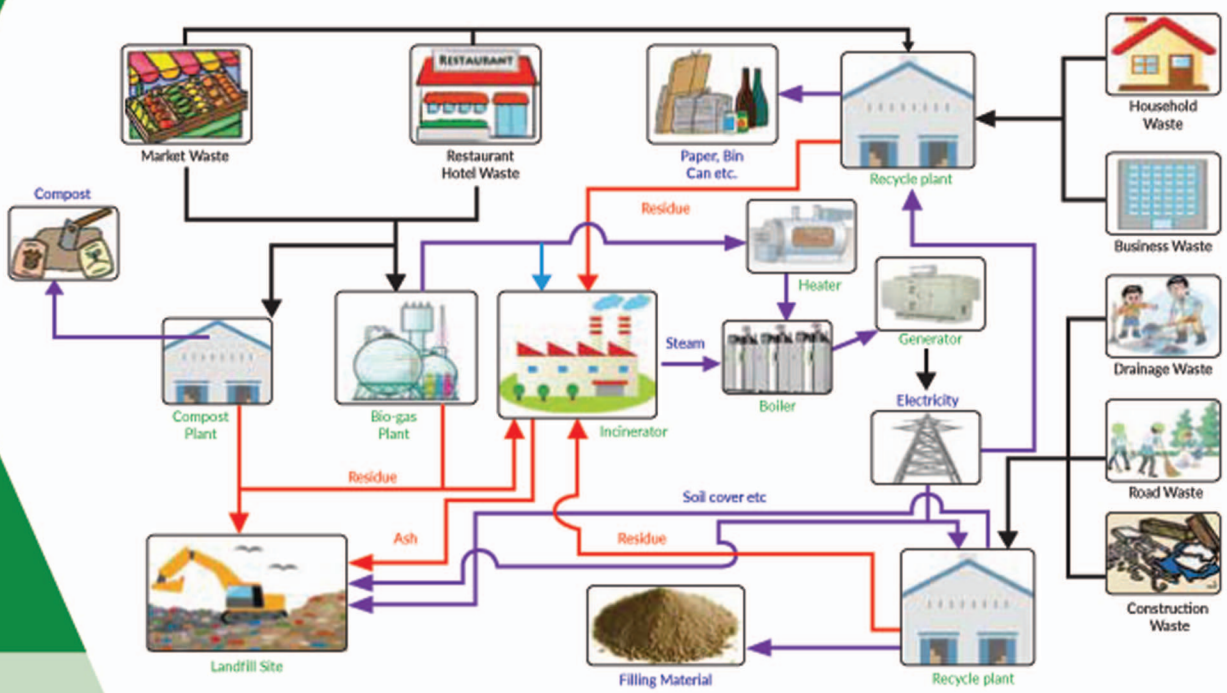
DHAKA NORTH CITY CORPORATION

WASTE REPORT

2018-2019



Eco-Town Concept of DNCC

Waste Managment Department

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LIST OF ACRONYMS

ACWMO	Assistant Chief Waste Management Officer
CAP	Community Action Plan
CBO	Community Based Organization
CI	Conservancy Inspector
CO	Conservancy Officer
CWMO	Chief Waste Management Officer
DNCC	Dhaka North City Corporation
DoE	Department of Environment
DSCC	Dhaka South City Corporation
ECR	Environmental Conservation Rules
ED	Engineering Department
EE	Executive Engineer
FTFP	Fixed-Time Fixed-Place
FY	Fiscal Year
GIU	Governance Innovation Unit
GoB	Government of Bangladesh
HCE	Health Care Establishment
HCW	Health Care Waste
HQ	Head Quarter
JICA	Japan International Cooperation Agency
JPT	JICA Project Team
LFS	Landfill Site
LGD	Local Government Division
MIS	Management Information System
MT	Metric Ton
NGO	Non-Government Organization
PCSP	Primary Collection Service Providers
PWCSP	Primary Waste Collection Service Providers
SCP	Secondary Collection Point
SE	Superintendent Engineer
SPD	Store and Purchase Department
STS	Secondary Transfer Station
SWM	Solid Waste Management
TD	Transport Department
TVC	Television Commercial
WBA	Ward-Based Approach
WMD	Waste Management Department
WMR	Waste Management Rules
WtE	Waste-to- Energy

WASTE FACTS AT A GLANCE

Total Area		196.23 sq. km
Population[1]		6.10 Million
Population density	Average	52,920 per sq. km (Considering old 36 Wards) 31,115 per sq. km (Considering 54 Wards)
	Maximum	102,034 per sq. km (W#36)
	Minimum	2,661 per sq. km (W#42)
Total Number of Zone		10
Total Number of Ward		54
Total Amount of Waste Generation[2]		4,220 MT/day (Total 54 Wards)
Waste Collection Growth		8%
Waste Collection	Total amount	1,122,478 MT
	Percentage	80%*
Total Trip Generation		203,636 nos.
Waste Collection	Highest in a month	104,059 MT
	Lowest in a month	55,927 MT
Cleaners of SWM	DNCC Cleaners	2,479 nos.
	Private Company Cleaners	1,435 nos.
Number of Sanitary Landfill		One (Amin Bazar Landfill Site)
Load Per Trip		4.71 MT/trip
Waste Generation During Eid-ul-Adha		11,550 MT
Number of Waste Collection Vehicles		164 (Arm Roller: 8; Compactor: 46; Container Carrier: 44; Dump Truck: 34 and Open Truck: 32)
Container Box		200 nos.
Average Waste Disposal in Landfill		3,075 MT/day
Landfill Operation Cost		235 Taka /MT

**Mostly uncollected from drain and newly extended area.*

http://www.dncc.gov.bd/

[1] Population and Housing Census 2011 and Population Projection of Bangladesh 2011–2061
[2] Future Vision of Solid Waste Management in Dhaka North City (New Clean Dhaka Master Plan 2018-2032)

MESSAGE FROM HONORABLE MAYOR

Waste Management is a concern for all the citizens as it ensures the safeguard of the environment and human health. As a responsible citizen, one has the right to update himself on the overall situation of waste management. In the same way, the Waste Management Department should also keep informing the public about the overall situation and carry out analysis on the overall activities of SWM for subsequent improvement. This objective would be achievable only by regular reporting on Waste Management which might be a professional approach of the WMD of Dhaka North City Corporation (DNCC).

DNCC focuses on the Municipal Solid Waste management through collection, transportation and disposal facilities to comply with health codes and environmental regulations.

In a year, DNCC handles about a million tons of solid waste with its available resources. By all means, it remains a challenge for DNCC because of population dynamism and multiple sources of generation. With the rapid growth of urbanization, the challenges are multifarious and even after all-out efforts, at times, it goes beyond our capacity to keep it within control. The WMD is also dynamic in looking forward to modern management to keep the activities in our grip.

Waste Management Department of DNCC has made its best effort to serve the citizen of the city. It is continuously adding endeavor to provide the best service and we are upgrading from traditionalmanagement to modern management including putting flavor of digitalization with the support of local experts and foreign donners like JICA. It is noteworthy that JICA has supported environment friendly waste collection vehicles, and currently assisting in preparation of a New Clean Dhaka Master Plan of 2018-2032. Targeting the Mujib Year (MujibBorsho) 2020, DNCC is getting ready to actualize the "Clean Village-Clean City (Poricchonno Gram-Poricchonno Shohor)" activities. With adding value to the services, we are committed to the citizen of DNCC for providing sustainable, clean and livable Dhaka city. I hope with the positive support of the citizen, we can achieve our goal.

Md. Atiqul Islam
Mayor

MESSAGE FROM CHIEF EXECUTIVE OFFICER

Waste Management is an important activity for the City Corporation for imparting a safe and pleasant environment to the citizen. Waste management is an issue related to environment, technical, cultural and socio-economical, and it needs multidimensional approaches for better Management. Effectiveness of Solid Waste Management reflects the overall standard of services provided to the citizen.

Dhaka North City Corporation has been entrusted to manage the solid waste of one of the most densely populated cities in the world. Besides, DNCC bears the diversified communities with high-medium-low income groups generating multiple issues related to the waste management. The Waste Management Department (WMD) could correctly identify the diversified issues and over the years putting its best effort to address those.

Providing services to the public are an ever-ending effort. DNCC also works for public welfare-oriented services and we, in DNCC, are obligated to keep our activities more transparent and accountable to the citizen. Transparency and accountability can only be possible through timely correct reporting or information disclosure system and this Waste Report would bear the testimony to serve the purpose. So far WMD has been preserving information in scattered way and now the effort is taken to publish in the form of a report. The report would reflect the waste management activities of DNCC and future endeavor for positive improvement.

DNCC is committed to present 'Clean Dhaka' to its Citizen and we all are devoted to bring success in Honorable Mayor's vision for "Green, Clean and Smart Dhaka". The waste report would help us evaluating our activities and finding ways to achieve Mayor's vision.

MD. Abdul Hai
Chief Executive Officer

INTRODUCTION TO WASTE REPORT

Waste Report is the Mirror for WMD that reflects the activities related to waste management of the City Corporation. Waste Report 2018-2019 has been prepared with the aim to inform the public about the waste management facts and activities of DNCC. Population being the pivotal point of Waste Management; the report focuses the population trend, overall solid waste management and future planning of the city corporation.

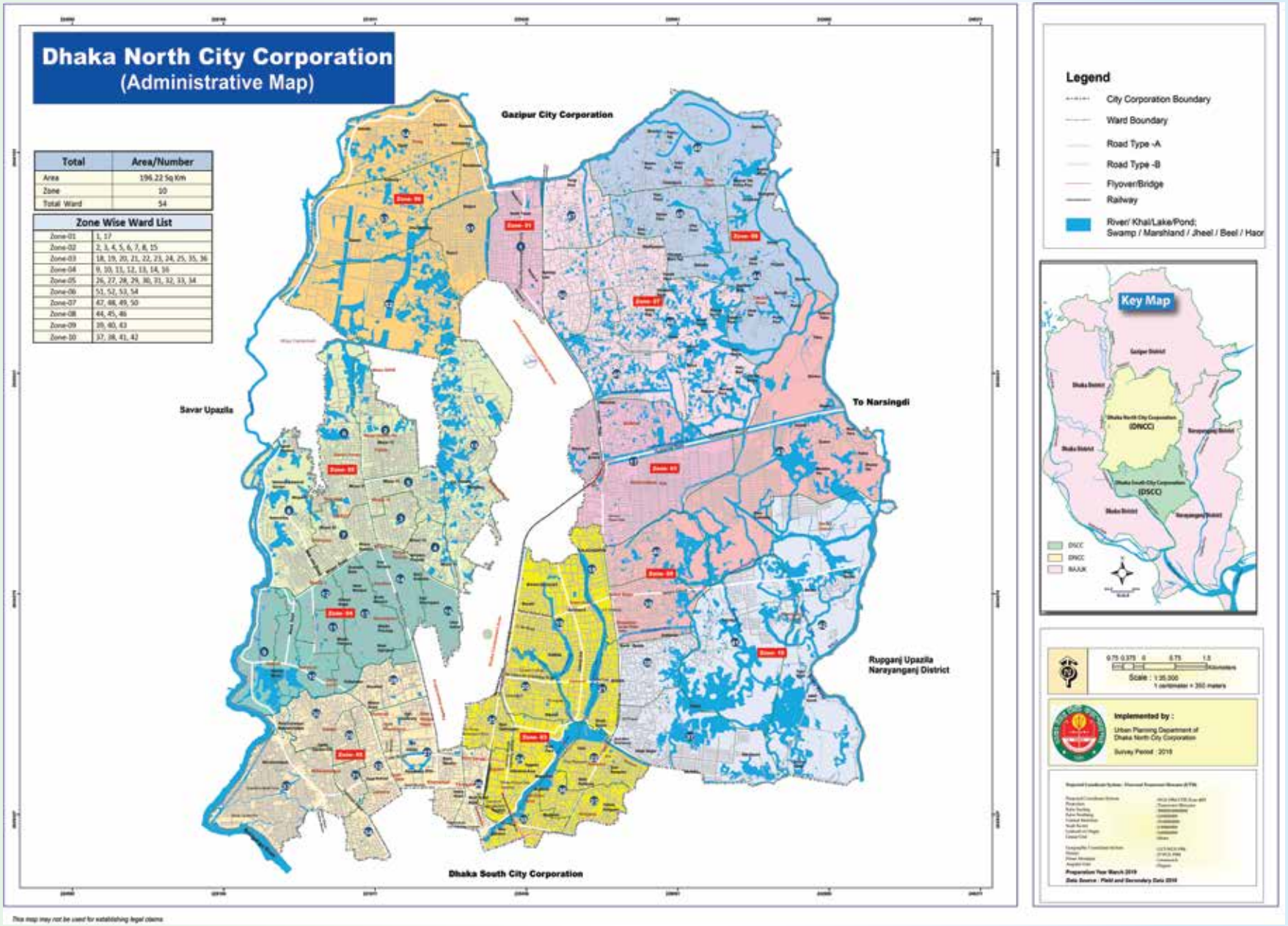
The rapid urbanization of Dhaka North City mostly affects the city area resulting multifarious difficulties in the waste management system. With the rapid development of the country the standard of living in Dhaka city is also improving and rate of per capita waste generation has also increased over the years. This increased trend resulting total waste generation in the city and DNCC is facing perpetual challenges in managing the total waste. Moreover, 18 wards of newly included area with the DNCC will come under the waste management system soon and will be needed to put additional effort for sound disposal of this increased waste in next 5 years. With the current organizational structure of WMD, it would be fairly challenging job for DNCC to bring this issue under manageable condition.

Besides Solid Waste, WMD is also focusing on the management of other categories waste like Medical Waste, Electronic waste, Industrial waste, construction waste etc. The Medical waste being the most dangerous to the public health has been brought under control managing through Prism Foundation Bangladesh. At present, DNCC does not have the resources to manage all the categories of the waste, however efforts are on to bring those under positive control. WMD would like to thank to all Solid Waste Management Officials of DNCC and JICA Expert Team for their relentless effort of improving the Waste Management of the City.

DNCC has started their Waste Report preparation since 2016 and intended to give some preliminary idea to the public regarding the Management of Waste in DNCC area so that citizen can appreciate the waste situation and understand how much is our effort to manage those effectively.

Commodore M. Manzur Hossain
Chief Waste Management Officer

AREA MAP OF DHAKA NORTH CITY CORPORATION



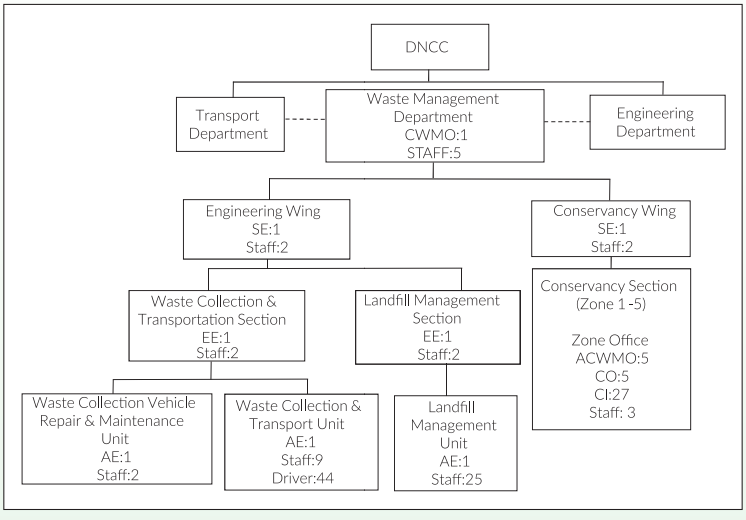
1.0 OVERVIEW OF SOLID WASTE MANAGEMENT

1.1 Function of Waste Management Department

The waste in DNCC is comprised of different types such as Municipal Solid Waste (MSW), Electronic Waste, Hazardous Medical Waste, Food Waste, Construction Waste and Industrial Hazardous Waste but DNCC waste management function is focused on MSW. Composition of MSW that DNCC deals with includes 'anything' that people throw into DNCC's waste bins and collection points. Waste Management Department (WMD) in DNCC covers the following areas:

- Regular Street Sweeping & Drain Cleaning;
- Monitoring of primary waste collection activities by the private companies and PCSPs;
- Transportation of Waste from the secondary transfer station to the landfill site;
- Construction, Operation and Maintenance of waste management infrastructures i.e. Ward office, STS, workshop, landfill components etc.;
- Procurement and maintenance of waste collection vehicles & landfill equipment;
- Operation and Maintenance of Amin Bazar Landfill site with protection of Environment by keeping leachate treatment, soil covering, greenery program etc.;
- Promoting Occupational Health and Safety of Cleaner;
- Capacity building of WMD officials through national and international training, seminar, workshop, site visit etc.;
- Planning of Waste Management activities and budgeting and
- Monitoring of Medical Waste Management.

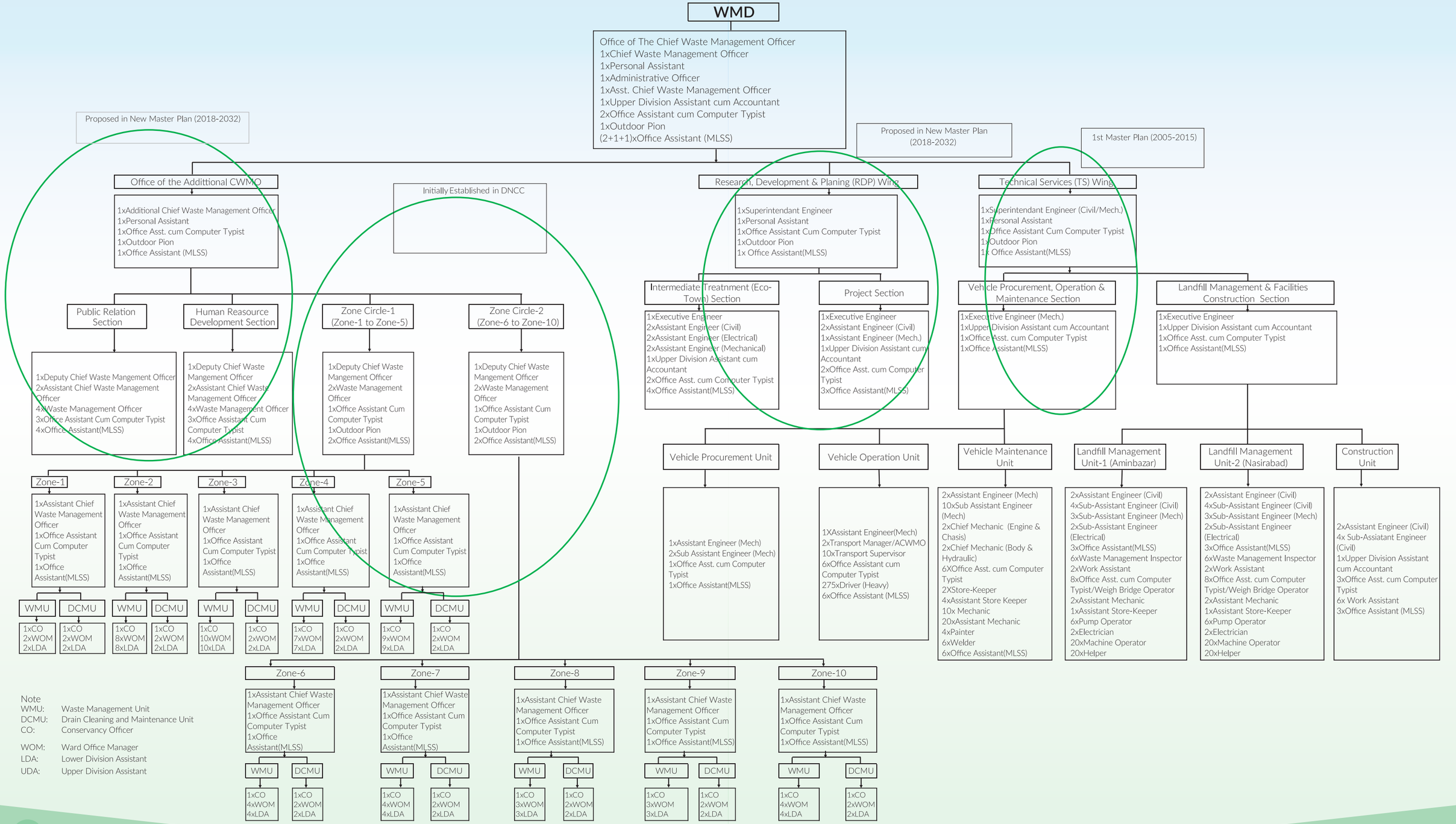
The WMD has been successfully managing around 3,000 MT of waste per day in close coordination with other departments, including the Transport Department (TD), Engineering Department (ED) and Store& Purchase Department (SPD). In general, the Engineering Wing of the WMD is responsible for the mechanization of the waste collection and transportation system. On the other hand, Conservancy wing is responsible for street and drain cleaning and monitoring the primary collection system. The collection and transport vehicles are being repaired and maintained by the Mechanical Department. TD is responsible for vehicle operation and SPD is responsible for the procurement of the small cleaning tools such as brooms, shovels, spades etc. A new Waste Management organogram has been proposed in the new Clean Dhaka Master Plan (2018-2032) for DNCC aiming to overcome the shortage of manpower and ensure efficient functioning of WMD.



Existing Organogram of DNCC Waste Management Department

Waste Report 2018-2019

PROPOSED ORGANOGRAM OF DNCC WASTE MANAGEMENT DEPARTMENT



Note

WMU:	Waste Management Unit
DCMU:	Drain Cleaning and Maintenance Unit
CO:	Conservancy Officer
WOM:	Ward Office Manager
LDA:	Lower Division Assistant
UDA:	Upper Division Assistant

1.2 Central Government's Regulatory Framework on SWM

The Government of Bangladesh (GoB) has formulated various regulatory documents such as policies, acts, rules, and strategies related to waste management, as shown in Table below. Draft Solid Waste Management Rules 2018 has been formulated as a fundamental law of waste management and are currently in the process of endorsement. The waste management-related laws define the responsibility of SWM regarding waste collection and transport in addition to waste treatment and disposal. Despite the case that the regulation appoints the central government agencies as a supervising authority, City Corporations are often involved in its supervision.

Regulatory Documents related to Solid Waste Management

Title/Contents	Year	Organization
Bangladesh Environment Conservation Act 1995, amended in 2000, 2002, and 2010	1995	DoE
National Environmental Management Action Plan	1995	DoE
Environmental Conservation Rules 1997	1997	DoE
Lead Acid Battery Recycling Related Circular	2006	DoE
Medical Waste (Management and Handling) Rules 2008	2008	DoE
National 3R Strategy for Waste Management 2010	2010	DoE
Local Government (City Corporation) (Amended) Act 2011	2011	LGD
Hazardous Waste and Ship Breaking Waste Management Rules 2011	2011	DoE
Ship Breaking and Recycling Rules 2011	2011	Ministry of Industries
National Environmental Policy 2013	2013	DoE
Seventh Five Years Plan (FY 2016–FY 2020)	2015	Ministry of Planning
Electrical and Electronic Product Induced Waste (E-waste) Management Rules 2017	2017	DoE
Draft Solid Waste Management Rules 2018	2018	DoE

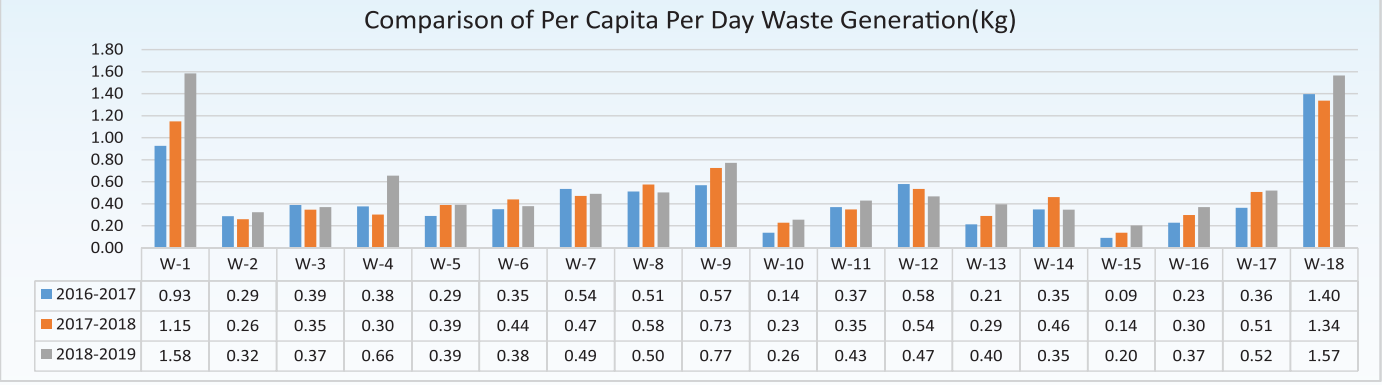
Local Government (City Corporation) (Amended) Act 2011

According to Section 92 of the Local Government (City Corporation) (amended) Act 2011, all the activities mentioned in the fifth schedule would be regarded as punishable offence. Section 13 of the fifth schedule finds littering as an offence. It states that "it is an offence if a person throws or keeps rubbish on the street or any place other than that prescribed by the City Corporation". Section 93 states that where there is no express provision as to punishments of any of the offences, then he/she may be liable to a fine not exceeding Taka 5,000. If the offence is repeated, then the fine shall have increments of Taka 500 every day.

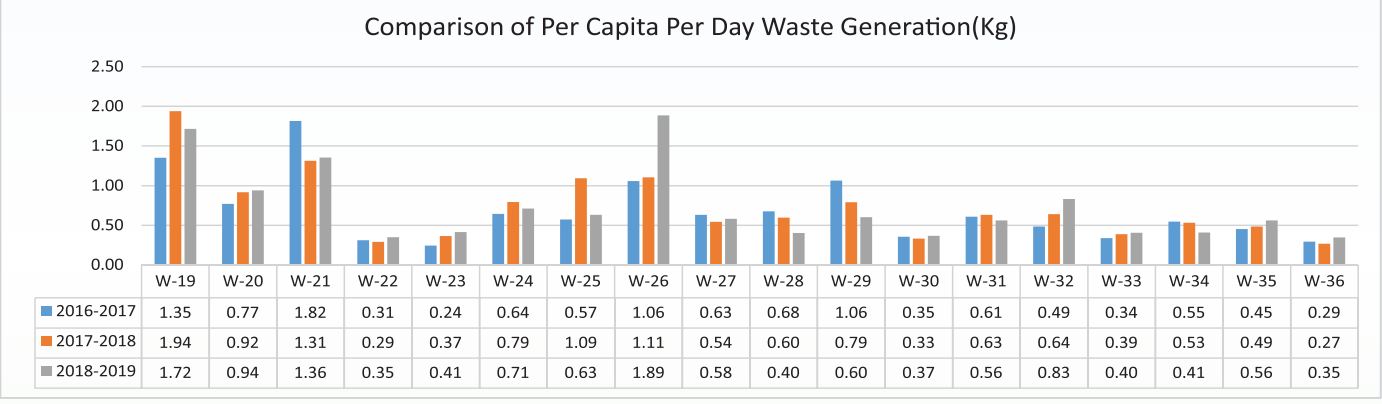
1.3 Per Capita Waste Generation

The amount of waste in DNCC is increasing day by day due to increased number of infrastructure developments, shopping complexes, restaurants, markets, bazars along with roadside tea-stalls, floating vendors, flower markets on the footpath. Due to economic and employment opportunities, peoples life-style have been changed in Dhaka City. Per capita waste generation have been increased by 31.2%, 12.1% and 11% in FY 2016-2017, FY 2017-2018 and FY 2018-2019 respectively. In 2018-2019, per capita per day waste generation is found 0.641Kg which was found 0.575Kg and 0.513Kg in 2017-2018 and 2016-2017 respectively.

Per capita waste generation varies from ward to ward due to the economic status and lifestyle pattern. People in Ward-26 (Kawran Bazar area) have been generating much more waste compared to other wards and per capita per day waste is 1.88 Kg. Per capita waste generation in Ward-1 (Uttara), Ward-19 (Gulshan area) and Ward 21 (Niketon area) is found to be higher than the other wards. Per capita per day waste in different wards are highlighted in the following subsequent charts:



	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11	W-12	W-13	W-14	W-15	W-16	W-17	W-18
2016-2017	0.93	0.29	0.39	0.38	0.29	0.35	0.54	0.51	0.57	0.14	0.37	0.58	0.21	0.35	0.09	0.23	0.36	1.40
2017-2018	1.15	0.26	0.35	0.30	0.39	0.44	0.47	0.58	0.73	0.23	0.35	0.54	0.29	0.46	0.14	0.30	0.51	1.34
2018-2019	1.58	0.32	0.37	0.66	0.39	0.38	0.49	0.50	0.77	0.26	0.43	0.47	0.40	0.35	0.20	0.37	0.52	1.57



	W-19	W-20	W-21	W-22	W-23	W-24	W-25	W-26	W-27	W-28	W-29	W-30	W-31	W-32	W-33	W-34	W-35	W-36
2016-2017	1.35	0.77	1.82	0.31	0.24	0.64	0.57	1.06	0.63	0.68	1.06	0.35	0.61	0.49	0.34	0.55	0.45	0.29
2017-2018	1.94	0.92	1.31	0.29	0.37	0.79	1.09	1.11	0.54	0.60	0.79	0.33	0.63	0.64	0.39	0.53	0.49	0.27
2018-2019	1.72	0.94	1.36	0.35	0.41	0.71	0.63	1.89	0.58	0.40	0.60	0.37	0.56	0.83	0.40	0.41	0.56	0.35

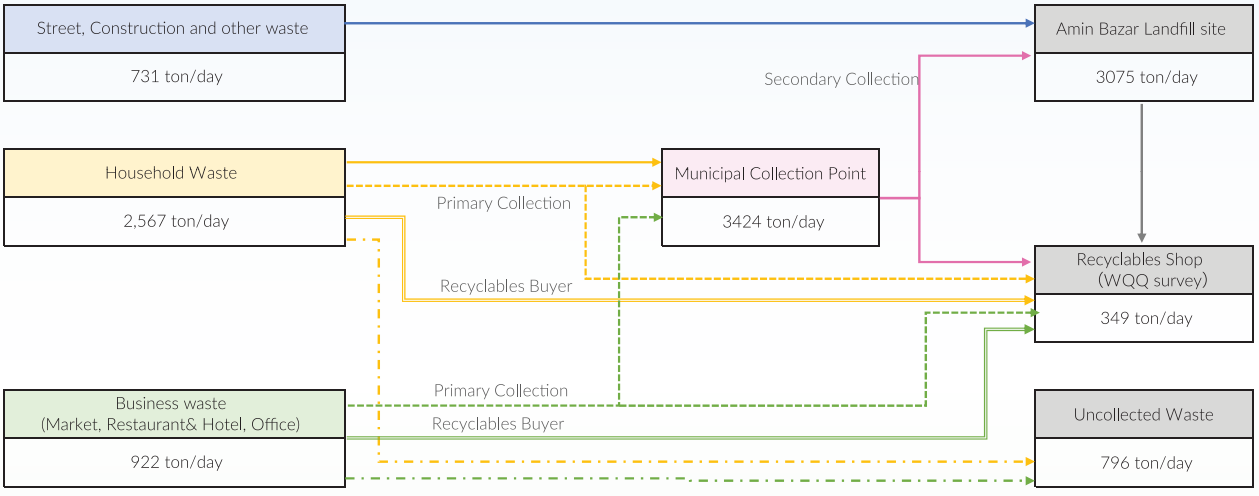
Though, DNCC is collecting Municipal Solid waste that citizens generate each day, still many citizens discharge waste into open spaces, drains, canals, own backyard rather than to dump in DNCC's designated secondary collection points. The highest and lowest amount of waste were collected from Ward-1 and Ward-10 respectively in 2018-2019. Ward-wise amount of waste collected in 2018-2019 are presented in the subsequent chart.

Ward-wise waste collection amount

1.4 Waste Collection Trend

DNCC currently collects 80% of solid waste by using their available vehicles. Ninety percent collection rate can be achieved by introducing more vehicles and adopting more efficient & modernized collection system in the city. The waste collection growth rate since 2014-2015 is shown in table and graph below. The Solid Waste sources and their final disposal scenario is depicted in Waste flow diagram for 2018-2019.

Year	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Total Waste Collection	602975	683174	852390	1039331	1122478
Monthly Average Collection	50248	56931	71033	86611	93540
Daily Average Collection	1652	1872	2335	2847	3075
Yearly Waste Growth	-	13%	25%	22%	8%



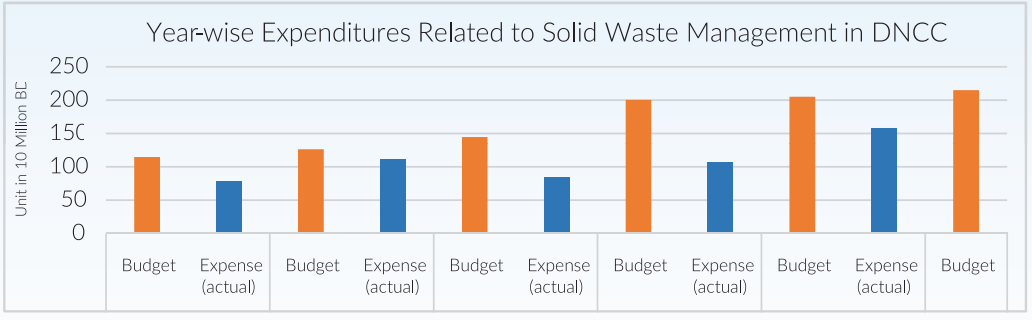
Waste Flow 2018-2019

1.5 Schematic Diagram of Collection, Transportation and Disposal System

In DNCC, waste collection consists of two parts, namely primary collection and secondary collection. DNCC is responsible for secondary waste collection to remove waste from STS/dustbins/containers and transport to the final disposal site. DNCC also takes support from private companies to provide waste collection and transportation service in some wards.

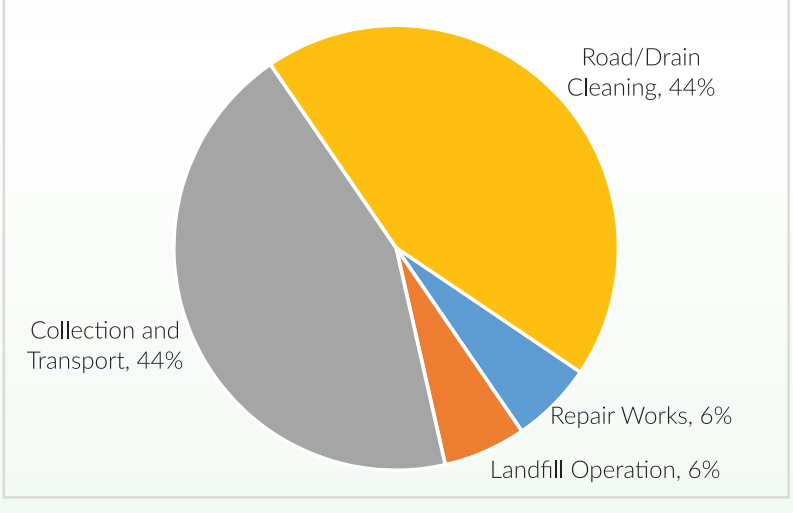
1.6 Expenditures Related to SWM

The total SWM expenditures increased in FY 2012–2013 and reached approximately Tk. 1.59 billion in FY 2016–2017, of which 86% and 14% were revenue and development expenditures, respectively. DNCC sets a budget of Tk. 23.9 billion for FY 2017–2018 as shown in the figure below; of this, the SWM budget accounted for 9%, at Tk. 2.15 billion. The conservancy tax income was Tk. 670 million, which is insufficient for covering the total expenditures of SWM.



Source: DNCC Budget Book 2017–2018

The SWM operation in DNCC is categorized into four types: i) Cleaning of roads and drains, ii) Collection and transport, iii) Landfill operation, and iv) Repair works. The first two categories account for 44% each, and the second two account for 6% each.The operation-wise expenditures of SWM were analyzed as shown in Pie Chart Figure.



Operation-wise Solid Waste Management Expenditure per ton (FY 2016–2017)

Operation	Waste Amount	Yearly Expenditure (BDT)	Cost per ton (BDT)
Cleaning of roads and drains	631 tons/day	696 million	3,024
Collection and transport	2,288 tons/day	687 million	832
Landfill operation	2,616 tons/day	87 million	91
Repair works	-	99 million	-
Total*	2,616 tons/day	1,570 million	1,644

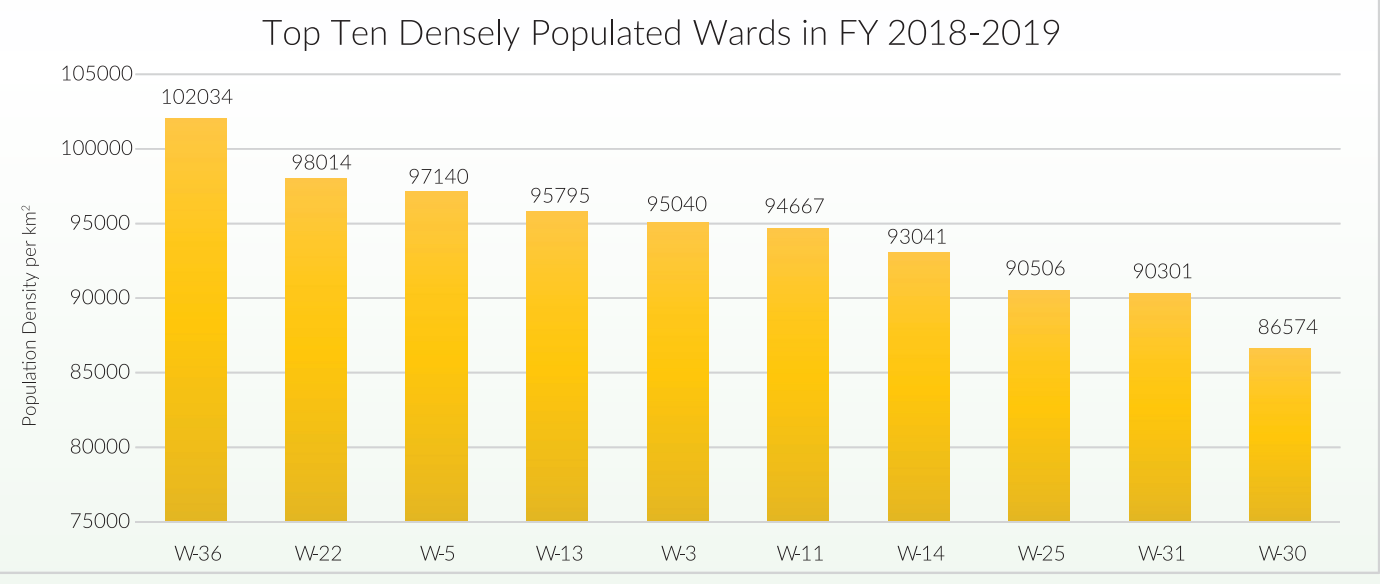
Source: JICA Project Team analysis based on the DNCC Budget Book 2016–2017

2.0 TRENDS OF POPULATION

Mega city Dhaka is one of the largest and most densely populated cities in the world[3]. Dhaka city is an attractive destination that offers employment opportunities, health care services, educational services and also encourages human settlement. Understandably, current rapid economic growth and overflow of population has exerted tremendous pressure on Solid Waste Management (SWM) that caused SWM to increasingly complicated and diverse, resulting in increased waste generation. Although many efforts have been taken to make the city clean as a pioneer of waste management in Bangladesh, the DNCC's jurisdiction became larger in 2017 corresponding to autonomous expansion of the urban area.

Waste generation, being an inseparable part of human habitation, demands it's well organized management in Dhaka North City. Pattern of waste generation changes as the society and life style transforms. Although organizational development processes are lengthy, yet, both vertical and horizontal organizational development is required to offset the pressure of waste generation.

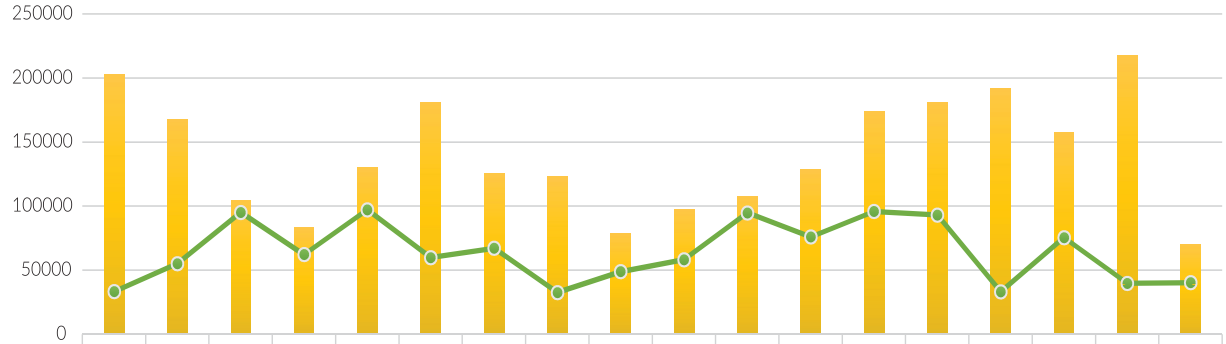
Dhaka North City Corporation has an average population density of 52,920 per sq. km in FY 2018-2019, with maximum and minimum population density of 102,034 and 2,661 per sq. km in Ward 36 and 42 respectively. Top 10 densely populated Wards are shown in subsequent chart.



DNCC consists of the aristocratic and eminent community living in Dhaka city. Population of the City has been estimated as 6.1 million. In this city, Ward-40 has the highest population (253,683); while Ward-42 has the lowest population (16,524). Ward-wise population and densities are shown in the following subsequent charts.

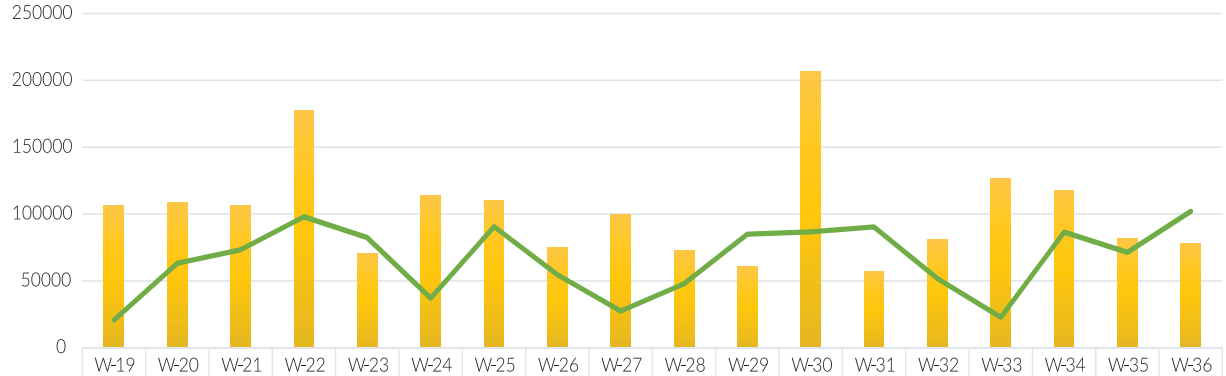
3. Source: The World's Cities Data Booklet, United Nations.

Total Population and Population Density in Wards 1-18 for the FY 2018-2019



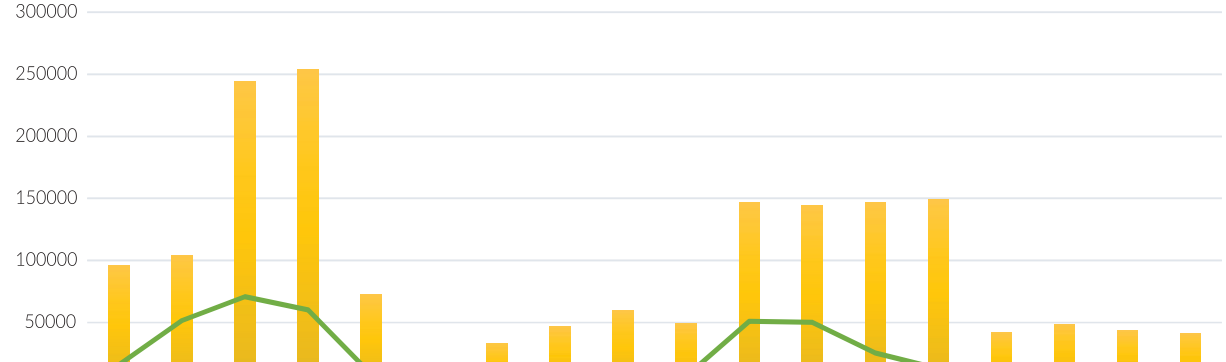
	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11	W-12	W-13	W-14	W-15	W-16	W-17	W-18
Total Population	202613	167871	104639	83175	130556	181027	125736	122974	78769	97139	107258	128825	173771	181057	192160	157420	217183	70319
Population Densit	33242.	55075.	95040	62163.	97139.	59764.	67059.	32567.	48773.	58201.	94667.	75913.	95794.	93040.	33096.	75392.	39668.	40205.

Total Population and Population Density in Wards 19-36 for the FY 2018-2019



	W-19	W-20	W-21	W-22	W-23	W-24	W-25	W-26	W-27	W-28	W-29	W-30	W-31	W-32	W-33	W-34	W-35	W-36
Total Populatio	106438	109010	106239	17720	70482	114156	110236	75028	99731	72937	60507	206306	56799	80662	126848	117775	81874	78464
Population Density	20524	63048	73318.	98013.	82435.	37123	90505	54605	27241	47733	84981	86574	90300	51673	22683	86472	71256	102034

Total Population and Population Density in Wards 37-54 for the FY 2018-2019



	W-37	W-38	W-39	W-40	W-41	W-42	W-43	W-44	W-45	W-46	W-47	W-48	W-49	W-50	W-51	W-52	W-53	W-54
Total Population	95799	103780	243735	253683	71849	16524	33161	46370	59690	48692	146340	144207	146241	148507	42011	48150	42988	40744
Population Density	15926.	51760.	70894.	60372.	8543.2	2660.8	3558.0	5652.1	11641.	6783.0	51078.	50334	25522	12958.	13747.	3938.9	4688.9	6666.2

3.0 PRIMARY WASTE COLLECTION

Waste collection from the points of generation or households or buildings are typically considered as primary collection if such wastes are disposed to the secondary collection point of municipal services of DNCC. Door-to-door waste collection activity is common in almost all the wards of DNCC. It is prevalent due to high pressure of population density and distance of secondary collection point. The entities providing primary collection or door-to-door collection services are recognized as Primary Collection Service Providers (PCSP) or Primary Waste Collection Service Providers (PWCSP). According to the JICA Project Team's survey (2018), there are around 418 PCSPs regularly working in DNCC.

PCSPs collect waste from door-to-door and transport the waste to dustbins/containers, or sometimes to vacant lands, by rickshaw vans. PCSPs are using various forms or mix of forms of secondary collection points such as compactor (in or outside of STS), container (in or outside of STS) and even in some cases they use open dumping or illegal points.

Primary Collection by the Rickshaw Vans

Zone Wise Statistics of Primary Collection Service Providers

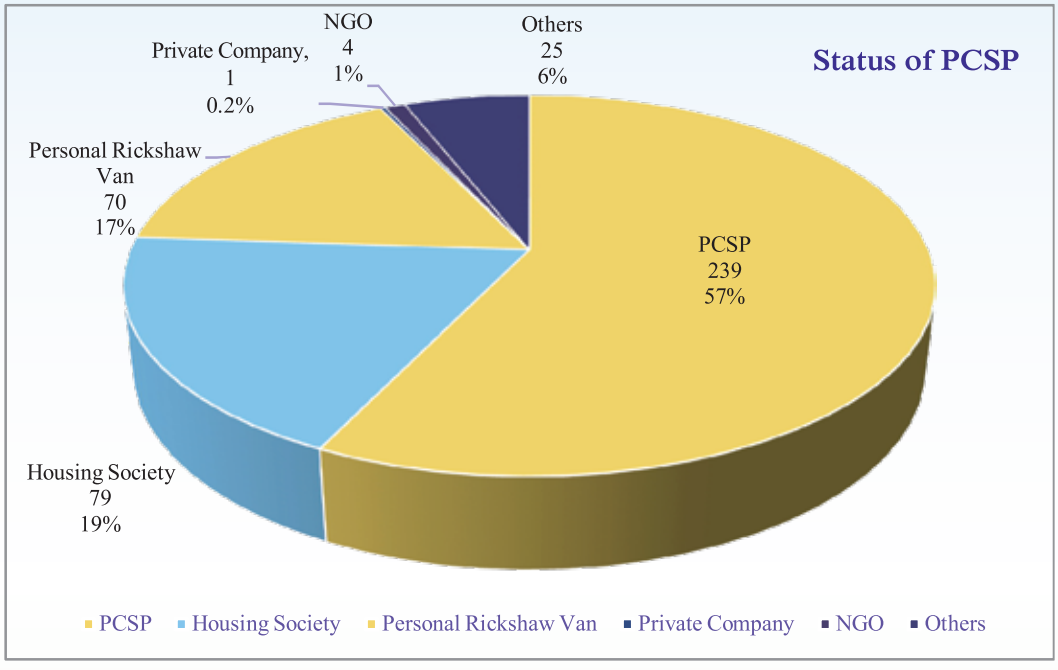
There are registered or unregistered individual person or organization or association with one or more rickshaw vans and with or without hand trolleys. The status or pattern of primary collection service providers is variable amongst the wards and it also varies with the pattern of community. However, Club, CBO, NGO, private company, housing society, individuals are the typical forms of PCSP.

Types of PCSP in DNCC

Zone No.	Types of PCSP						Total No.
	Ordinary PCSP	Housing Society	Personal Rickshaw Van	Private Company	NGO	Others	
1	22	12	22	0	0	0	56
2	55	11	9	0	2	9	86
3	76	20	7	1	2	5	111
4	44	34	9	0	0	10	97
5	42	2	23	0	0	1	68
Total no.	239	79	70	1	4	25	418

Among the total 418 PCSPs of 6 different categories, Ordinary PCSP van services are the most prevalent contributing approximately 60% to the total no of PCSP. Apart from the ordinary PCSPs, in many places of DNCC, waste is being collected by the Housing Society and personal rickshaw vans.

The registration process of PCSP was developed and mainstreamed with the assistance of JICA Expert Team since 2007. The same system is still being followed, using same forms and formats for application and monitoring with little changes in the registration process by DNCC.



PCSPs are gradually shifting from informal to formal sectors by having various recognition and registration from the different bodies of the government. DNCC is trying to improve PCSP's service through capacity building and empowerment activities such as registration system, training, stakeholders' dialogues etc.

Zone Wise Cleaners Statistics

Altogether, 3,914 cleaners are regularly working relentlessly for the common goal, to clean Dhaka city. The cleaners are responsible for street, drain, truck and STS cleaning. Among the existing wards, Ward-1, 17, 18, 19, 20, 21, 24, 25 of Zone 1 & 3 are under privatization. The number of cleaners is insufficient if their work volume and scope is considered. Zone wise distribution of cleaners has been shown in the following table:

Zone	DNCC			Private Company		
	Street Cleaner	Drain Cleaner	Truck Cleaner	Street Cleaner	Drain Cleaner	STS Cleaners
1	-	-	-	450	100	40
2	475	40	56	-	-	-
3	230	12	45	620	175	50
4	446	31	118	-	-	-
5	834	33	159	-	-	-

4.0 SECONDARY WASTE COLLECTION

Waste accumulated in Secondary Collection Points (SCPs) (e.g., Secondary Transfer Station (STS), Container &dustbins) are categorized in three major types based on the source of waste: household waste, street waste including sludge from drainage, and business waste. There are four different types of secondary collection receptacles: concrete bins/dustbin, containers, arm roll containers, and compactors for direct transport without waste storage. Open curbside waste accumulation is sometimes used at designated points for areas where container placement is difficult. It is noteworthy that, dustbin and dumping sites closure are ongoing with the DNCC initiative. So far, 175 dustbins and more than 20 containers have been removed from the streets. Some collection routes have been reformed accordingly to improve the collection efficiency by introducing compactors with FTFP collection.

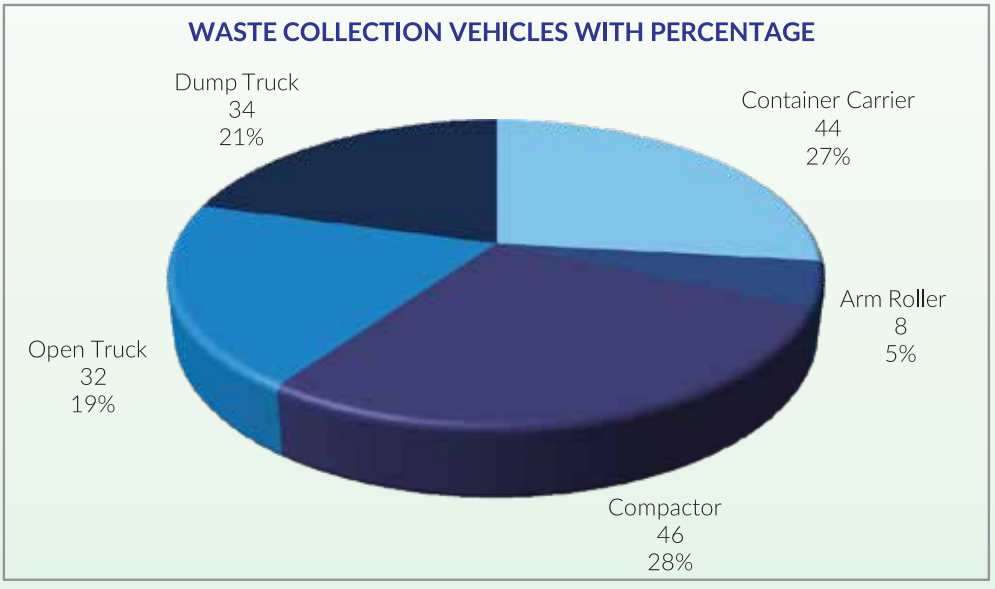
List of Collection Vehicles

There are altogether 164 waste collection and transport vehicles in DNCC among which 156 vehicles are under operation. DNCC is gradually shifting towards compactor driven waste collection and transportation considering its environment friendliness. There are altogether 44 compactors in DNCC which is 28% of the total waste collection vehicle. The summarized list of the collection and transport vehicle of DNCC is stipulated in the following table:

Summary of DNCC Waste Collection Vehicle

SL	Item	Total	Under Operation	Under Repairing
1	Container Carrier	44	39	5
2	Arm Roll	8	8	0
3	Compactor	46	44	2
4	Open Truck	32	31	1
5	Dump Truck	34	34	0
	Total	164	156	8

Note: Japan Grant Aid vehicles are Operatedby Transport Department



Snippets of Waste Collection Vehicles

Container Carrier

Arm Roll

Compactor

Open Truck

Dump Truck

Container Carrier = 44

Arm Roll = 8

Compactor = 46

Open Truck = 32

Dump Truck = 34

Landfill Heavy Equipment

Bulldozer

Excavator

Wheel Loader

Wheel Loader

Bulldozer = 8

Excavator = 6

Wheel Loader = 1

Wheel Loader = 2

Mechanized Collection Equipment

Jet & Sucker

Road Sweeper Machine

Jet & Sucker = 2

Road Sweeper Machine = 1

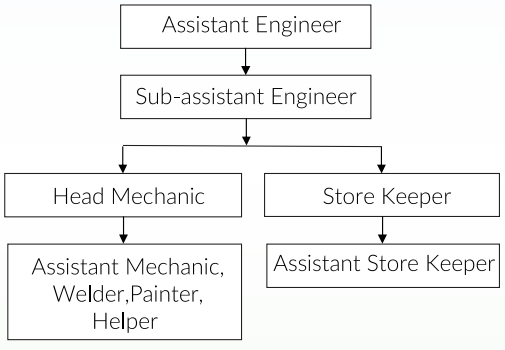
Workshop of DNCC

DNCC has two workshops for the maintenance of their vehicles. One workshop is in Dhalpur which was constructed under "Japan Environmental Grant Aid" and the other one is in Gabtoli. Snippets of workshop and typical staffing pattern of workshop are shown below.

Dhalpur Workshop

Gabtoli Workshop

Organogram of Workshop



Ward Wise Secondary Transfer Station (STS)

In 2015, DNCC constructed the first Secondary Transfer Station (STS) to avoid open dumping in designated and undesignated spots. Before that, both designated and undesignated spots were in open environment, mostly large concrete bins or containers either on footpath or roadside.

The location of the Secondary Transfer Stations are provided in the following table:

Zone	Ward	STS Location	Zone	Ward	STS Location
1	1	BDR Bazar, Uttara	3	22	Banasree
		Section-12, Kabarsthan, Uttara		23	KhilgoanKabarsthan
		Jashim Uddin Road, Uttara		24	Tejgoan, Orion Circle
		Ranabhola, Section-10, Uttara			Tejgoan, Rolling Mills
	17	Kuril Bishwa Road			Tejgoan, Begunbari
		Nikunja-2, West Side Road-18	4	9	BTRC Bus Counter, Gabtoli
		KhilkhetRailgate		10	Majar Road, Diabari
		Niketan, Gate-02			Mohona Pump, Technical
2	2	Mirpur Ceramic Road		11	Kallyanpur Bus Stand
	3	Mirpur Jalladkhana		12	Tollerbag

Zone	Ward	STS Location	Zone	Ward	STS Location
		Mirpur DNCC Market		14	Agargoan, Taltola Bus Stand
	4	Baishteki Culvert, Mirpur		16	Kachukhet, Wasa Pump
	5	East Side of Kashli Road, Mirpur		26	Tejkunipara, Khelaghar Math
	6	Arambag Culvert, Mirpur			Karwanbazar
		Mirpur Mods Zone, Pallabi		27	Khejur Bagan
	7	ShialbariMor, Mirpur		28	Orthopedic Hospital, Shyamoli
		Adjacent to Proshikha Building			Agargoan Science Museum
	8	Rainkhola, Mirpur		29	RingroadBadshah Faisal School
	15	Vashantek bazar, Mirpur	5	30	Dhaka Uddyan
		ManikdiKabarsthan		31	Mohammadpur Town Hall
3	18	Notun Bazar		32	Mohammadpur Fertility
	19	TNT Playground, Korail			PGR, Ganabhaban
		Gulshan Shooting Club		33	Bosila Bridge
		Banani BTCL Office			Jaker Dairy Firm
	20	MohakhaliKachabazar		34	Rayer Bazar Beribadh
	21	Gudaraghat, Badda		36	Nayatola Park

At the first instance, shifting those open spots to an enclosed area was very challenging because of insufficient land in all wards to build STS. As of today, despite all the difficulties DNCC constructed 52 STSs. In addition, DNCC plans to construct more STS as the organization is yet to provide this facility in some wards.

Secondary Transfer Station

List of Private Company & their Activities:

At present, the waste collection and transport system has been outsourced and implemented by private sectors in eight wards of DNCC. The scope of works of the private companies are from the road/street sweeping and drain cleaning to waste transportation to Amin bazar landfill site. A summary of the private sector operation is presented in Table below.

Private Company Information

SL. No.	Name of the company	Working area	Total Staff	Total vehicle & equipment
1	Cleantech Limited	Zone 1: Ward 1	391	72
2	Rakib Enterprise	Zone 3: Ward 21 and 25	262	74
3	M/S Multi International	Zone 3: Ward 18, 19, and 20	615	137
4	Khandokar Brothers and Network	Zone 1: Ward 17	224	27

Manual Street Sweeping

DNCC cleaners are often reviled for the nuisance they create by leaving a choking, eye-watering cloud of dusts behind them when at work. Altogether 1,985 street cleaners of DNCC start their job at 4 AM in the morning and finish by 8 AM. They are engaged with street sweeping along with removing trash and street garbage, waste collection and disposal activities. Rest of 494 cleaners are involved in drain cleaning, truck cleaning and STS cleaning.

Cleaners face several difficulties and challenges like floating vendors, scattered street hawkers, illegal road side tea stalls & hotels/restaurants, roadside vegetable/fish/fruits markets/bazars, at the time of street sweeping. Besides that, digging and cutting of city roads/streets and dumping or storage of construction materials on the main road/city create both street and drain cleaners' job more problematic and challenging. In rainy season this situation gets worst. Almost 450-ton street waste (excluding construction materials) have been collected every day[4] .

Vegetable, Fruit and Fish Market on main road

Floating Vendors

Road side tea stalls & shops

Illegal shops

[4] Future Vision of Solid Waste Management in Dhaka North City (New Clean Dhaka Master Plan 2018-2032)

Main road occupied by Construction Material

Footpath occupied by Construction Material

Flower Market

Bus Stoppage on main Street

Mechanical Road Sweeping

In 2017-2018, DNCC introduced the first road sweeper to test its effectiveness in cleaning Dhaka's street. Experience of the road sweeper has been very encouraging as a result DNCC had decided to procure 9 more road sweepers which will be in operation soon.

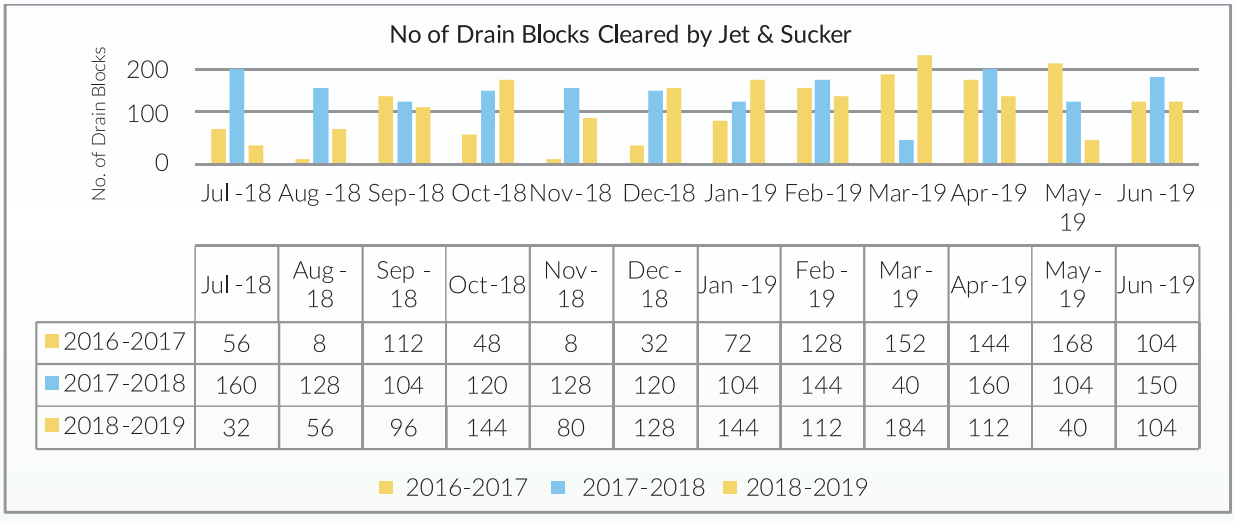
Mechanical Road Sweeper in Operation at night

Activities to Clear the Drain Blockage:

Drain cleaning is one of the major activities of WMD. Unlike street cleaning drain cleaning is not a daily job but periodically and upon necessity, cleaning is done by the drain cleaners of WMD. Both the manual and automatic drain cleaning are practiced by the WMD. Altogether 391 drain cleaners are working dedicatedly to solve the drain blockage and water stagnation issues.


Manual Drain Cleaning

DNCC is gradually shifting towards automatic drain cleaning system from the manual drain cleaning. DNCC had purchased the first Jet & Sucker in the year of 2015. The first Jet & Sucker has cleared the total number of 4,438 drain blocks since its inception which has given people a huge relief. Due to its effectiveness and usefulness, DNCC purchased the second machine back in 2018, which has cleared 1080 blocks in 2018-2019 fiscal year. Drain sludge is comprised of sand and clay which are the major catalysts liable for the blockage. Operation statistics of Jet and Sucker is presented in the chart below:



	Jul -18	Aug -18	Sep -18	Oct-18	Nov-18	Dec -18	Jan -19	Feb -19	Mar -19	Apr-19	May -19	Jun -19
2016-2017	56	8	112	48	8	32	72	128	152	144	168	104
2017-2018	160	128	104	120	128	120	104	144	40	160	104	150
2018-2019	32	56	96	144	80	128	144	112	184	112	40	104


Jet & Sucker Clearing the Drain Blocks

5.0 FINAL DISPOSAL SITE

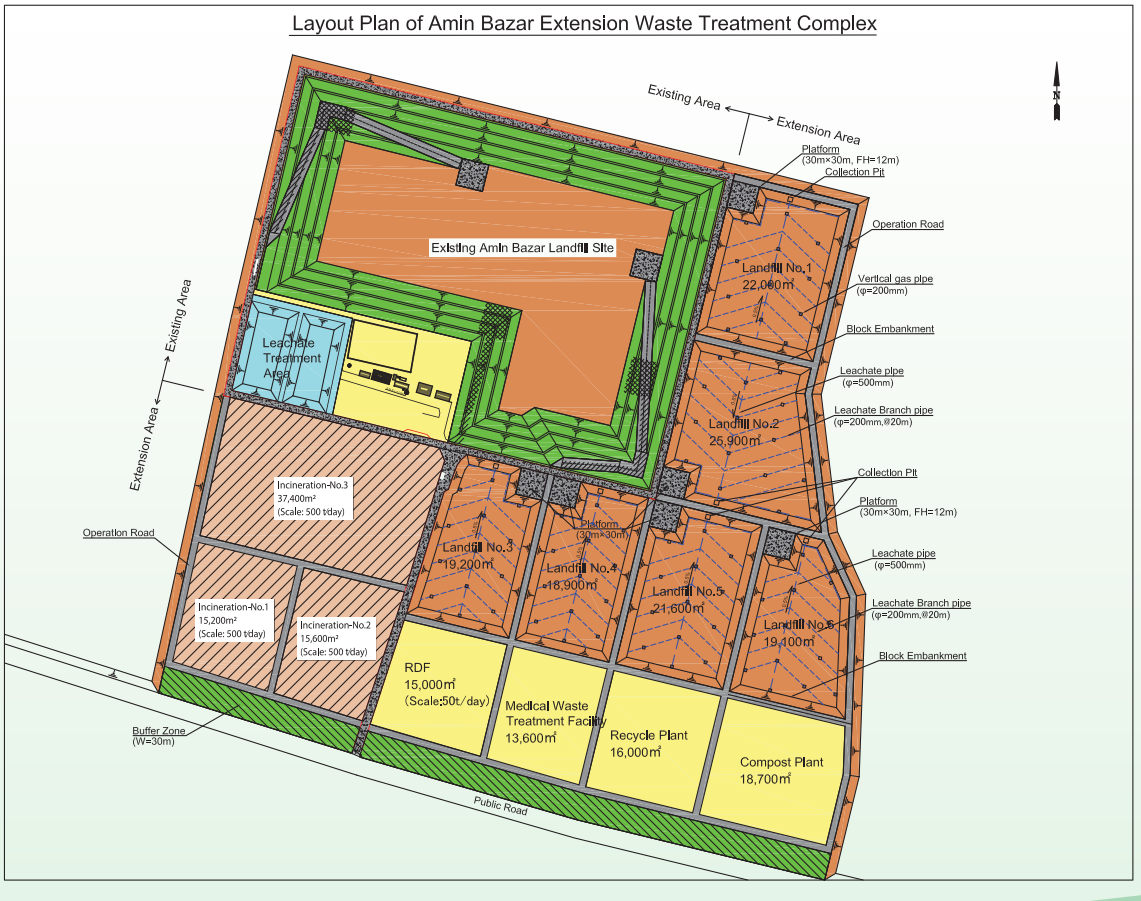
5.1 Components of Amin Bazar Landfill Site

Amin Bazar Landfill is the ultimate disposal site of solid waste for Dhaka North City Corporation. It is an indispensable part of the waste management of DNCC. Amin Bazar LFS is located about 17 km west of the DNCC headquarter. DNCC built the LFS on 53 acres of land in 2005, which became operational in 2006. Amin Bazar LFS is the only LFS for DNCC. Main facilities of Amin Bazar Landfill Site are:

- Embankment
- Leachate treatment facility (with anaerobic treatment system)
- Leachate collection / drainage facility
- Rain water collection facility (open ditch)
- Gas vent pipes
- Landfill management office
- Truck scale
- Car wash facility
- Dumping platform
- Access road
- Workshop

Currently, Amin Bazar LFS receives all types of waste in DNCC except for tannery and medical waste. As per high court injunction, the waste is transported to Amin Bazar LFS only at night from 10:00 p.m. to 6:00 a.m. However, daytime dumping is ongoing because of the following reasons.

- Lack of awareness;
- Difficulties of matching time between duration of collection and transport of high amount of waste and
- Shortage of working crews and vehicles



Amin Bazar LFS is expected to be filled up by 2020. Therefore, DNCC is in the process of acquiring 80 acres of land nearby for extension. The DPP for this purpose has already been prepared and sent to the relevant ministries for approval which includes intermediate treatment facilities' provision such as land development for incineration plant construction, medical waste treatment plant, compost plant etc.

5.2 Weighbridge

A new weighbridge has been installed on the approach road of the Landfill Site. Itsdesign is more advanced and user friendly for the operators and helpful for the drivers for their waste weighing. It saves the weighing time as well as ensures the discipline of the vehicles.

Snippets of New Weighbridge Operation

5.3 Leachate Treatment Plant

Leachate treatment by using physical,chemical and biological methods has been introduced in Amin Bazar LFS in 2018 immediate after completing the leachate pond repair. The schematic flow diagram of leachate treatment is shown in figure below. Raw leachate is released into an anaerobic pond (Pond 1), and the treated leachate is transferred through pumps to a chemical mixing tank. At that point, some chemicals such as polymers, ferrous sulfate, and lime are added with purified water. Afterward, the leachate is transferred to a primary clarifier to remove the sludge. The leachate is then transferred to a secondary aerobic unit (Pond 2) that uses 24 hr. aeration to keep the aerobic bacteria alive. The leachate is again transferred to a secondary clarifier, and the treated leachate is discharged to a sump to discharge into ambient water.

Leachate Treatment Plant has been designed to treat the effluent from the entire Amin Bazar Landfill Leachate with the following scale:

- Type of Effluent- Amin Bazar Sanitary Landfill Effluent.
- Quality of Effluent - 40 m^3/hr.
- Treatment Hours - 16 hrs./day.
- Treatment Concept - Activated Sludge Process followed by Biological Treatment.

Operational Leachate Treatment Plant in Amin Bazar

Test Result of Leachate Treatment Plant

Parameter	Inlet	Outlet	Standard of Discharge in Inland Surface Water	
			ECR'1997	Draft WMR'2019
pH	7.81	8.22	6-9	5.5 -9.0
Total Suspended Solid (TSS) ((mg/l)	210	53	150	100
Bio-chemical Oxygen Demand (BOD) (mg/l)	1200	57.5	50	30
Chemical Oxygen Demand (COD) (mg/l)	3050	105	200	250

Note: Inlet leachate sample was collected on 24th January 2019 and tested from BRTC, BUET
Outlet treated sample was collected on 11th February 2019 and tested from BRTC, BUET

5.4 Washing Bay

A Car wash pool with three sets of high-pressure machines is in operation for 24 hrs. basis. This facility is used for washing the tires of waste vehicles after each trip before they exit the landfill site for parking in the garage. A new Car Washing Ramp has been built close to the existing car washing pool. This ramp shall be useful for the heavy equipment washing.

New Car Washing Ramp beside the Car Wash Pool

5.5 Soil Cover and Greenery

Three locations of the piled wastes are covered with soil and then turfed which made the waste piles green and beautiful. This soil covering as well as turfing shall be continuing in future to create a greenery environment in the Landfill site.

Greenery in the Landfill Site

5.6 Landfill Operation Monitoring

A computerized monitoring system with CC TV has been set up around the landfill site. This allows 24 hours online monitoring of entry, exit, weighbridge, general area of dumping and personnel on duty.

5.7 Landfill Operating Cost

Generally, a sanitary Landfill involves high operating cost as multiple types of vehicle are engaged round the clock. Moreover, the heavy metal contents in waste management and depreciation cost of equipment add up the operating cost. This cost is minimized through careful planning, leachate treatment and regular supervision of landfill activities. Landfill operating cost for per ton waste is 187 Taka. The landfill operation cost of 2018-2019 is listed below.

Sl. No.	Item of Expenditure	Cost (Million BDT)
1	Fuel Cost for landfill Operation	47.50
2	Equipment Depreciation Cost	100.00
3	Development Repair and Maintenance Cost	100.70
4	Staff Salary	14.15
5	Electricity Bill	1.95

5.8 Landfill Visit of DNCC Mayor and Japanese State Minister of Environment

Honorable Mayor of DNCC has visited the landfill site on 29th June 2019 along with Mr. Minoru Kiuchi, State Minister of Environment, Japan; Hitoshi Hirata, Chief Representative, JICA BD office and the key personals of WMD.

Landfill Visit's of Honorable Mayor of DNCC and State Minister of Environment, Japan

6.0 WARD-BASED APPROACH IN WASTE MANAGEMENT

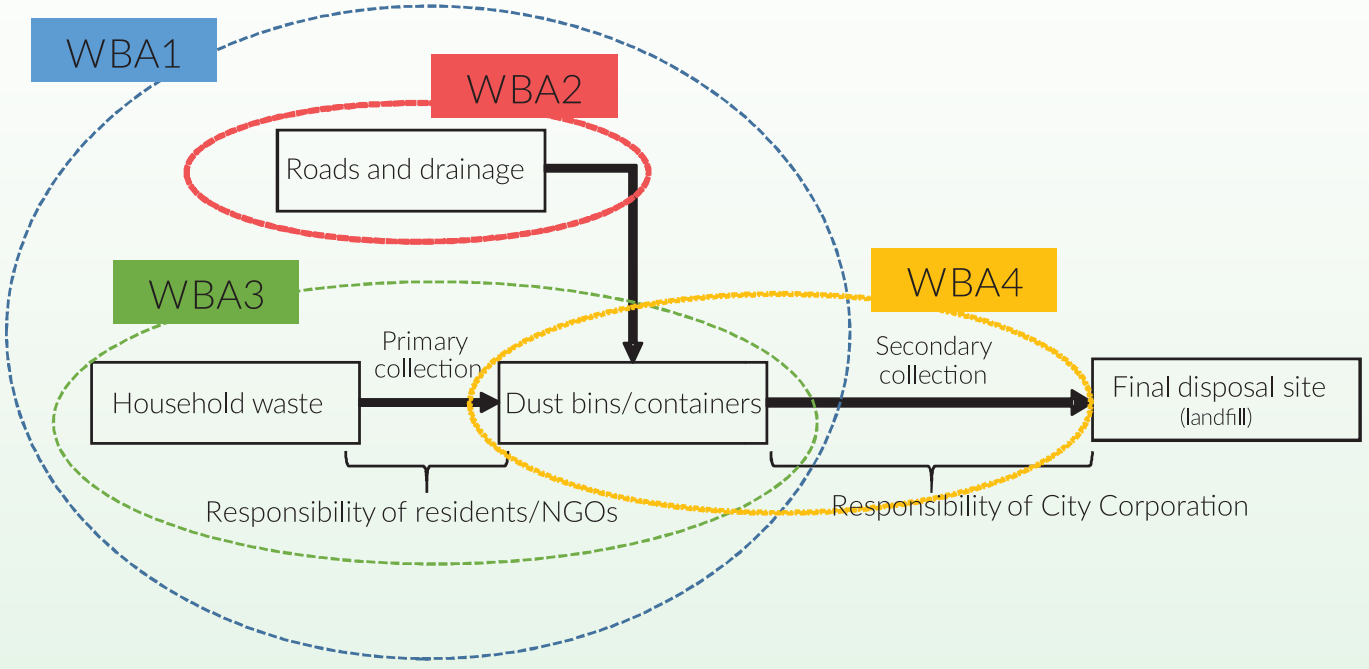
6.1 WBA Components

The people's participation in SWM was realized over time for the improvement of waste collection, transportation and disposal through a community participatory framework known as the Ward-based Approach (WBA). As a result, requests and complaints from citizens were handled gradually with by the WMD and ward offices, which oversee the SWM on-site. The SWM activities of the DNCC thus became connected with the society in Dhaka, and the social interest and responses instilled job pride in the DNCC staffs.

The ward-based approach (WBA) aims to build a synergy of related activities in the wards (field level) and headquarter by synchronized intensive resource input, which includes the four major components that are interlinked. The four components of WBA are as follows

WBA 1: Construction and management of ward SWM office
WBA 2: Safety education for cleaners and establishment of safety and sanitation committee
WBA 3: Community participation
WBA 4: Improvement of waste collection service

WBA drives field-level activities that cover the entire DNCC jurisdiction under the WMD and is a key tactic for boosting the community participatory SWM for Dhaka's clean environment as well as the CI's work efficiency. The WBA activities are outlined as an official work of DNCC by office order. All stakeholders for the WBA including DNCC officials, CIs, COs, and cleaners as well as ward councilors need to work together for successful WBA activities. Through the success of WBA activities, overall management of solid waste can be improved.



Interrelation among WBA components

6.2 Management of Ward SWM Office (WBA-1)

Ward-1

Ward-4

Ward-15

Meeting at Ward-27 (Renovated)

Meeting at Ward-32 (Renovated)

The importance of functioning of Ward office is mentioned in WMD directives and Administrative Procedure Book (Draft).WMD directives will help the CI's to prepare ward level SWM plan and the administrative procedure book will guide in ward office management. The first ward office in Dhaka was constructed in 2008 and 20 ward offices have been built in DNCC since then. Still some Conservancy Inspectors use community centers as temporary ward offices or have no office. DNCC constructed 13 ward offices and renovated 2 ward offices in FY 2018-19. However, the acquisition of private land for ward office construction is a challenge owing to complicated and unclear land ownership rules.

List of Wards of SWM Ward Offices:

Sl. No.	Ward Office	Sl. No.	Ward Office
1	Ward#1 (Uttara)	11	Ward#23 (Khilgaon, Malibag)
2	Ward#2 (Mirpur-12, Kalshi)	12	Ward#24 (Tejgaon I/A)
3	Ward#4 (Mirpur-13, 14)	13	Ward#27 (Razabazar, Sher-e-Bangla Nagar)
4	Ward#5 (Mirpur-11)	14	Ward#28 (Agargaon, Taltola)
5	Ward#8 (Mirpur-1)	15	Ward#29 (Tajmahal Road)
6	Ward#9 (Anand Nagar, Bagbari)	16	Ward#31 (Nurzahan Road, Shahjahan Road)
7	Ward#12 (Tolarbagh, Bangala College)	17	Ward#32 (Lalmatia, Shyamoli)
8	Ward#15 (Vasantek, Matikata))	18	Ward#33 (Japan Garden City)
9	Ward#17 (Khilkhet, Nikunja)	19	Ward#34 (Jafrabad, Madhubazar)
10	Ward#18 (Baridhara)	20	Ward#36 (Nayatola, Magbazarcoloni)

Newly Constructed Ward Office *Renovated Ward Office* *Word Offices (Constructed before 2018)*

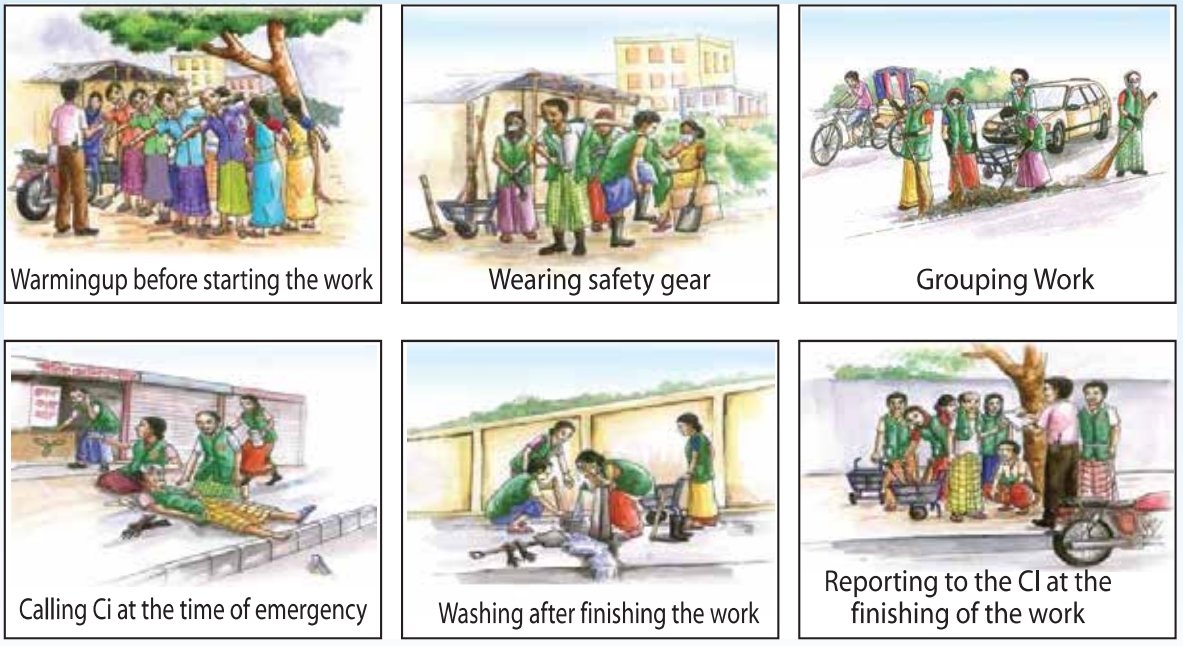
6.2 Safety, Education and Health Care Services for Cleaners' (WBA-2)

Dhaka North City Corporation has arranged several cleaner's workshops and seminars for cleaners' safety and sanitation issues to enhance work efficiency, motivate and encourage them by providing safety gears and raising awareness for the cleaners' work environment. Although, field workers of waste management department suffer regularly from unhealthy and non-sanitary works, such as getting ill for not taking precautions before touching garbage or getting injured for touching sharp materials. Therefore, providing necessary safety gears, such as masks, gloves and first aid boxes to prevent such incidents are essential for improving the work place environment for the field workers of the waste management department.

Cleaners' Safety Education Program

DNCC has formulated Safety and Sanitation Committee (SSC) through the clean Dhaka project in all Wards and Landfill to ensure safe and sanitary working environment of the cleaners and workers of the WMD. SSC is directed to organize safety committee meeting once in a month accordingly CI will prepare a meeting report for submitting to ACWMO. Collecting all the meeting reports of different Wards, ACWMO will compile them and submit to CWMO for further development.

DNCC distributed a worker's manual that contains work procedure at the start, health & safety instructions and instructions of safety measures while working in a team to avoid accidents and casualties. The WMD encourages each cleaners and cleaner's group to support each other by, for example, helping other group's work after finishing own work. Such an on-job training contributes to changing mind setting of the cleaners and drivers for mutual assistance and respect and to better organizational governance.



Cleaners Working Manual

Sometimes cleaners face road accidents and casualties while working in the main/busy roads. Some accidents are fatal, while some are injurious. DNCC in association with hospitals and diagnostic centers has taken a number of programs to provide health care services to cleaners. For example, the Anwer Khan Modern Medical College Hospital had arranged a free cancer screening program for 400 cleaners and agreed to support the affected cleaners with special discount for further treatment. The Ibne Sina Diagnostics has offered the Cleaners and their family members to get special discount on pathological test and treatment.

As per the direction of the Prime Minister, DNCC has committed to provide accommodation facilities to 784 cleaning staff by 2021. For this, the Honorable Mayor laid the foundation stones of four 15-storey residential building and a 4-storey school building in the Gabtoli area of DNCC.

Pictures of Free Cancer Screening Inaugural Ceremony

6.3 Community Involvement and Education Program for Participatory SWM (WBA-3)

DNCC has continued to periodically hold public meetings and Environment Educational Program in which the mayor, councilors, and WMD officials respond to the community's opinions and stakeholder concerns in zones and wards. In addition, Eid-related workshops, PCSP meetings & workshops, special cleaning programs, and environmental education programs in schools are occasionally organized by the WMD to increase the awareness of the citizens.

Through the formation/recognition of community unit working group (CUWG) and community action plan (CAP) by community SWM issues analysis are suggested in community SWM guideline, which was developed in JICA's last technical cooperation project.

DNCC conducted the following activities to strengthen community SWM activities:

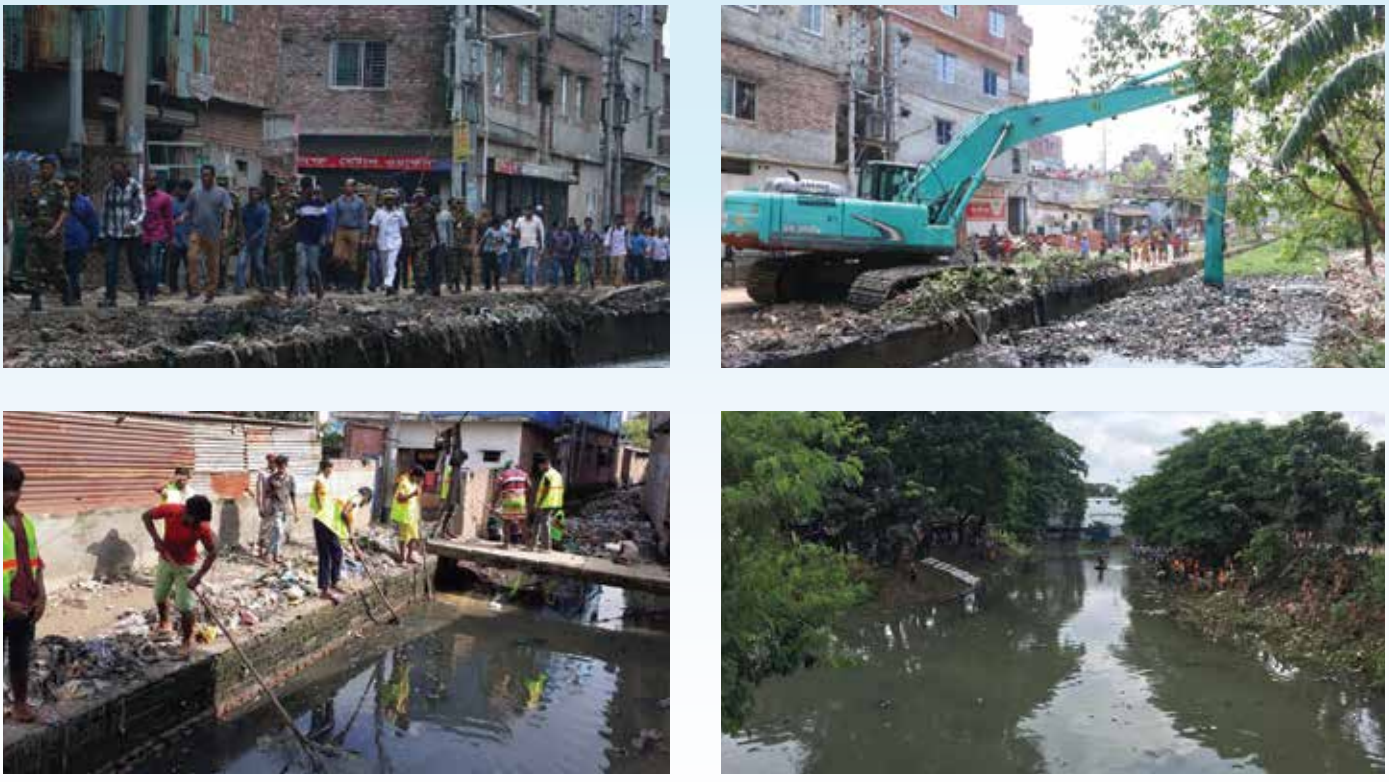
- Community engagement program for solid waste management
- Promotion of 3R and waste segregation
- Promotion on littering offence
- Compactor allocation and promotion program

Honorable mayor of DNCC attended several open discussions of public meetings, Environment education Program in educational institutions and cleaning campaigns organized by DNCC in different wards. Honorable Mayor inaugurated wall painting program and special cleaning campaign on the 99th birth anniversary of Bangabandhu Sheikh Mujibur Rahman.




Open Discussion, Education Program and Public Awareness Campaigning

Special cleaning activity have been conducted periodically in each ward to ensure the North city clean involving citizens or certain wards. Honorable Mayor Atiqul Islam of Dhaka North City Corporation (DNCC), inaugurated a bypass drainage canal from Kalshi to Baunia in Dhaka. DNCC has removed more than 80 trucks of dirt from the Kalshi canal and recovered a lot of waste like mosquito nets and even furniture while cleaning the Kalshi canal. DNCC has started cleaning of several canals occupied by waste that causes water-logging.



Special Cleaning at Kalshi, Mirpur

The DNCC is planning to implement a project called "Two Trees One Dustbin". DNCC Mayor hoped that citizen will accept the dustbin designed by the DNCC as their own property. Afterwards, DNCC will place them strategically to sustain them. Besides that, several campaigning on littering offence and citizens duty on solid waste management have been conducted.

Public awareness campaign through Wall Painting

6.4 Introduce New Collection System with Compactor& Improve Existing Collection System (WBA-4)

Aiming to improve the waste collection efficiency, DNCC has adopted fix-time-fix-place collection system with compactor trucks (WBA 4A) and also making effort for improving existing/traditional collection system ((WBA 4B) through removing dustbins, containers and also closing open spots. Thus far, 175 dustbins and more than 20 containers have been removed from the streets since 2013[5]. Dustbin and undesignated dumping sites closure are ongoing with the DNCC initiative. Meanwhile, almost all the wards are having facilities of FTFP compactor collection system.

[5] Future Vision of Solid Waste Management in Dhaka North City (New Clean Dhaka Master Plan 2018-2032)

DNCC organized compactor promotion program to let community know about the environment friendly collection system through compactor provided by JICA in ward 11 & ward 22. Before compactor promotion, Conservancy inspector of certain wards have arranged several meetings with Councilor and community representatives about Compactor timing and placing. In those meeting they altogether made a route plan of Compactor and distributed the leaflet to community focusing on public awareness and citizen involvement in SWM. Finally, DNCC has arranged the compactor Kick off meeting inviting representatives from different society for open discussion.

Compactor Promotion at Ward 11

Compactor Promotion at Ward 22

6.5 WBA Core Group Members & Meeting

DNCC has formulated WBA core group comprising of HQ officials (CWMO, Superintending Engineer, Executive Engineer) and field level officials (ACWMOs, COs and CIs). WBA Core group meeting takes place once or twice in a month depending on the necessity of the improvement of Solid Waste Management. In the meeting, both HQ and field level officials share their challenges, problems and suggestions. In some cases, CWMO or any other HQ officials provide practical instructions to field level officials to solve issues on community involvement, labor management, street sweeping, waste collection etc. On the other hand, ACMOs have meeting with their COs and CIs in the zone offices on urgent issues or challenges related to Waste Management of their zone.

WBA Core Group Meeting

Proposed WBA Core Group Member	
Group/ToR	Members
Group Leader	Chief Waste Management Officer
Planning Committees	♦ Additional CWMO ♦ Superentendent Engineer ♦ Executive Engineers ♦ All ACWMOs
Co-Ordinator	Md. Mofizur Rahman Bhuiyan (ACWMO, Zone-5)
WBA-1: Ward Office Management I. Ward Profile: compile solid waste data by ward (target: all wards) II. Management of SWM Administrative Procedure Book (Admin Book) Review Committee	♦ Md. Rokib Hasan (CI, Ward-26) ♦ Md. Shahidul Islam (CI, Ward-27) ♦ Md. Abul Hashem (CI, Ward-30)
WBA-2 : Cleaners' Safety and Sanitation Improvement I. Implementation of cleaners' workshops (target: all wards) II. Implementation of Zone trainings: Training of Trainers for cleaners' workshop III. Safety and Sanitation Committee Formation	♦ Mohammad Ashadul Islam (CI, Ward -1) ♦ Habib Md. Al Hasan (CI, Ward-21) ♦ Md. Rabiullah (CI, Ward-22)
WBA -3: Promotion of Community Participation I. Implementation of community meetings (target: all wards) II. Implementation of Zone trainings: Training of Trainers for community meeting III. Arrangement of educational program (target: each zone IV. Management of PR committee in collaboration with PR department	♦ Md. Bengir Ahmed (CI, Ward-19 & 20) ♦ Md. Jahirul Islam (CI, Ward-36) ♦ Md. Rafiul Hassan (CI, Ward-24 & 25)
WBA -4 : Improvement of Waste Collection and Transportation I. Promotion of source separation (target: 1-Big waste generator, 2-Model community) II. Implementation of PCSP training (target: all wards) III. Communication with transport department regarding Fix-Time Fix-Place (FTFP) collection	♦ Md. Abu Khaled (CO, Ward-9 & 10) ♦ Md. FarhadHossian (CO, Ward-11 & 12) ♦ Md. Anwar Hossain (CI, Ward-6 & 7)

7.0 QURBANI WASTE MANAGEMENT

In Dhaka North City, approximately 2,15,000 sacrificed animals were slaughtered during the first day of Eid-ul-Adha. There were 183 designated spots by DNCC to slaughter sacrificed animals. In addition, 356 spots were identified for slaughtering in residential complexes which makes it to a total of 539 spots. Moreover, 250 open slaughtering spots on roadside has been detected. Different from the previous years, citizens had more positive approach on slaughtering sacrificed animals in the designated spots allocated by DNCC.

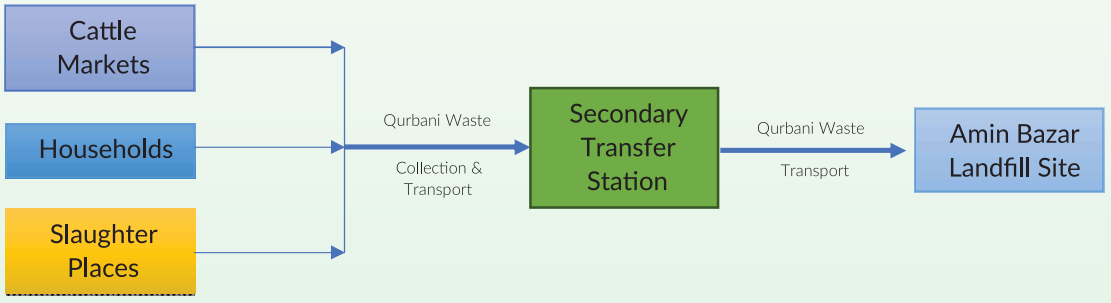
No. of wards	No. of sacrificed animals in DNCC	Sacrificed animals slaughtered near own residence	Sacrificed animals slaughtered in designated spots	Sacrificed animals slaughtered in open roads
36	2,32,000	4066	1,15,934	32,000

Qurbani Waste Collection

Honorable Mayor of DNCC had monitored the Eid-ul-Adha arrangements and preparation which had been started three months beforehand, with a well-defined action plan that helped the cleaners from DNCC and PCSP for quickly removal of qurbani waste with efficient collection and transportation to predefined secondary collection points. This year, Councilors from ward 7, 27& 31 were first to declare their areas clean and rest of them followed afterwards.

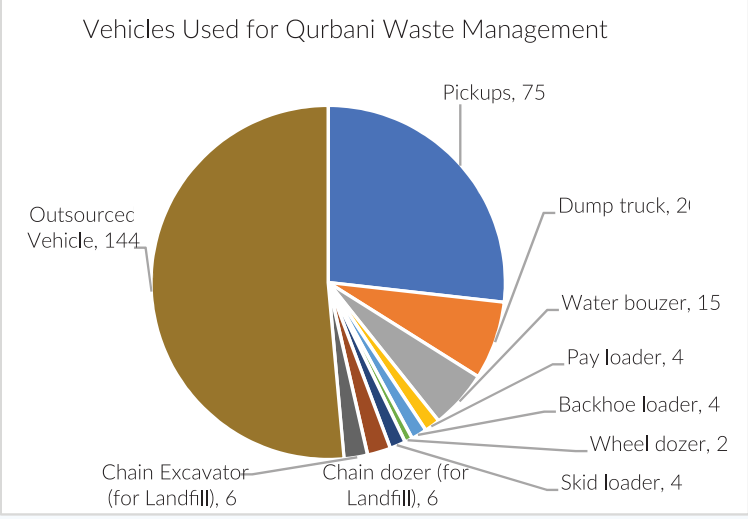
Qurbani Waste Data of DNCC

Year	Sacrificial Animal	Waste Generation (MT)	Growth (%)
2016- 2017	197,000	9,165	NA
2017- 2018	207,880	10,655	16
2018- 2019	2,32,000	11,550	8



Qurbani Waste Management Flow Chart

To manage the huge volume of waste that was generated during the three-day Eid-ul-Adha, waste vehicle and heavy equipment were used. In total of 280 waste vehicles and mechanical heavy equipment were in operation where 124 vehicles were outsourced. To manage the waste, DNCC outsourced 6,800 cleaners, making it 9,500 cleaners in total who worked relentlessly day & night for the quick removal of waste and bring back the city to its old livable condition for the city dwellers. Officials from all sectors and grades were involved collaborated manner to manage this huge volume of waste.



As always, citizen participation and cooperation is incomparable for successful solid waste management and therefore, this year a lot of importance were given to public awareness to inform the general people aware about the facilities that are to be served and the need for cooperation. For motivating people to accept and make the best use of the facilities, the following tools were used.

- TVC by GIU, Prime Minister's Office, Digital promotion in association with a sponsor
- Two weeks long sponsor based motorized announcement
- Week long miking in each ward by Zonal Executive Officers
- Meeting by the respected Councilors with local community leaders, scavengers and private waste collectors
- Communicating messaging through Leaflets, Household waste collectors, Media reports, Rally and Imams at the mosque raising awareness during the last three Jummah before the Eid-ul-Adha

Service provided by DNCC to the citizens are as follows:

- ✓ Garbage bags distributed house to house by the respected Councilors with the help of ACWMOs and CIs.
- ✓ ZEOs and Councilors arranged butchers at the designated slaughtering spots
- ✓ Bleaching powder and anti-germ liquid were distributed through the CIs where the sacrificed animals were slaughtered.
- ✓ For raising awareness, 100,000 leaflets were distributed in the North City.
- ✓ Facebook page, DNCC apps, official numbers of officers were available throughout to make the communication with the public more convenient.
- ✓ Free vehicle service was provided by the Councilors to fasten the removal of waste from the respective areas.

Areas of Concern for Next Year

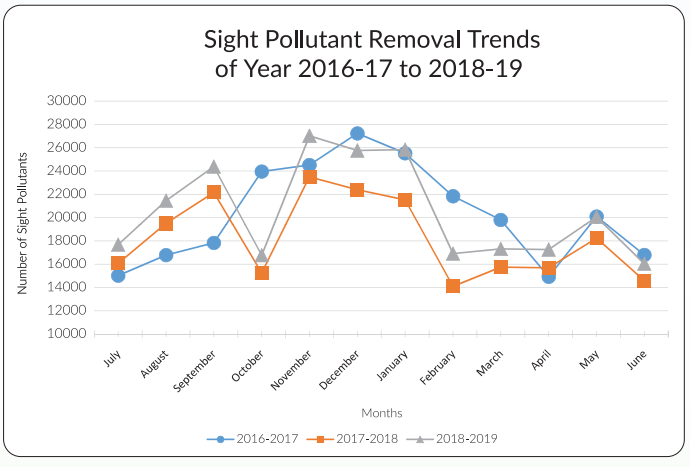
- ✓ Raise awareness for slaughtering sacrificed animals in the designated spots.
- ✓ Introduce eco-friendly jute bag.
- ✓ Avoid dumping Qurbani Waste to landfill and use it as a resource.

8.0 REMOVAL OF UNAUTHORIZED BANNER FESTOON DISPLAY

Unauthorized banners, festoons, graffiti, posters, overhead signboards and billboards are illegal ways of branding and publicity. These pollutants are damaging natural beauty of the city and also are making sight pollution. Government organizations, political parties, private enterprises and individuals; all are applying this illegal way for branding and publicity.

Applying relevant laws, DNCC had been removing illegal display & structure if it is not authorized. Especially the city takes the worst look at the time of national & local election along with others political programs out of that time. Various trans-national corporations & local companies are also seriously responsible for these types of pollutants. During the time of festival different organizations, political parties, institutions, public figures, interest groups, various unions, different services providers use banners, festoons etc. for branding their products, services etc.

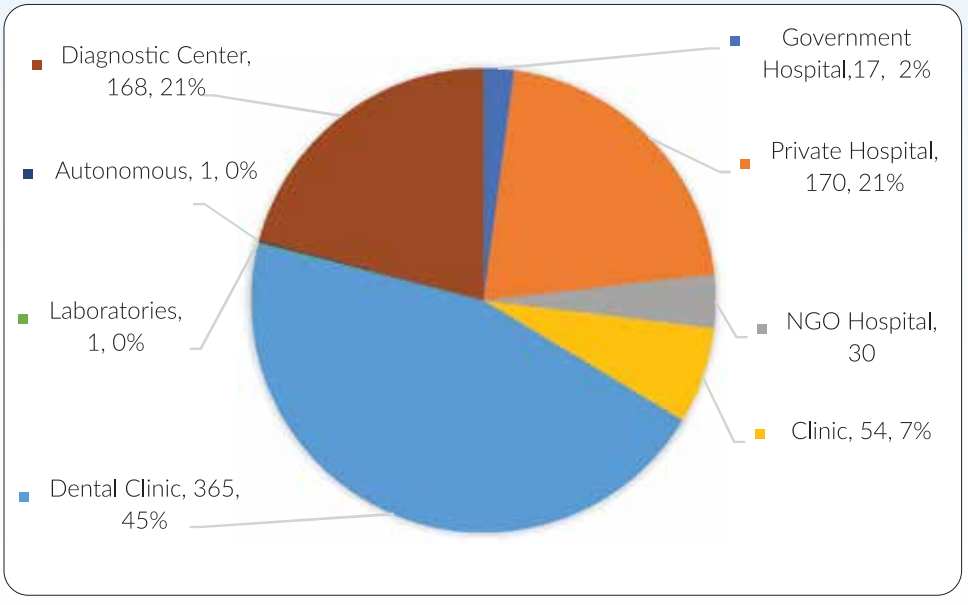
During the period between Sep 2016 and Jun 2017, DNCC removed 244,326 banners and festoons weighing about 46,553 Kg. To remove these huge sight pollutants, DNCC spent 30,300 man-hours. In 2017-2018, Waste Management Department removed 218,724 banners & festoon with the weight of 48,060kg using 43,200 man-hours. In 2018-2019, DNCC has removed 246,458 banners & festoons. The trend of banner and festoon removed by month is presented in the chart below.



Removal of Banner Festoon

9.0 MEDICAL WASTE MANAGEMENT

Medical waste generated in the Health Care Establishments (HCEs) in Dhaka is growing with an ever-increasing number of Government, private and NGO hospitals, clinics and NGO clinics, Dental Clinics, Diagnostic Center, Autonomous hospital, laboratories in North City Corporation, Dhaka. The proportion and number of HCE of DNCC is shown in the following pie chart.



Proportion and number of HCE in DNCC

The daily amount of medical waste generation in DNCC is 3248.4 kg in the year 2018. Amount of Infectious, Sharps, and Recyclables waste are 2388 kg, 509.2 kg and 351.2kg respectively in the same year. The following tables highlights the daily average waste generation in different HCE and yearly medical waste generation including growth rate. Though hazardous fraction of medical waste is very small less than 1% but overall waste of the city might be very risky if this small fraction is not managed properly.

Daily average Waste of Dhaka North City Corporation

Types of HCE	General (Kg)	Infectious (Kg)	Sharp (Kg)	Recyclables (Kg)	Total Medical waste (Kg)	Total Waste (Kg)
Government Hospital	4810	846	123	62	1031	5841
Private hospital	18354	2688	569	531	3788	22142
NGO Hospital / clinic	488	104	10	10	124	612
Clinic	1236	171	27	15	213	1449
Dental Clinic	1131	200	Less than 1	Less than 1	200	1331
Laboratories	5	1	Less than 1	Less than 1	1	6
Autonomous Hospital	700	50	15	3	68	768
Diagnostic Center	3244	507	90	68	665	3909
Total	29968	4567	834	689	6090	36058

Source: Medical Waste Management Survey by PRISM

DNCC monitors Onsite storage, sorting and management, and collection

Many of HCSs are using color-coded bins/containers for onsite storage. The color codes, category of waste, organizations are responsible to treat the waste and present situation is in the following Table. The most onsite treatment system is limited to the needle cutting and some sort of sterilization or autoclaving in limited scale. The in-house management i.e. the segregation at source according to the color codes, internal transportation and storage is the responsibility of the respective government hospitals, private hospitals and clinics.

Onsite Sharp (Needle) disposal system Segregation at source with Color Coded Bins

Onsite storage in color Coded Bins

Monitoring of Source Segregation by DNCC

10.0 EXPERIENCE GATHERING OF WMD OFFICIALS

WMD sometimes arrange official visits of different waste recycling/treatment factories to gather knowledge and future DNCC's service improvement on ongoing waste recycling /treatment systems as well as their capacities. In this regard, WMD officials have visited Glass Recycling Factory and E-waste Recycling Factory (JR Enterprise, Azizu E-waste Recycling etc.). Moreover, WMD officials & DNCC councilors are also invited by different donor agencies like, JICA to visit their SWM related experiences and latest technologies.

JMS Glass Industry Limited

Azizu E-waste recycling factory

SWM Experience Sharing in India

SWM Techology Sharing at Re-Tem office, Japan

11.0 WMD DIRECTIVES

The main objective of a WMD directives is to ensure safe & secured human health with sound environment. The first WMD Directives developed in 2008 with the help of JICA's Technical Assistance Project, which stipulates establishment of the WMD and implementation of priority activities based on the first Master Plan. In 2012, the Directives was then amended as the second Directives exclusively for DNCC in consideration of the WMD's activities and surrounding circumstances, introducing the WBA concept through series of stakeholder consultation e.g. BUET, DU, Professionals, Elite citizens etc. The components of the second WMD directives are stipulated as follows:

1. Strengthening WMD's institutional capacities
2. Promotion of Public Private Partnership
3. City wide Awareness Raising Program
4. Improvement of existing system of waste collection and final disposal
5. Study on new waste treatment system
6. Optimizing allocation and enhancing efficiency of SWM equipment
7. Expansion of WBA considering 3Rs
8. Improvement of work environment and occupational health as a part of WBA-2

The new WMD directives 2019 is the third Directives, lay down objectives and strategies in ten key components, which are stated in the New Clean Dhaka Master Plan to reduce adverse environmental impacts of solid waste by introducing an integrated and sustainable management system together with involving the citizens and adopting appropriate technology. The components of the third directives of DNCC includes:

1. Public Relation, Public Awareness and Public Involvement
2. WBA Activity Implementation
3. Waste Reduction
4. Waste Collection
5. Collection Vehicle Maintenance
6. Intermediate Treatment (Eco-Town)
7. Final Disposal
8. Rules and Regulations
9. Organization
10. Financial Management.

12.0 ADMINISTRATIVE PROCEDURE BOOK

The SWM administrative procedure book referred to as "Admin Book," portrays the formal steps and the authority of the administrative procedures which helps to provide a mutual understanding between the applicants and approvers of the proposal, such as the CWMO, SE, EE, ACWMO, CO, CO etc. The Admin Book was developed on the basis of the enacted laws, regulations, and rules related to SWM. The first draft was prepared in 2012 with the support of JICA. On the basis of the first draft, the first edition of the Admin Book was prepared in Bengali in 2018.

The Admin Book will be revised regularly in accordance with the revision of laws and orders, and with practical experiences. Training sessions and workshops for DNCC staff and related stakeholders are required to disseminate the process written in the Admin Book. A review committee for the development of the Admin Book will be established to include the CWMO, sub-group leaders of the WBA Core Group, legal staff, and financial staff.

Proposed Admin Book Review Committee Members:

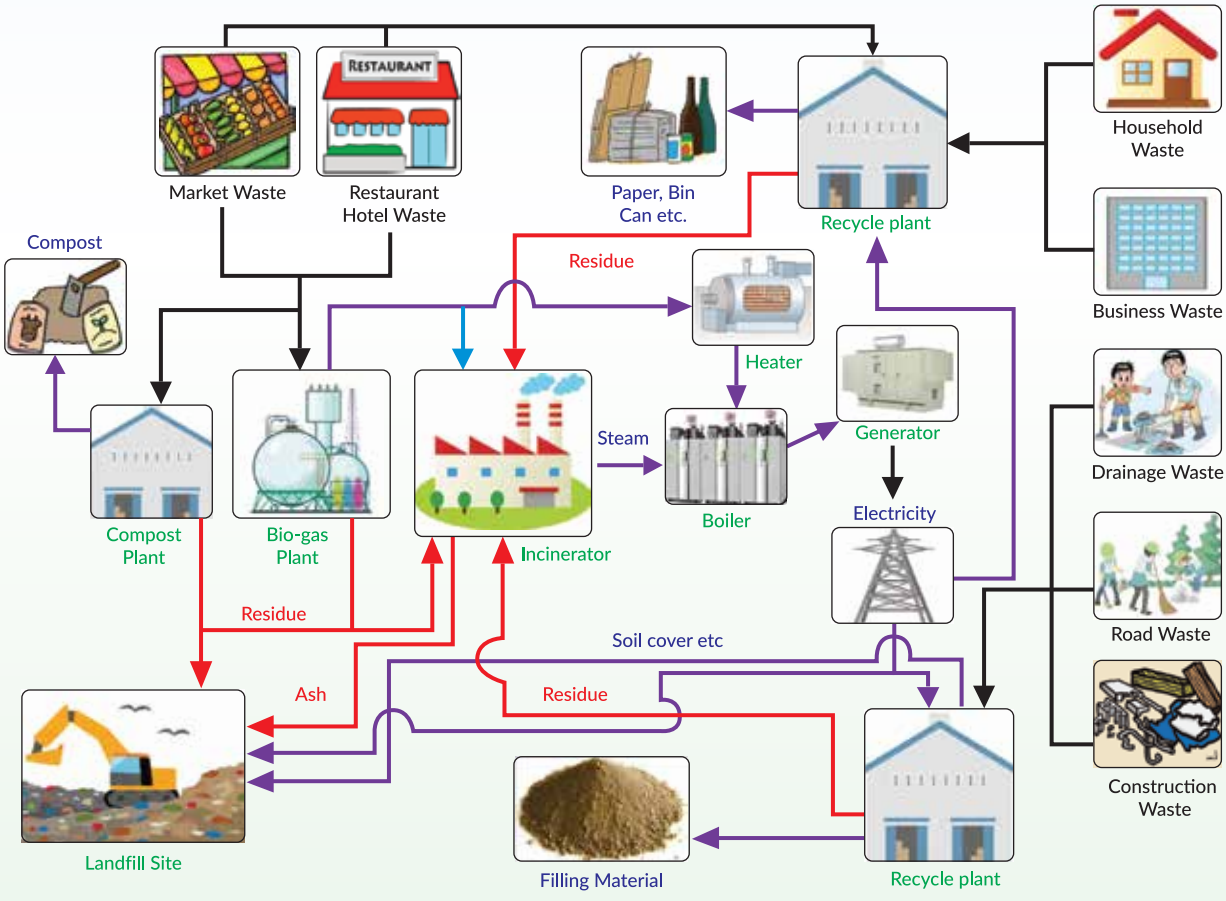
1. Additional Chief Waste Management Officer (ACWMO)
2. Coordinator of WBA Core Group Member
3. Sub-group members of WBA -1
4. Representative from Revenue Department
5. Representative from State Department
6. Representative from PR Department
7. Representative from HRD
8. Representative from Landfill Management Unit (LMU)
9. Representative from Supply and Procurement Department
10. Representative from Law Department
11. Representative from Transport Department
12. Representative from Engineering Department
13. Other Officials if necessary

13.0 FUTURE WASTE MANAGEMENT PLAN

Future Waste Management Planning for Existing and Extended Wards (Resource Recovery Facilities: Introduce 3R with Intermediate Treatment System (Eco-Town Scenario))

A. General Information

Considering the lack of land availability in Dhaka, source separation as well as a significant waste reduction through intermediate treatment is unavoidable to secure final disposal sites. As the most powerful solution to reduce and diversify waste, the 3R concept with WtE is introduced with Eco-Town scenario. The following figure, shows a conceptual waste flow of the Eco-Town Scenario which contains various intermediate treatment options, such as WtE, food waste treatment, recycling, and medical waste treatment. All together with these waste reduction menus in assumption with reasonable treatment capabilities, the Eco-Town scenario could achieve 57% of waste reduction by waste recycling and source reduction.



Eco-Town Concept of DNCC

Conceptual Waste Flow of the Eco-Town Scenario

Three intermediate treatment methods can be considered in the said Eco-Town Scenario.

- **Waste-to-Energy Plant**

WtE plant, or incineration plant with electricity production, has significant potential to reduce waste to one-tenth of the original volume. It is costly on both the construction and operation and the DNCC does not have any experience yet on such a high-end technology implementation. Biogas from a biogas plant may be used as supplemental fuel to WtE.

- **Food Waste Treatment**

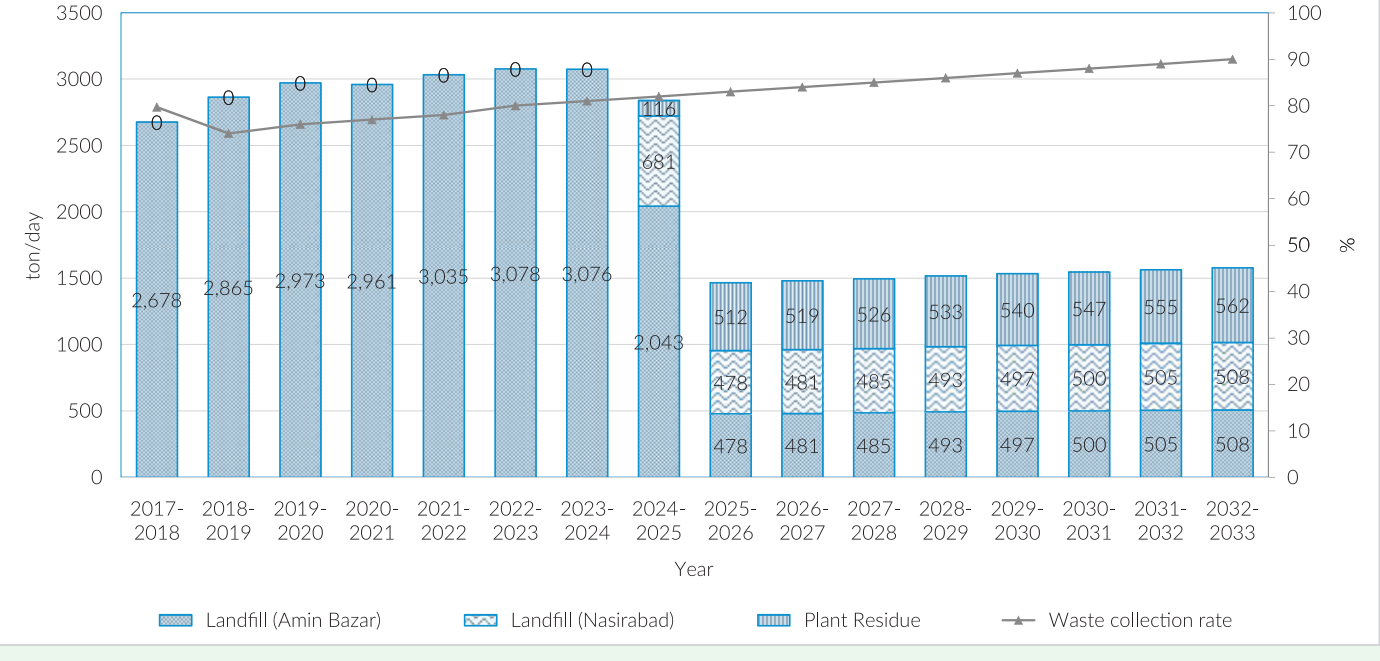
Food waste from restaurants and markets that produce large amount of food waste with less contamination can be treated in a composting plant. The compost is used as organic fertilizers.

- **Recycle Plant**

Waste from drainage, road cleaning, and construction sites is sorted and recycled at the recycling plant. After waste sorting, some of the organic items such as construction waste, can be used as raw materials or filling materials for the LFS. Sorted recyclables such as paper, bottles, cans, and plastics are sent further to process for recycling.

B. Final Disposal

The following figure shows the estimated final waste disposal amount up to FY 2032–2033. If the intermediate treatment is constructed in FY 2024–2025, the volume of waste for waste disposal would drastically decrease to about half of the collected volume.



Estimated Final Disposal at Landfill in the Eco-Town Scenario[6]

[6] Source: JICA Project Team analysis based on BBS "Population Census 2011," "Population Projection of Bangladesh 2011-2061," "Economic Census 2013," "Waste Amount and Composition Survey Report (2018)"

14.0 STAKEHOLDER ENGAGEMENT

Aiming to ensure a clean City, the first and foremost important activity is believed to be community participations. However, in Dhaka city, varieties of stakeholders exist and they are associated with municipal solid waste management and their participation degree can be taken to higher level with improved effort of stakeholders' engagement of City Corporation through the spectrum of WBA. The stake holders are:

- Primary Collection Service Providers (PCSP)
- Housing societies
- House owner's association
- Market association
- Shop owners associate
- Sports club
- Mosque committees
- Various religious institutional committees
- Neighborhood associations or CBOs and NGOs
- Ward councilors and female councilors etc.

Ward based Approach can give a platform to engage the stakeholders with planning and implementing community-based participatory solid waste management (WBA 3) following its guidelines. Community action plans (CAP) are made with the participation of key stakeholders where city corporation staff and community leaders can play facilitation roles. And community or waste generator can take the decision-making role of their community SWM system design in terms of waste disposal or transshipment-points, discharge methods, collection time and method along with social mobilization or behavioral changes of polluters. Fixed time and fixed place collection with compactor trucks are a good example of stakeholders' engagement in ward level solid waste management under WBA. Regular cleaning or waste collection is important but at the same time, keeping or maintaining the community areas' cleanliness is more important so that it does not get dirty again quickly which is only possible where stakeholders are positively and voluntarily engaged themselves.

Stakeholder Engagement Programs

15.0 WAY FORWARD

- Formulation and execution of Master Plan and Directive and related policies or guidelines for DNCC Solid Waste Management;
- Established well-functioning Waste Management Department focusing the target of New Clean Dhaka Master Plan 2018 -2032;
- Development and conceptualization of Administrative Procedure Book aiming to enlighten all the WMD staff on administrative and procedural guidelines such as labor law, taking leave, promotion, equipment purchase, data management, information disclosure etc.;
- Managing the waste considering the philosophy of Megacity such as decentralization to institutionalize each ward's waste management through Ward Based Approach;
- Fixed-time and fixed-place collection system promotion in each ward gradually by compactor trucks;
- Gradual removal of container and dustbins by compactor trucks for cleaner and efficient collection;
- Promotion of integrated SWM through adoption of 3R concepts with strong organizational support and back up;
- To make massive volume reduction in the LFS by introducing the concept of Eco-Town as suggested by JICA Expert Team through the combination of the Incineration, waste to energy, composting, construction waste recycling etc. processes;
- Advocacy and campaign to mobilize the society regardless the age and gender through PR and Awareness planning and implementation using effective Information Education and Communication (MIS) tools and techniques;
- Waste Management related database management system development and application in monitoring and planning through the adoption of Management Information System (MIS);
- Inclusion of more mechanical street sweeper which are efficient and easy to operate;
- Inclusion of more jet and sucker machines for drain cleaning;
- Ensure highest ethical compliance in waste management through transparency and accountability in steps of management through publishing reports or sharing information in websites;
- Ensure service benefits of all officials such as the regular provision of safety gears, insurance of cleaners, CIs, and Landfill staffs etc.;
- Vehicle operation and management to be in a unified system of WMD as suggested by JICA and LGD.

Technical Support: JICA Solid Waste Management Project Team