TN TAMIL NADU | US URBAN SANITATION | SP SUPPORT PROGRAMME

REPORT

CITY SANITATION PLAN: PERIYANAICKEN-PALAYAM

January 2016

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TN US SP
TAMIL NADU URBAN SANITATION SUPPORT PROGRAMME

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Abbreviations

ADD	Acute Diarrhoeal Diseases
AEO	Assistant Educational Officer
AEO	The Assistant Educational Office
AES	Acute Encephalitis Syndrome
ANC	Ante Natal Care
APL	Above Poverty Line
BCC	Behaviour Change and Communication
BDO	Block Development Officer
BIS	Bureau of Indian Standards
BPL	Below Poverty Line
BSNL	Bharat Sanchar Nigam Limited
BSUP	Basic Service to Urban Poor
CDD	Consortium for DEWATS Dissemination
CI	Controlled Industries
CLTS	Community-Led Total Sanitation
CMCC	Coimbatore Municipal City Corporation
CPHEEO	The Central Public Health and Environmental Engineering Organization
CSR	Corporate Social Responsibility
CT	Community Toilet
CWSS	Combined Water Supply Scheme
DCHB	District Census Hand Book
EM	Effective Microorganism
F	Female
FC	Fitness Certificate
GH	Government Hospital
GI	General Industries
GO	Government Oder
GoI	Government of India

Abbreviations (contd)

GoTN	Government of Tamil Nadu
GR	Growth Rate
GSL	Geo Spatial Laboratory
HH	Household
IHHL	Individual Household Latrine
INR	Indian Rupees
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
LMW	Lakshmi Machine Works
LPA	Local Planning Authority
LPG	Liquefied Petroleum Gas
M	Male
mg/l	Milligram per litre
MLD	Million Litres per Day
MTP	Mettupalayam
NA	Not Applicable
O&M	Operation and Maintenance
OD	Open Defecation
OHT	Over Head Tank
ORS	Oral Rehydration Solutions
OSS	On-Site Sanitation System
PAN	Permanent Account Number
PCA	Primary Census Abstract
PHC	Primary Health Centre
PNP	Periyanaicken-Palayam
PRICOL	Premier Instruments & Controls Limited
PSC	Public Sanitary Conveniences
PSP	Public Stand Post
PT	Public Toilet

Abbreviations (contd)

RCC	Reinforced Cement Concrete
ROC	Recurring of Current
RTO	Regional Transport Office
SBM	Swachh Bharat Mission
SBR	Sequential Batch Reactor
SHG	Self Help Groups
SHI	Special and Hazardous Industries
SOP	Standard Operating Procedures
SRKV	Sri Ramakrishna Mission Vidyalaya
SSA	SarvaShikshaAbhiyan
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TNEB	Tamil Nadu Electricity Board
TNSTC	Tamil Nadu State Transport Corporation
TNUSSP	Tamil Nadu Urban Sanitation Support Programme
TP	Town Panchayat
TWAD	Tamil Nadu Water Supply and Drainage Board
UGD	Under Ground Drainage
ULB	Urban Local Body
WC	Western Closet

Executive Summary

Executive Summary

This document presents the City Sanitation Plan (CSP) for PNP which includes a situation analysis of sanitation and related major components such as water supply, storm water drainage and solid waste management. An action plan to bridge identified gaps is also proposed.

The CSP preparation exercise included various approaches such as secondary data collection, field visits, sample surveys, stakeholder consultations and discussions. TNUSSP baseline studies, a slum vulnerability study, community and public toilet assessments, and a scoping exercise have informed the preparation of this CSP. The data was collected and analysed using primary and secondary data collection methods.

E1.1. Location, Physiography, Demography and Socio-economic Characteristics

PNP is situated 17 kilometres (km) north of Coimbatore city along Highway No. 67. The most dominating physiographic feature of PNP is the Kurudi Malai (Kurudi Hills) on the western side, while the northern, southern and the eastern parts of the Town Panchayat (TP) are made up of plains. The TP has pleasant weather due to the presence of forests to the north and the cool winds blowing through the Palghat gap in the Western Ghats. With an area of 938 hectares, PNP received an average annual rainfall of 906 mm in 2015, with half of this accumulating during the summer months.

As per Census 2011, PNP is a Class III town with a population of 25,930 individuals. This reported population of PNP is projected to reach about 33,000 by 2025. Scheduled Caste communities account for 10 per cent of the population, while Scheduled Tribe communities form 0.07 per cent. Daily floating population of PNP, mainly those who work in the TP, is estimated at about 3,500. Further, about 2,000-3,500 commute to PNP on a weekly basis.

Total slum population makes up about 8 per cent of the total population. An assessment was done in the slums to assess their vulnerability in terms of water, sanitation and basic facilities.

In terms of land use classification, 61 per cent of the land is classified as agricultural, 17 per is residential, 8 per cent is industrial and 6 per is public or semi-public land. While there is no designated forest area in the TP, it has a total of eight parks and recreational spaces.

Eighty-one per cent of the population in PNP TP is literate. Female literacy is marginally lower at 77 per cent. 43 per cent of the population report being gainfully employed for more than 180 days annually. In terms of fuel and electricity, 85 per cent of households reported using liquefied petroleum gas (LPG) as fuel for cooking and 98 per cent use electricity for lighting (Census 2011).

PNP has access to a good public transport system as the highway connecting Coimbatore and Mettupalayam goes through the town, which is also supplemented by the passenger train running five times a day between these two places.

E1.2. Water and Environmental Services

E1.2.1. Water

There are no water bodies, i.e. lakes or ponds, within the TP jurisdiction as dried ponds have been taken up or converted for different uses. Drinking water in PNP TP is supplied from the Combined Water Supply Scheme (CWSS) through the Pillur-II water scheme (Athikadavu) by the Tamil Nadu Water Supply and Drainage Board (TWAD). The water from Pillur is treated at the water treatment plant at

Velliangadu, and water reaching the town from the CWSS is stored in four overhead tanks with a total capacity of 1.74 MLD. This drinking water is supplied to households and other types of establishments.

Since the storage capacity of overhead tanks is just a part of the daily drinking water supply, supply is augmented by 48 bore wells, 4 open wells and 2 hand pumps in the town. Residents in the TP report usage of the CWSS supply for potable purposes, while the groundwater-based supply is for other purposes in the household.

At the household level, 98 per cent have access to potable water. Of this, 81 per cent of the water sources are within the premises, 18 per cent are near the premises and 1 per cent is away from the premises. The local distribution is metered and supplied by the TP. Analysis of cases of water borne disease in the Government Hospital suggest that such incidents are more frequent during the rainy season.

While current water supply volumes seem to satisfy the population requirements, considering the increased demand in the future, it is necessary to source additional water supply, increase storage capacities, protect the sources for non-potable water supply, and reduce water losses and leakages.

E1.2.2. Storm Water Drains

The main natural storm water drain in the town is the Perumpallam Odai, a stream originating from the foothills of Kurudi. It runs north east cutting across PNP, Veerapandi and Karamadai, and eventually joins the Bhavanisagar dam. Open drains are constructed for a length of 25.35 km through the town leading to the Perumpallam Odai. However, these drains also carry sewage in addition to storm water, which contaminates the water bodies and groundwater. It is estimated that the capacity of the storm water drain is around 5 MLD every day with an additional load of about 1.4 MLD in the rainy season. Dumping of household waste including kitchen waste, plastic bags, plastic bottles, and wrappers from chocolates and biscuits affects the flow of drain water.

E1.2.3. Solid Waste Management

With 8.5 tonnes of waste generated every day, PNP has a good system of waste collection with 52 push carts, 3 tractors, 1 tipper and 1 Tata Ace. Though the Municipal Solid Waste Management Rules, 2015, emphasise segregation at source, this practice appears to be followed partially only in three wards. Waste is systematically segregated with dedicated space for windrow and vermicomposting at the resource recovery park of the TP.

The biodegradable waste which is generated by households, hotels and markets is estimated to be 4.5 tonnes per day and is transported to the New Recovery Park. There it is shredded and converted into organic manure in 35-45 days using the windrow composting method. Biodegradable waste is also vermi-composted.

Non-biodegradable wastes are sold to scrap dealers. The silt and other inert materials that are collected from the drains are taken in trucks and dumped at the landfill at Erankattu Thottam on Athipalayam Road.

E1.3. Sanitation and Wastewater Arrangements

E1.3.1. Sanitation

Individual household toilets cover 83 per cent of the town, 14 per cent are dependent on public sanitary conveniences (PSC) and 3 per cent defecate in the open. Schools, colleges and hospitals in the TP have their own toilets while four of the twelve Government offices do not have their own toilet and depend on PSC. The government offices in PNP TP office do not have separate toilets for men and women and no separate urinals.

Thirteen PSCs including public and community toilets serve the town panchayat. Most of the households without individual toilets are reported to be using the PSCs, while there are reports of a few members defecating in the open. In PNP, four OD spots were identified during field visits and all these places were located near two slums –Vivekanandapuram and Kuppuchipalayam–with railway tracks and open spaces nearby being the preferred sites for OD. Kuppuchipalayam slum has no PT or CT for men and children within the settlement. There is a PT for women, which is located 500 m away from the houses. At night, the women are wary of accessing this and prefer to defecate in the open, if the need arises.

Sanitation workers who maintain the PSC are overloaded and spend only a few hours cleaning the toilets. This reflected in lower user feedback with just 35 per cent of the users reporting to be satisfied with cleanliness. Also, long queues especially during morning hours is reported to be an issue with 61 per cent of the respondents highlighting this.

Further, infrastructure in some of the PSCs is poor with mugs, buckets and dust bins either missing or damaged. In some cases toilet doors and windows are in a poor condition, the seats of the toilet are sometimes in disrepair and some of the flushing systems do not work. In PNP just 44 per cent of the users reported the toilets to be safe for use.

No user fee is mandatory in any of the locations, as the TP makes the payment for the cleaner / caretaker. However, the cleaners informally demand Rs.2 from the users if they happen to see them while cleaning in the mornings.

E1.3.2. Containment, Collection and Treatment

The TNUSSP household survey showed that the containment systems used in more than three fourths of the households were septic tanks, and others to be single pits. Among other establishments, only 46 per cent had watertight septic tanks while 17 per cent had septic tanks with partition walls. All the establishments with toilet facilities reported being connected to septic tanks. A preliminary scoping study indicated that all the 13 PSCs in the town are connected to septic tanks for containment of fecal matter. It was observed that six septic tanks out of the 13 connected to these toilets are exfiltrating due to blockage or breakage.

Containment structures in households and establishments are currently emptied by private desludging operators. There are four private operators residing within the TP cluster having eight cesspool vehicles. Of this, two are registered with the TP. There are two more sludge operators who come into the TPs from Vadavalli to provide the service to households. The operators charge households about Rs.1,000 to 1,500 per truckload of septage emptied. Key challenges reported by operators include access to septic tanks which often need to be broken open, lack of skilled operators and drivers, stigma from households and lack of fecal sludge disposal sites.

There is no treatment facility available at the TP for treating sewage and septage. Although the Ukkadam sewage treatment facility in Coimbatore has a decanting station, it is almost 20 kms away from PNP. Therefore, the current disposal site for fecal sludge is in the farmlands in and around the TP. Most of the farm's soil conditioned using the septage from households is used for growing fodder crops.

E1.4. Institutional Arrangements and Municipal Finances

The PNP TP is governed by an elected council consisting of 18 members – one elected from each administrative ward by the voting population. The TP executive is headed by the Executive Officer, who is assisted by staff to manage administrative functions. Solid waste management, maintenance of public streets and drains, and PSC are all the responsibility of TP. The creation of suitable infrastructure, recruitment of staff/workers and management of these works forms a core duty of the TP.

The TP's annual expenditure for the financial year 2015-2016 was Rs.35.27 crore, of which TPs own revenue (taxes, charges and fees) constitute about 9 per cent. A substantial portion of the development and maintenance works is managed through funds devolved and grants from the state and national

governments (32 per cent), contributions from the state government (17 per cent) and other sources. TP also receives Corporate Social Responsibility funding.

The expenditure on salaries and wages makes up about 5 per cent of the annual expenditure. Water revenue brings in about Rs.46 lakh, while payments to the TWAD Board were Rs.3.8 crore. For the emptying of sludge from septic tanks in CTs and public buildings, the TP reported an expenditure of Rs.83,000. While the current revenue stream affords it a certain cushion for managing daily expenditure on sanitation related services, the cost of any intervention in the full chain of sanitation cannot be borne by the TP.

E1.5. Action Plan for Sanitation Improvement

Based on the sanitation situation assessment, weaker elements of the sanitation chain were identified for potential improvements and a key action plan was put together. The elements requiring interventions were identified as containment, conveyance, treatment and reuse.

In terms of containment, the key action items identified include stopping open defecation in identified wards/locations, conversion of insanitary latrines to sanitary latrines, improving the operation of PSCs and addressing the service needs of the floating population. Activities identified under fecal sludge conveyance include regularising desludging activities, safe emptying of septic tanks, and ensuring fecal sludge is discharged at designated sites only. With respect to treatment and reuse, a treatment facility for greywater and septic tank effluents and re-use option for fecal sludge after treatment are identified as an action item. Estimated investment for the city sanitation plan is also provided by component along with sources of funds where possible and works out to Rs. 1,21,49.670.

Introduction

1. Introduction

This document details the City Sanitation Plan for the Periyanaicken-Palayam (PNP) Town Panchayat (TP), in Coimbatore District of Tamil Nadu State. Chapter 1 presents the key geographical features, along with demographic, socio-economic and spatial profile. Chapter 2 presents the details of Water and Environmental Services, while Chapter 3 presents Sanitation and Wastewater arrangements. This is then followed by a brief analysis of the institutions and the current financial status of the ULB. The last section of the City Sanitation Plan summarises the areas requiring improvements in sanitation delivery and outlines an Action Plan for improved sanitation in the ULB, taking account of the factors above.

1.1 Methods

Towards drafting the City Sanitation Plan, both primary data collection and secondary research was undertaken.

The Scoping Exercise conducted by the Indian Institute for Human Settlements (IIHS) offered baseline information with respect to demography, socio-economic profile, water supply, sanitation and solid waste management in PNP (TNUSSP, 2016). Also, other studies conducted by TNUSSP including Baseline Studies (TNUSSP, 2016), Desludging Operators: An Overview (TNUSSP, 2018), Vulnerability Assessment of Slums in PNP and Narasimhanaicken Palayam (NNP) (TNUSSP, 2018), and Assessment of Community Toilets and Public Toilets in PNP and NNP (TNUSSP, 2018), have informed the CSP. Further, additional information was taken from the District Census Handbook and Google Maps. TP level income and expenditure information was provided by TP officers.

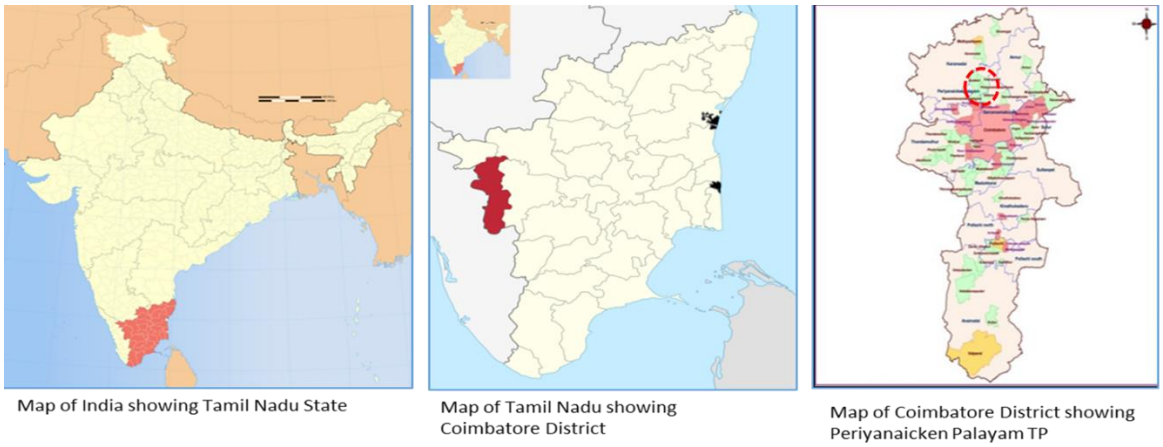
A number of field visits were conducted to interact with TP officers and community members to understand various aspects including the location of key infrastructure, water supply, water storage and treatment, location of storm water drains, solid waste management systems, and open defecation spots, among others. All information was validated and presented in this CSP.

1.2 Geographical Setting

1.2.1 Location

PNP is situated 17 kilometres (km) north of Coimbatore city along Highway No. 67, which runs between Coimbatore and Mettupalayam. Figure 1.1 indicates the location of PNP with respect to the district, State, and National boundaries.The TP is part of an almost fully urbanised corridor extending along the Coimbatore-Mettupalayam Road.

Figure 1.1: **Location of PNP Town Panchayat**



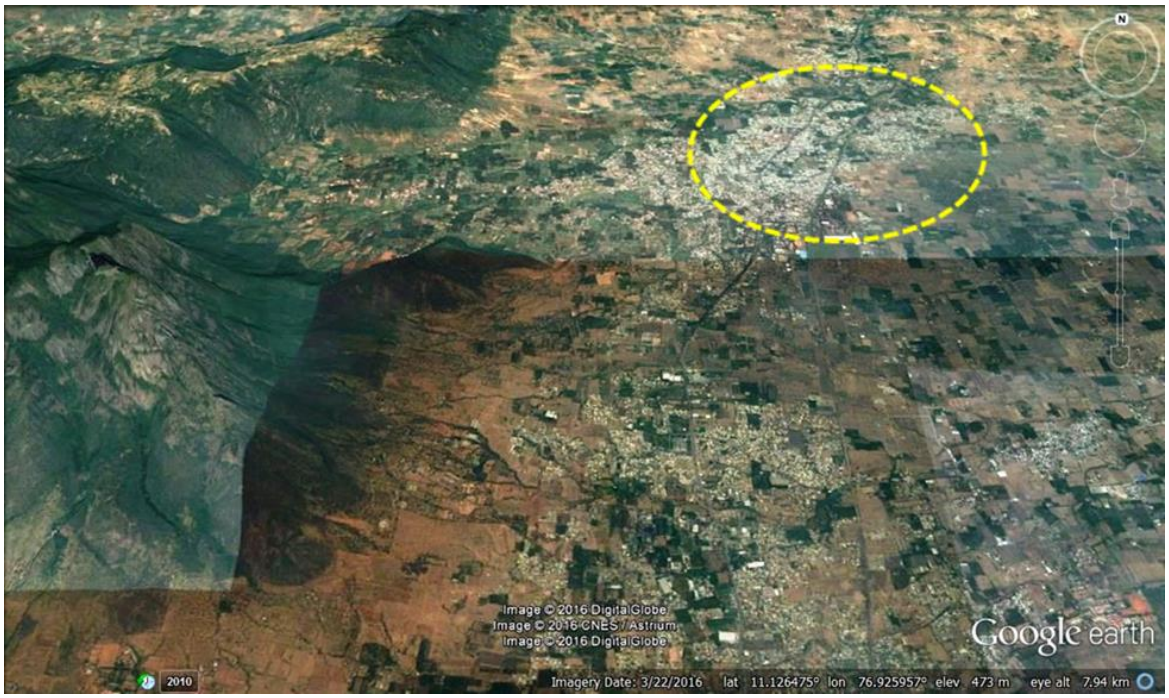
Source: Wikipedia, 2016

1.2.2 Physiography

The most dominating physiographic feature in the study area is the Kurudi Malai (Kurudi Hills) on the western side. The highest peak of these hills is about 1,500 metres (m) above mean sea level. One of the peaks at an altitude of 1,440 m is most predominantly visible from anywhere in the TP. The Kurudi Hills range is a part of the Thadagam Reserve Forest. These hills have rocky peaks with dense-to-moderately-dense mixed jungle along the slopes towards the foothills. The satellite imagery presented in Figure1.2 provides a glimpse of the physiography of the study area.

The northern, southern and the eastern parts of the TP are plain in contrast, with a gradual slope from the west to the east. The streams originating from the Kurudi Hills form most of the natural drainage in this area. River Kousika, flowing on the southern side of the town, is one of the main natural drains. It flows towards the east, for more than 50 km, to join River Noyyal near Vanjipalayam in Tirupur district. The Perumpallam Odaiis the other main natural storm water drain which passes through PNP. Perumpallam Odai flows north through the towns of Veerapandi and Karanadai and finally joins the Bhavani Sagar dam.

Figure 1.2: Satellite Imagery of PNP Environs

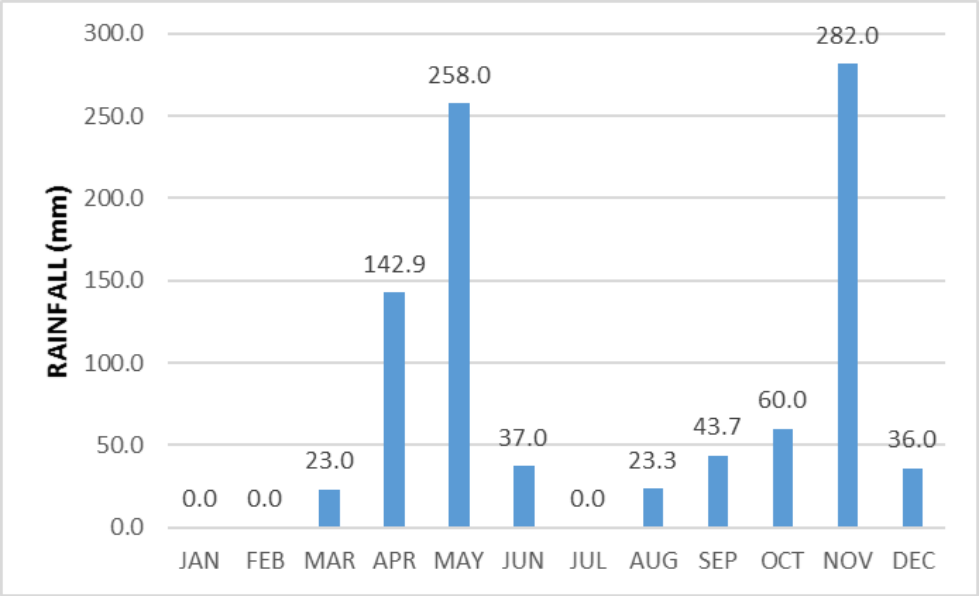


Source: Google Earth, 2016

The TP has a pleasant climate due to the presence of forests to the north and the cool winds blowing through the Palghat gap in the Western Ghats. The area has a tropical wet and dry climate (Köppen climate classification), with the wet season lasting from October to December due to the north-east monsoon. The maximum daily temperature ranges from 29.3 °C (85 °F) to 35.9 °C (97 °F), and the minimum daily temperature ranges from 18.2 °C (68 °F) to 23.5 °C (76 °F).

Analysis of rainfall data for the year 2015 indicates that PNP receives rainfall primarily in two phases in the year: during the summer months before the south-west monsoon sets in, and then during the north-east monsoon period from October to early January. In 2015, PNP received rainfall of 906 mm, with half of this happening during summer months.

Figure 1.3: Monthly Rainfall in PNP During 2015

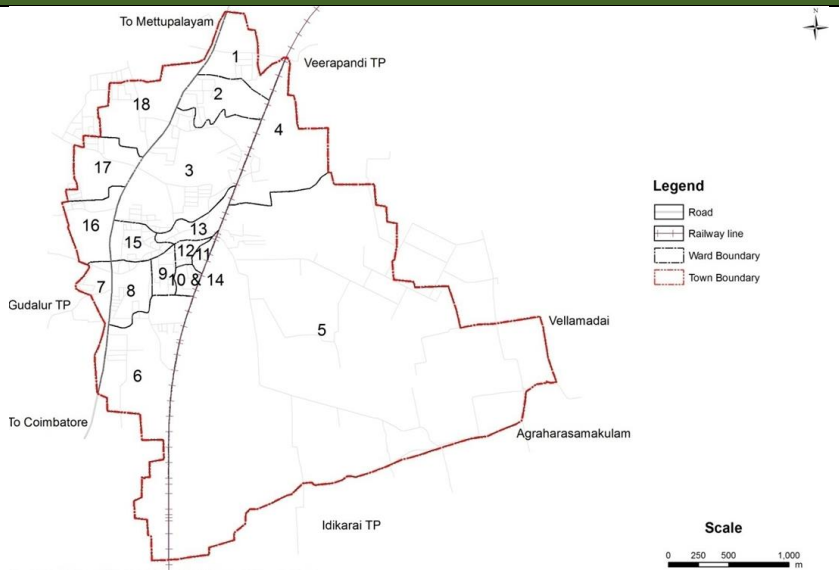


Source: India Meteorological Department, 2015

1.2.3 Spatial boundaries

The area of PNP is 938 hectares (9.38 sq km) according to the Local Planning Authority (LPA), Coimbatore. The TP has Kurudampalayam TP to the South, Idigarai and Veerapandi TP to the East, and Narasimhanaicken-Palayam (NNP) TP to the North.

Figure 1.4: **Administrative Map of PNP Town Panchayat**



Source: Town boundary from DTP, Ward boundaries – recreated based on the sketch obtained from TP office

1.2.4 Ward boundary

The ULB states that there will be delimitation of wards during election time, which might bring changes in the current ward boundaries.

1.2.5 Statutory status of the ULB

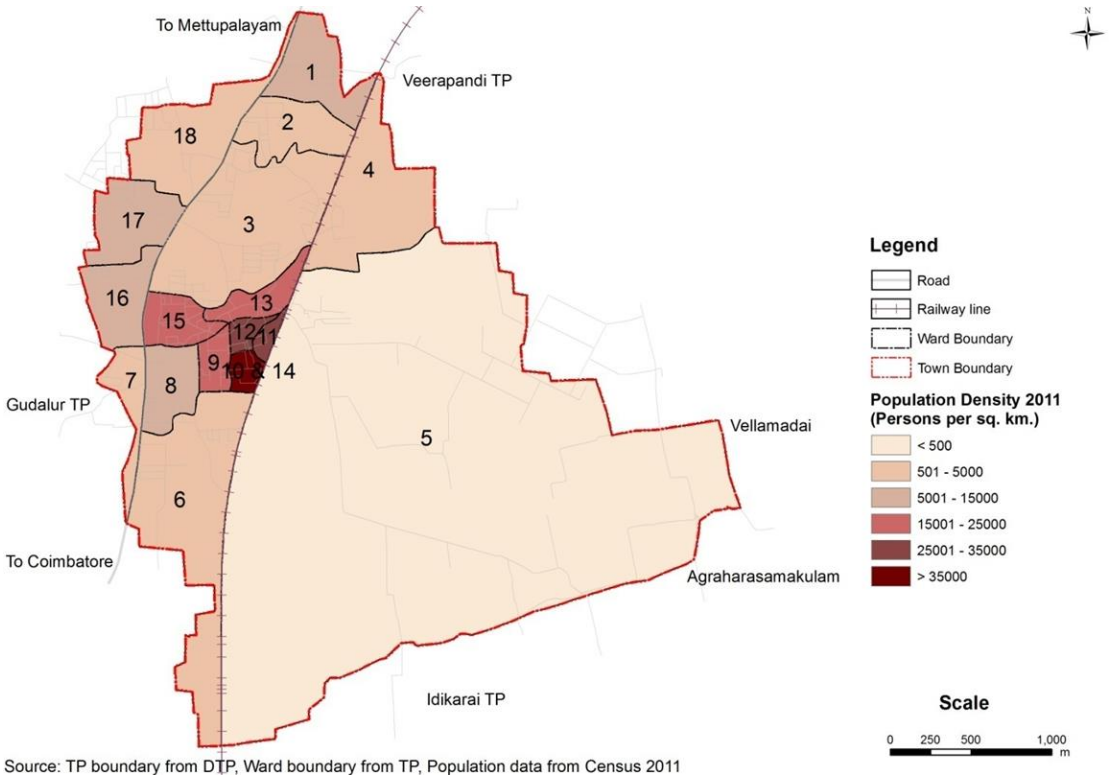
PNP has been a Selection Grade Town Panchayat (with an annual income of between Rs. 16 and 20 lakh) since 2012. It was upgraded from a Selection Grade village panchayat and was given the status of TP based on a Tamil Nadu Government Order (GO no.270) from the Municipal Administration and Water Supply Department, dated 11 June 2004.

1.3 Demography and Socio-economic profile

1.3.1 Resident population

According to the Census 2011, PNP is a Class III town with a population of 25,930 living in 7,377 households. The town has 18 wards, of which wards 3, 13, 15 and 16 are the most populous with more than 2,000 people each[1]. Figure 1.5 shows the distribution of people across the administrative wards of the TP.

Figure 1.5: **Distribution of Population in Wards of PNP**



Source: Census 2011 Data

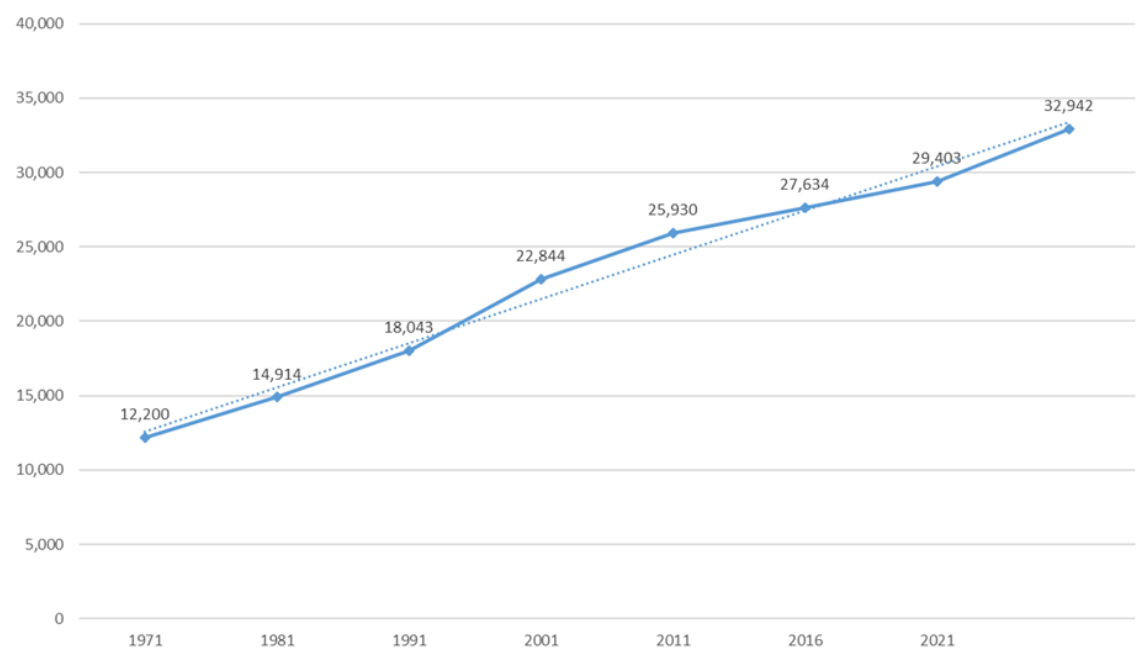
[1]Densities have not been computed as the ward boundaries are yet to be validated and hence ward area estimates too. Delimitation is expected to be effected by the time of the next ULB elections which would possibly create more wards in the denser areas.

Higher resident population is reported in the cluster of wards 8-16 situated along the Coimbatore-Mettupalayam highway and the railway line. Resident population is sparser on the eastern side of the railway line.

1.3.2 Population growth

The historical growth in population and projections are presented in Figure 1.6. Historically, the population of the town has grown the fastest between 1991 and 2001, when the population increased by 27 per cent. The TP reported a population of 25,930 in 2011 and is projected to reach about 33,000 by 2025.

Figure 1.6: **Population in PNP Town Panchayat (1971-2021)**



Source: Census of India, 1971-2011 and TNUSSP Projections

1.3.3 Floating population

PNP, sees an inflow of persons coming in for employment and for festivals like Mahashivaratri, Amavasya, Christmas and Ramzan (during which time a significant number of people come in from the neighbouring areas of Coimbatore, Mettupalayam, Sirumugai, and others).

Discussions with stakeholders and key informants indicate that an estimated population of 3,500 commute to PNP on a daily basis for employment. This would make up about 10-15 per cent of the population in the TP. Apart from this, it is estimated that about 2,000 people visit on a weekly basis, increasing to about 3,500 during major festivals.

These social and cultural events are organised in institutions that have provision for sanitation facilities (such as churches, choultries, etc.), but there is a significant number of itinerant persons in PNP who require sanitation services and facilities.

1.3.4 Social composition

Scheduled Castes account for 10 percent of the population, while Scheduled Tribes form 0.07 percent of the town's population (Census 2011). Arunthathiyars, Adi Dravidas, Kudumbans, Chakkiliyans and Pallans are the prominent Scheduled Castes in the town. Amongst Scheduled Tribes, Kurumans and Irulars are numerically dominant (Census, 2011).

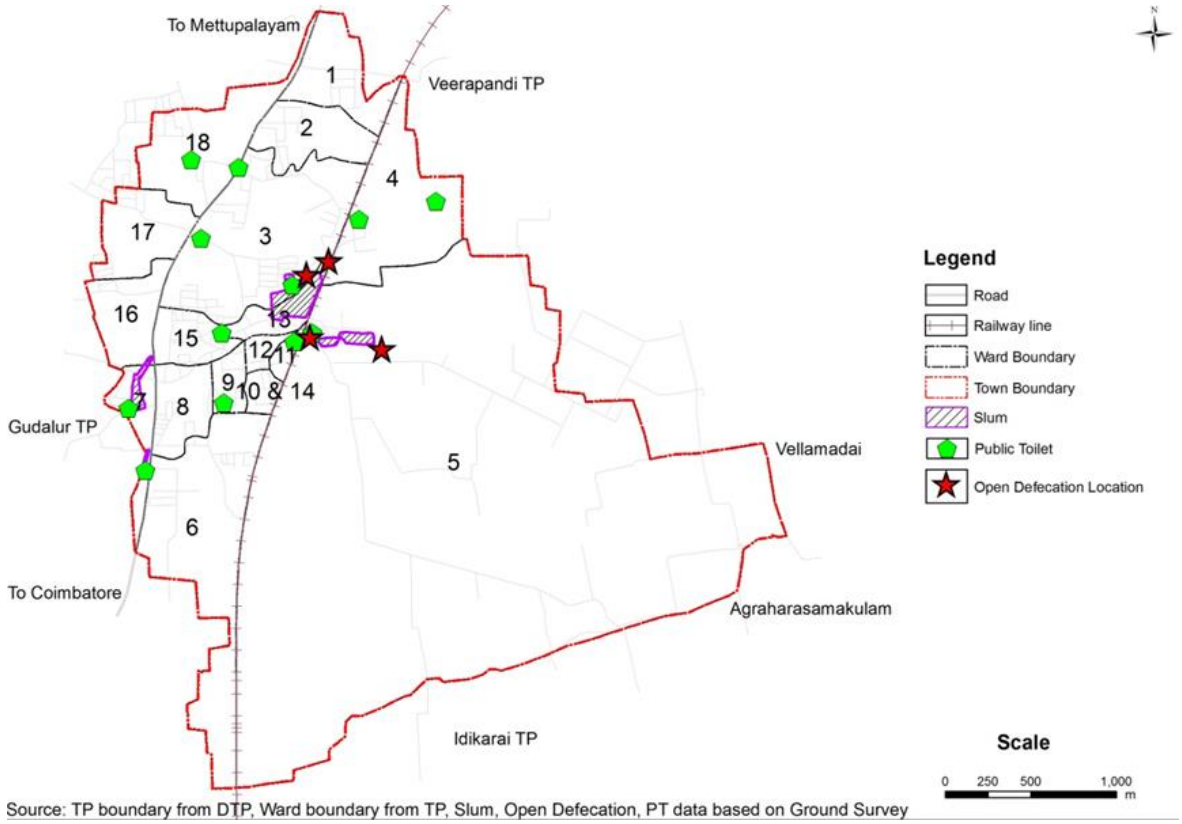
Hindus are the dominant religious group, forming close to 93 per cent of the population. Christians account for more than 5 per cent, while Muslims account for less than 2per cent.

Tamil is the most widely spoken language – among 55 per cent of the population. Telugu, Kannada, Malayalam and Urdu are also spoken, amongst 30 per cent, 11 per cent, 3 per cent and 1 per cent of the population respectively.

1.3.5 Slum population

The total slum population in the town, according to Census 2011,[2] is 2,010, forming close to 8 per cent of the total population. The average household size in slums is about 3.5, while the sex ratio is 970. Twenty-two percent of the slum population belongs to the Scheduled Castes while there are no Scheduled Tribe members reported to be living in the slums. Data from the TP office recognises three slum settlements in the town, namely, Kuppuchipalayam (Ward No. 5), Anna Nagar (Ward No. 7) and Vivekanandapuram (Ward No.13), with a total population of 1,695. The location of the slums is presented in Figure. 1.7.

Figure 1.7: **Location of Slums in PNP**



Source: Primary survey, 2016

[2]A slum, for the purpose of the Census, has been defined as residential areas where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and design of such buildings, narrowness or faulty arrangement of street, lack of ventilation, light, or sanitation facilities or any combination of these factors which are detrimental to the safety and health. There are three types of slums: notified, recognised and identified.

Field visits show that in the three slums in PNP, 70 per cent of the houses are built with pucca material (like bricks). The remaining households were semi-pucca or kachcha (made of impermanent materials like biomass). Some households were built under the Basic Services for the Urban Poor (BSUP) Scheme, which is part of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) 2015-2016. Seventy-five percent of the households report not having legal tenure (pattas), but all households report payment of house tax and have electricity service connections. Men and women in the slums are employed mostly as daily wage workers in the mills, in construction and in service sector establishments like hotels and bakeries. The average daily wage for men is reported to be Rs. 250-500 and for women Rs.200-300.

A slum vulnerability assessment was done to check key development parameters such as health, education, livelihood, basic infrastructure facilities, and social capital leading to different levels of vulnerability across slums in contiguous TPs of PNP and NNP . Slum-level primary data was collected through a focused group discussion with around 10 key informants from the community and participatory observation of the slum. The slum vulnerability matrix is presented in Figure 1.8.

Figure 1.8: **Slum vulnerability matrix - PNP**

Name of the slum	Ward No	TP	Status of slum			No. of NGOs/CBOs operating in the slum	Condition of approach road to slum	Housing	Basic Amenities				Availability of minorities	Availability of BPL HHs	Availability of Identity proofs	Adults and children Education	Employment pattern	% of children as child labor	Status of health and health services					No. of functional AWC within slum	Composite (Total Score = 42)
			Authorization	Location	Migration				Toilet	Water supply	Drainage	Electricity							Availability of PHC facility	Health seeking behavior	Service coverage	Outreach services	Disease outbreak in past 1 year		
Kuppuchipalayam - Arijana Colony	5	PNP	0	1	0	1	0	1	2	1	1	0	1	0	0	1	2	0	2	0	0	1	0	2	16
Vivekanandhapuram	13	PNP	0	1	0	0	0	1	1	1	1	0	0	0	0	1	2	0	1	0	0	1	0	1	11
Anna Nagar	7	PNP	0	2	0	1	0	1	0	1	1	0	0	0	0	1	1	0	2	1	0	2	0	1	15

Vulnerability assessment of slums in PNP

Most Vulnerable Moderately Vulnerable Less Vulnerable

Source: Vulnerability Assessment of Slums in PNP and NNP, 2018

1.4 Planning and transportation

The Local Planning Authority (LPA) of Coimbatore established in 1974 under the Town and Country Planning Act, 1971, is responsible for preparing the Master Plan and Detailed Development Plans for areas within its jurisdiction.

The LPA prepared a Master Plan for Coimbatore in the early 1990s that was approved in 1994. It consisted of the existing land-use back then and land-use proposed for 2001. Since the Master Plan has to be updated every 10 years, in 2011 a new Master Plan was prepared with the existing land use (as per 2011) and proposed land use for 2021. However, the current Master Plan has received more than 3,000 objections from the public, and therefore, the LPA is in the process of revising the entire Master Plan.

PNP town falls under the PNP Panchayat Union, which is a part of the Coimbatore North Taluk. According to LPA records, the area of PNP town is 938 hectares (9.38 sq km).

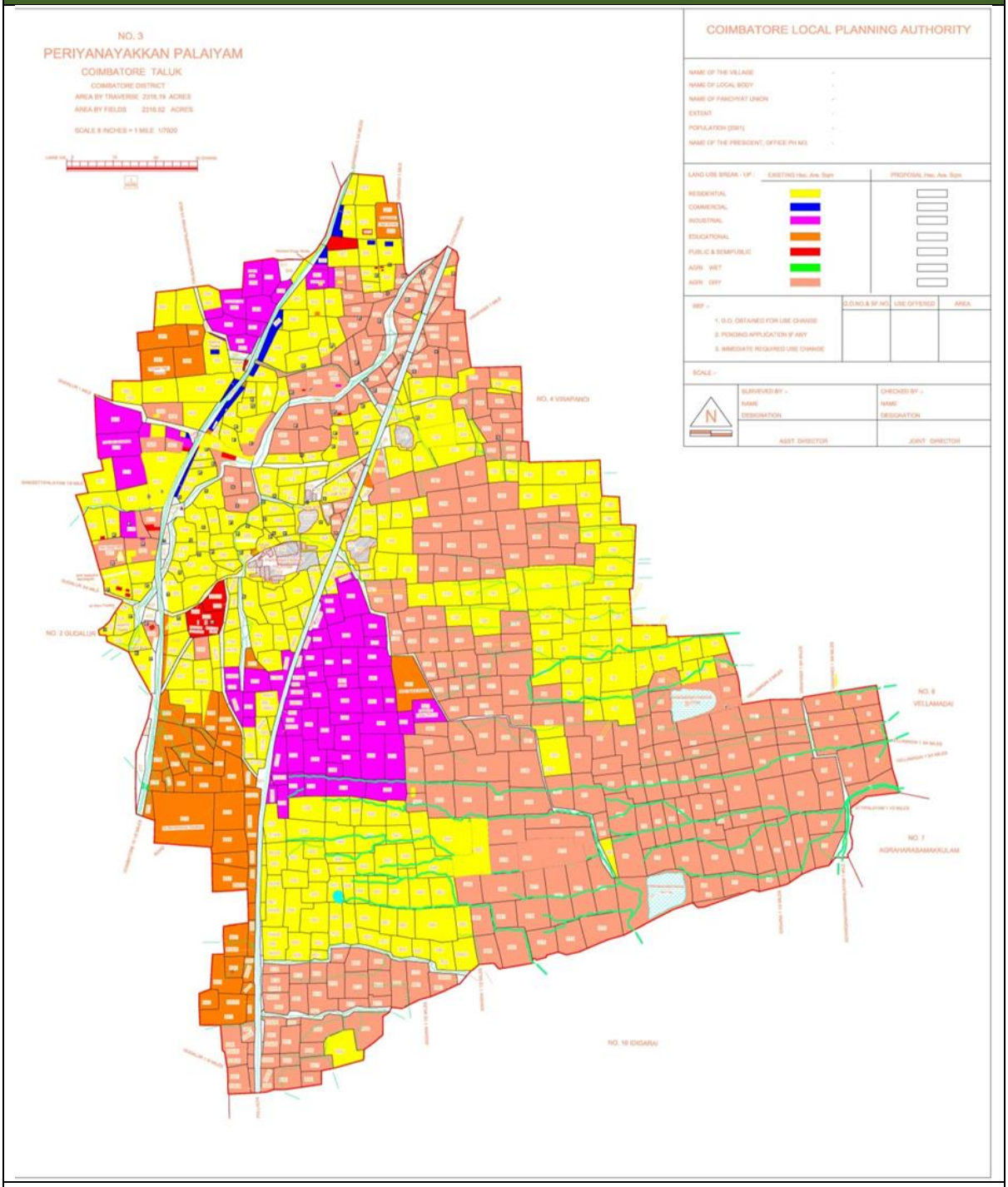
1.5 Land use classification

The land use for PNP according to the current LPA Master Plan (under revision) is presented in Figure 1.9. The distribution of the area in the TP under different land use categories is presented in Table 1.1.

Table 1.1: **Land Use in PNP TP**			
Sl. No.	**Land Use**	**Area (in sqkm)**	**Proportion of Total TP Area (%)**
1	Agriculture	5.83	61.3
2	Commercial	0.04	0.4
3	Industrial	0.83	8.7
4	Public & Semi Public / Institution	0.60	6.3
5	Rail Way	0.12	1.3
6	Residential	1.63	17.1
7	Road	0.30	3.1
8	Water Body	0.17	1.8
Total		**9.51**	**100.0**
Source: DTCP LPA masterplan analysis, 2017			

Primary observations in the TP indicate that land-use changes have not been significant, with possibly some reduction in area under agriculture and some increase in the area under residential use.

Figure 1.9: **Land Use Map of PNP**



Source: LPA Coimbatore, 2015

1.6 Parks, playgrounds and forests

In PNP, a total of eight parks and recreational spaces are available, two of which are general-purpose parks, four are children's parks, and two are play grounds. MGR Nagar Park has a play area and walking space, while the Shakti Nagar play ground has an auditorium. There is no recorded forest area in this TP.

1.7 Connectivity and Transportation

1.7.1 Public transport system

PNP has access to a good public transport system as the highway connecting Coimbatore and Mettupalayam goes through the town. The frequency of buses in either direction is high (one every 10 minutes during the day). This is supplemented by rail connectivity, with the passenger train running five times a day between Coimbatore and Mettupalayam.

1.7.2 Individual transport

The Census 2011 reports that 49 percent of the households own motorised two-wheelers. Ownership of a four-wheeler is reported by 9 percent of households.

1.8 Ownership of assets and access to social services

Ninety-four percent of the households reported owning television sets, while a smaller proportion (34 per cent) reported owning a radio/transistor (Census 2011).

Landline telephones are owned by about 7 per cent of households in the TP, and mobile phone ownership was reported by nearly 71 per cent of households (Census 2011). While mobile phone penetration was uniform across all wards, it was noted that Ward 6 reported low ownership (only 40 per cent).

Two-wheeler ownership was significantly lower in wards 11 and 13, and above the TP average in wards 1, 3, 6, 14, 15, 16, 17 and 18. Ownership of four-wheelers was also reported to be higher in wards 1, 6, 8, 15, 16, 17 and 18. Twelve per cent of households reported owning computers, while wards 3, 4, 5, 10, 11 and 12 reported relatively low ownership (less than 10 per cent).

Around one in every seven households in the TP owned all the four assets above (vehicles, communication, entertainment and computers), while one in every 50 households did not own any of these. The asset-less households were reported more in wards 5, 7, 11 and 17.

Eighty-five percent of households reported using liquefied petroleum gas (LPG) as fuel for cooking. LPG penetration was highest in wards 1, 3, 9, 14, 15, 16 and 17, and lowest in wards 4, 5, 10, 11 and 13. Use of firewood as fuel was relatively high in ward 5, 11 and 13.

Census 2011 data indicates that 98 per cent of households in PNP TP use electricity for lighting, with the remaining households using kerosene as fuel. In addition, there are 13 industrial establishments and 1,652 commercial establishments that have electricity connections (as per the data from the power utility). The TP has also 1,520 streetlight connections.

1.9 Literacy and employment

Eighty-one per cent of the population in PNP TP is literate. Female literacy is marginally lower at 77 per cent. Wards 4, 5, 7, 8, 11 and 13 have a lower proportion of literates, overall, as well as a lower proportion of female literates.

Of the total population of 25,930 (Census, 2011), there are 11,217 main workers (43 per cent) gaining employment for more than 180 days annually; 14,713 non-workers (53 per cent) and a small n umber of marginal workers (less than 0.5 per cent). Female non-workers form 38 per cent of the town’s population, and the male non-workers form 20 per cent.

2

Water and Environmental Services

2. Water and Environmental Services

This chapter presents the water, storm water drain and solid waste management status of PNP TP. Sanitation and wastewater arrangements are covered in the next chapter.

2.1 Water

2.1.1 Water resources in Periyanaicken-Palayam

Currently, there are no water bodies, i.e. lakes or ponds, within the TP jurisdiction. Existing streams were found to be dry and dried ponds had been taken up or converted for different uses.

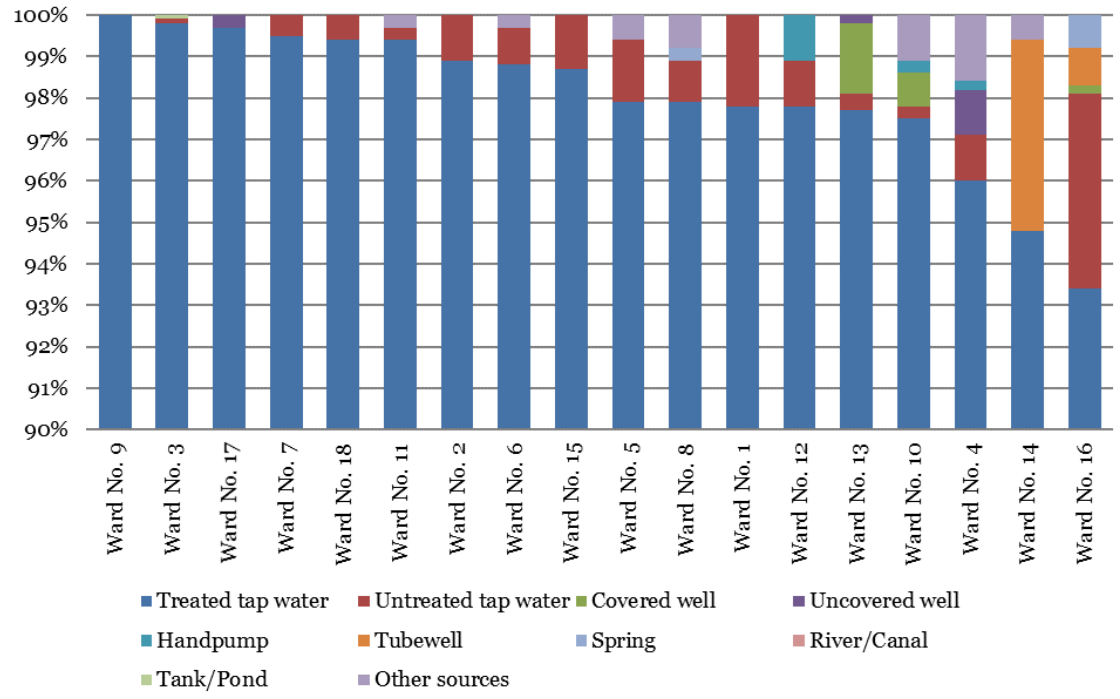
Box 2.1: **Encroachment of Water Bodies**
The Kuttaipaguthi area, a part of Ward no. 13 of PNP TP, had been a pond about 30 years ago. It was later converted into poramboke land and was encroached by members of the public, but these people do not have legal tenure for the encroached lands. The storm water channel of this area has been encroached by the slum settlements, and hence the width of the drain is reported to have reduced drastically.
Source: Discussion with residents, PNP, 2016

2.1.2 Access to potable water sources

Census 2011 data reports that 98 per cent of households in the TP primarily access potable drinking water through piped supply from a treated source. Another one per cent receives piped water from an untreated source and the rest depend on non-potable groundwater sources like tube wells, open wells and hand pumps. About 81 per cent i.e. about 6,005 households have a source on their premises, 18 per cent of households have a source near their premises, and one per cent access a water source away from where they live.

Analysis of ward level data from Census 2011 shows that coverage of tap water connections from treated sources varies from 93 to 100 per cent across the wards (Figure 2.1). Ward 9 reports 100 per cent coverage of tap connections from treated source. A majority of the houses dependent on untreated piped supply are in Ward 16 (33 households). The highest proportion of households dependent on tube wells for drinking water are in Ward 14 (19 households).

Figure 2.1: **Predominant Sources of Drinking Water (Ward Level) in PNP**



Source: TNUSSP analysis, Census 2011

2.1.3 Sources of potable water

Drinking water in PNP TP is supplied from the Combined Water Supply Scheme (CWSS) through the Pillur-II water scheme (Athikadavu) by the Tamil Nadu Water Supply and Drainage Board (TWAD). The quantity of supply varies between 3.5 to 4 million litres daily (MLD). Since there is insufficient water from CWSS for daily supply to all residents in PNP, the TP has installed about 48 bore wells, 4 open wells and 2 hand pumps in the town to augment water supply using groundwater.

2.1.4 Arrangements for potable water supply

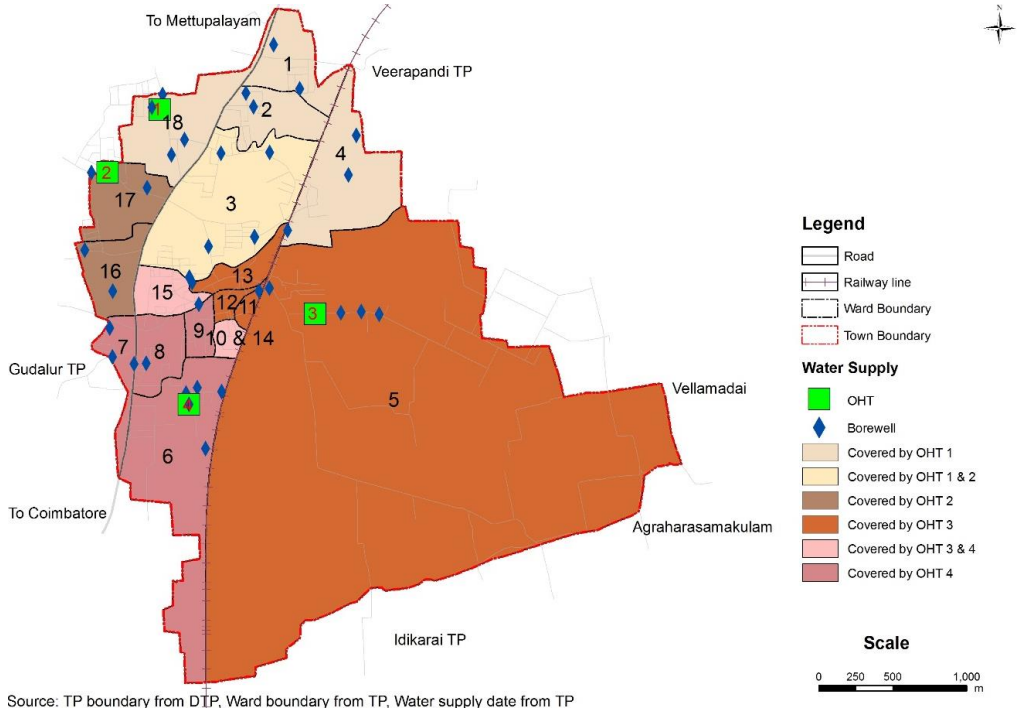
2.1.4.1. Treatment

The water from Pillur is treated at the water treatment plant at Velliangadu (close to the source – Pillur dam) and tested for physical, chemical and biological parameters at regular intervals. The quality of water received by the TP is of good quality, and hence no additional treatment of this water is carried out, except for occasional chlorination during the monsoon season.

2.1.4.2. Storage

The water reaching the town from the CWSS is stored in overhead tanks (OHT) and these are distributed spatially around the town. Under the Athikadavu-I scheme, two OHTs were constructed to store water. Later with increasing demand, two more OHTs were constructed and were ready for use in 2014 under the second scheme. Currently, the town has a total of four OHTs with a total installed capacity of 1.74MLD. Each of the OHTs has service areas as depicted in Figure 2.2.

Figure 2.2: **Water Supply Distribution in PNP Town Panchayat**



Source: TNUSPP 2016

2.1.4.3. Distribution

The TP receives water from the CWSS once every three days. The storage facility – OHT – is not even sufficient for a day's supply of drinking water. Thus, on the days that CWSS water is available to the town, the storage and distribution to households is managed such that each distribution line is assured about three hours of drinking water supply. On the days that treated water is not available from the CWSS, the TP provides supply of water accessed from the groundwater infrastructure, pumping it to the same four OHTs and using the same distribution lines. The groundwater-based supply is carried out every two days.

Out of the 48 bore wells, a few cater to public toilets (PTs), government buildings and institutions in the town, but the majority of them deliver water to public stand posts (PSPs) across the town. There are about 130 PSPs connected to these bore wells, and it is estimated that approximately 1,500 households completely depend on them and the remaining households partially using this facility. There is at least one PSP on every street. The TP officials estimate 23.37 litres per capita per day (lpcd) of non-potable water is supplied to the town. The non-potable water is supplied through the PSPs and is free of charge.

The water stored in each OHT is distributed to the households, commercial establishments and industries in the respective service areas as presented in Figure 2.2. Each OHT is fitted with a flow meter to measure the quantity of water put into the distribution network. The TP indicates that about 3.5 MLD of water is distributed every day. The TP estimates losses in the distribution lines to be about 10 per cent and estimates the availability of water at the user end to be about 70 lpcd, after accounting for supply to commercial and industrial establishments. The TP office records indicate that there are about 6,143 water supply connections, the majority of which are household connections (5,904 are domestic, 197 are commercial and 42 are industrial connections). There are also 130 PSPs that serve the urban poor within the town.

2.1.4.4. Metering and tariff

The TP provides water service connections to households, establishments and industries on payment of a fixed one-time connection charge. A monthly user fee is levied thereafter, and usage is monitored through individual water meters installed on the premises. The monthly charges for the water connections are levied based on meter readings taken by the bill collectors every one or two months. A model flow meter is shown in Figure 2.3. The TP does not recover any user fee from medical and religious establishments such as hospitals, temples, churches and mosques. The water supplied through the PSPs is also for free. The user charge varies according to the type of connection, and must be paid at the TP office. The details of connection charges and monthly water supply charges across each type are provided in Annexure 1 (Table A.2).

Figure 2.3: **Water Meter**

Source: Primary Survey, PNP, 2016

According to the TP records, 100 per cent of the water tax for all connections is collected and no arrears remain. The water tax collected for the Financial Year 2015-16 was Rs.42.13 lakh[3]. The reported annual expenditure on provision of water supply by the TP is Rs.83.11 lakh. Of this, an average of Rs.5 lakh is paid to the TWAD Board for the supply of Athikadavu water from the CWSS every month. This shortfall of about Rs.41 lakh is met using the town panchayat budget.

2.1.4.5. Duration and quality of supply

The duration of water supply to households varies occasionally due to the exigencies of staff working hours and manual control over the inlet valve. This can reportedly become a problem when some distribution line disruptions occur.

Drinking water from the CWSS supplied to the TP is treated at source using clari-flocculation and rapid sand filters. Then, the water is subjected to chlorination at the OHT before distribution to the households. The water supplied through CWSS is tested once a month by the TP and complies with the standards prescribed for drinking water. A sample of the drinking water quality test results carried out by the TP is presented in Annexure 1 (Table A.1).

[3] 1 lakh = 100,000

Figure 2.4: Non-Potable Water Supply in PNP

Source: Primary survey, 2016

Residents in the TP report usage of the CWSS supply for potable purposes, while the groundwater-based supply is used for other purposes in the household. It is also a fact that since water is supplied continuously and users are being charged a fixed monthly fee, there is no incentive to conserve water (except in times of scarcity) and there is plenty of scope for water conservation. While the residents report availability of sufficient water in different parts of the town, there are periods (like in summer) when the water supply hours and quantum are decreased. Households cope by augmenting their storage and storing enough water for the forthcoming week during supply days.

Figure 2.5: Private water suppliers in PNP

Source: Primary Survey, PNP, 2016

There are a few private water suppliers in the TP who supply water for construction activities. Discussions with stakeholders suggest that households that are economically better-off prefer to buy water from private water suppliers at the rate of Rs.200 to 300 for 1,000 litres of water. The water is sourced from private bore well sand treated by reverse osmosis.

The records of the Government Hospital, PNP, indicate cases of water borne diseases – acute diarrhoeal diseases (ADD), enteric fever, viral hepatitis, cholera and acute encephalitis syndrome (AES) – which could be caused by contaminated water. Perusal of hospital records from September 2015 to June 2016 indicates that nearly 1,500 cases of ADD were reported between November and January. This coincides with the months that receive rainfall in the region. Higher cases during rainfall could suggest (1) people accessing unsafe water sources more; (2) contamination of water supply sources by fecal sources, (3) high flows in drains, impacting piping systems. Additional care needs to be taken with water treatment and disinfection during the rainy season.

As part of the baseline household survey in PNP TP, water quality analysis was carried out on a limited sample. The key results were:

1. A total of 54 samples collected from a cluster of two TPs – from wells, bore wells, OHTs and drain sources – and tested for nitrates and fecal contamination.

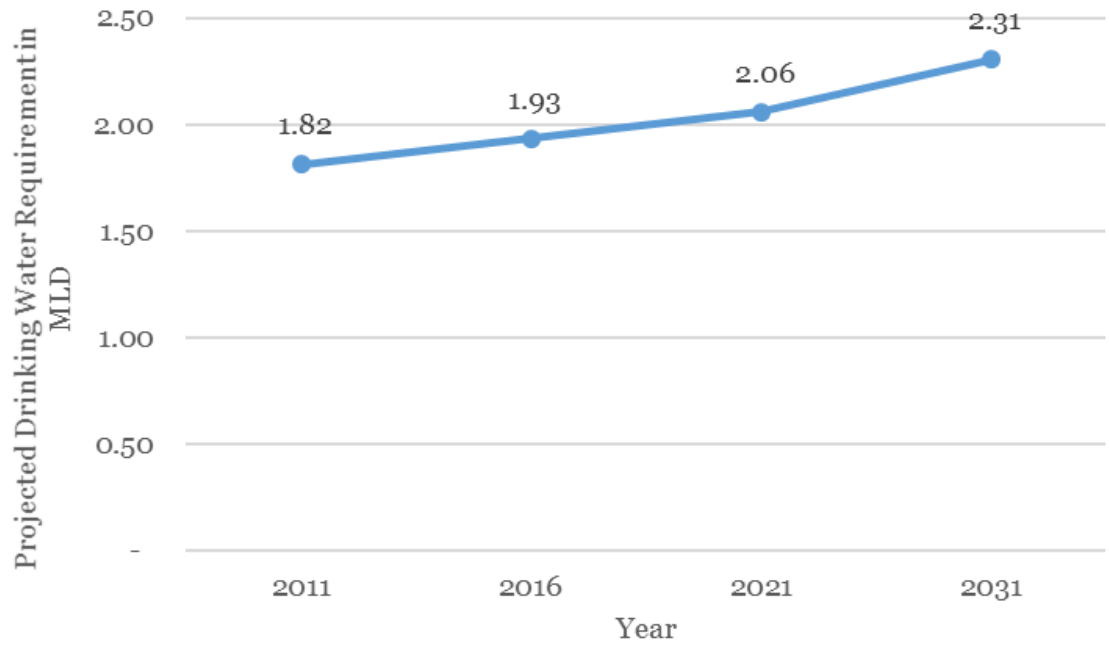
2. Results revealed 7 out of 32 potable water sources were contaminated with fecal coliform. Twenty out of 21 drainage samples tested positive for fecal contamination.

3. Exfiltration from septic tanks of households and community toilets/public toilets (CTs/PTs) are inferred to be the main source of the contamination.

2.1.5 Projected demand for potable water

The current and projected demand for drinking water for the TP is presented in Figure 2.6.

Figure 2.6: **Projected Demand for Drinking Water in PNP**



Source: TNUSSP Projections, 2016

The current water supply volumes seem to satisfy the population requirements for the future. However, the low OHT storage capacities and the current distribution system lead to loss of water and inefficiencies. Considering the increased demand in the future years, it is necessary to source additional water supply, increase storage capacities, protect the sources for non-potable water supply, and reduce water losses and leakages. Rejuvenation of the existing distribution network and protection of groundwater sources is required.

2.2 Storm Water Drains

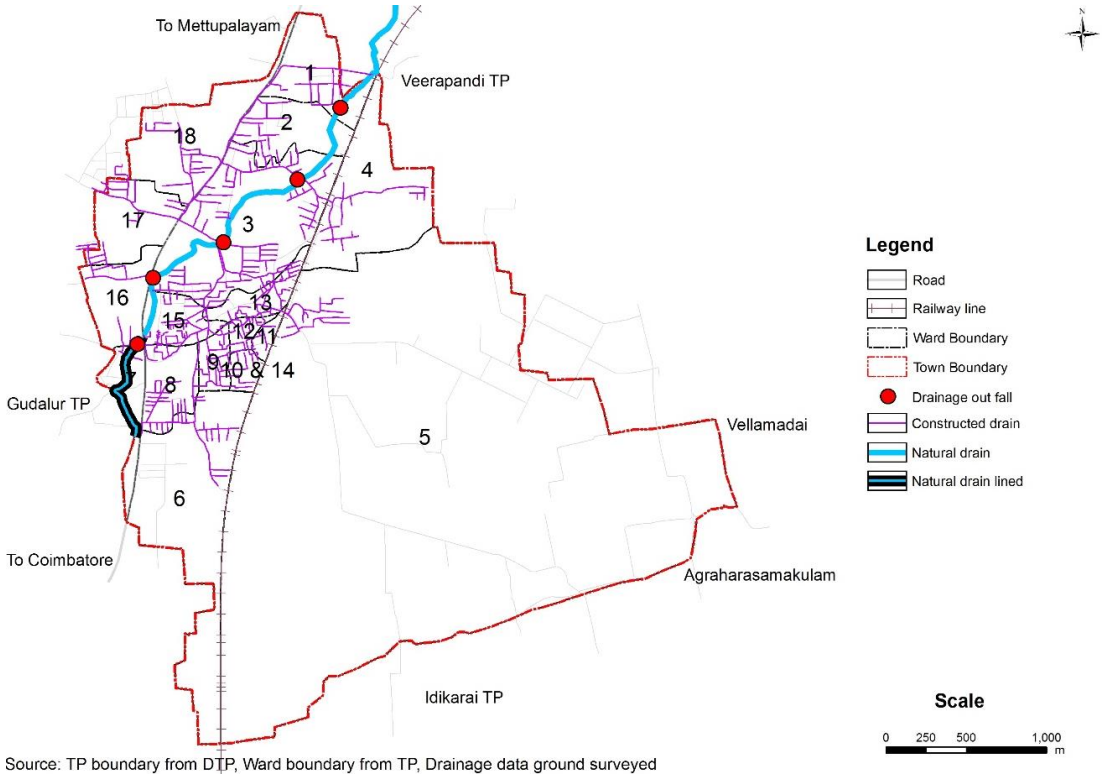
The Town Directory (Census 2011) indicated 16 km of pucca roads and 9.5 km of *kachcha* roads in the town.

2.2.1 Natural drainage

A stream originating from the foothills of Kurudi –Perumpallam Odai – runs north-east cutting across PNP, Veerapandi and Karamadai, and eventually joins the Bhavanisagar dam. It is the main natural storm water drain in the town. Currently, wastewater from the towns flowing in the constructed storm

water drainage network has five main outfalls into this drain. These are: The Bhagat Singh outfall, Arulmighu Choklingeshwar outfall, Irwin Road outfall, Subbanagounder Road outfall, and Lakshmi Nagar outfall.

Figure 2.7: **Drainage Map of PNP Town Panchayat**



Source: TNUSPP 2016

2.2.2 Built-up drains

Open drains are provided for a length of 25.35 km the town and lead to the Perumpallam Odai. However, these drains also carry sewage in addition to storm water, which contaminates the water bodies and groundwater (Figure 2.7).

2.2.3 Flow calculations

The area of the town is 9.38 sq km and the average annual rainfall is 606 millimetres (mm). As 1 mm of rainfall = 1 litre of water/m², the total volume of annual rainfall is estimated to be 5,684 million litres. Assuming that 25 per cent of the town area is built up (including hard surfacing), which contributes to the surface run-off, it is estimated that about 1,421 million litres of rainwater in in the town needs to be effectively drained every year to avoid flooding (the average number of rainy days is 38).

About 5 million litres is supplied (potable and non-potable) on a daily basis. Assuming that about 80 per cent of this constitutes return flows in the drains, the storm water drainage should be capable of managing 5 MLD every day with an additional load of about 1.4 MLD in the rainy season.

2.2.4 Areas prone to flooding

As reported by the TP, none of the locations are prone to flooding.

2.2.5 Upkeep of the drains

Dumping of household wastes including kitchen waste, plastic bags, plastic bottles, wrappers of chocolates, biscuit packets and so on, in the drains affects the flow of drain water. Heavy human intervention is required when drains and septic tanks are blocked and very often these sanitation

workers have to do it manually, by entering the drain. There are not enough sanitation workers and hence proper cleaning does not take place. Most of the sanitation workers are contractual labour who are paid low wages, and absenteeism among contractual labour increases the workload of other sanitation works. Male contractual labour receives Rs.225 per day while female contractual workers receive Rs.200 (or Rs.100 per shift) for eight hours of work.

2.3 Solid waste management

The PNP TP has taken initiatives to collect solid waste and carry out resource recovery such as electricity through bio-methanation, production of compost from organic waste, and so on.

There are 18 wards, 8,986 assessed properties, 46 commercial complexes, 16 educational institutions and 8 hospitals in PNP. The quantity of solid waste generated in the TP is estimated to be 8.5 tonnes per day. (Source: PNP TP Office).

Biomedical wastes from hospitals are collected by Technotherm – a private treatment facility operator –while municipal solid waste from households and commercial establishments is collected by the TP.

2.3.1 Arrangements for collection of solid waste

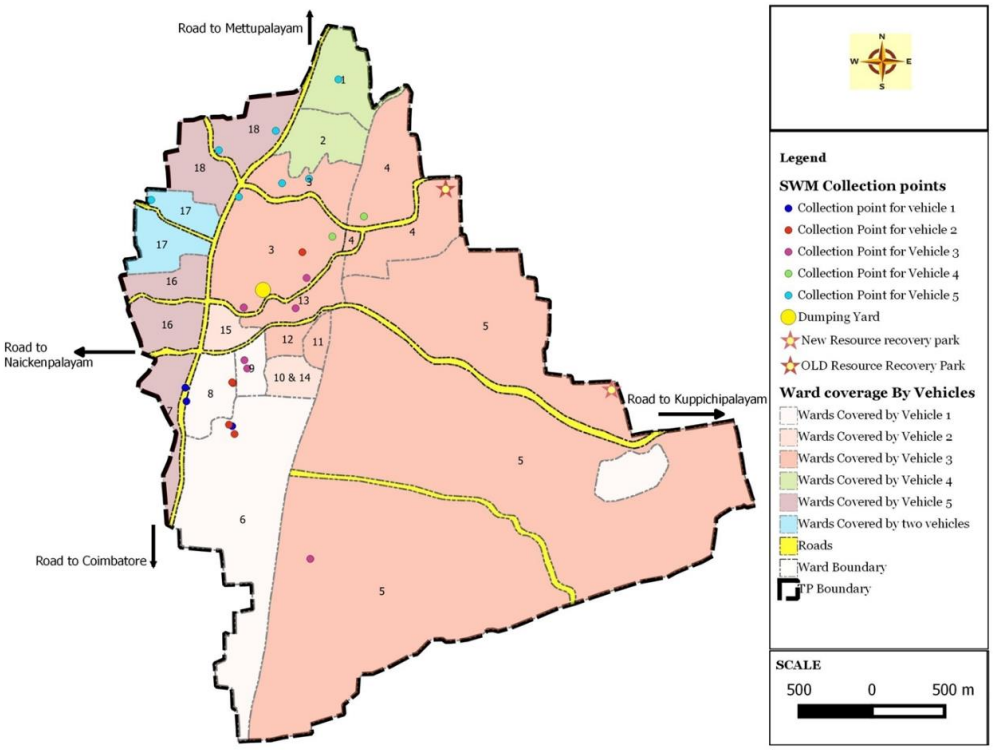
2.3.1.1. Primary Collection

This TP has 58 pushcarts that are used to collect solid waste from households and small establishments that are situated within the wards. Each pushcart is supplied with four bins that have a capacity of 25 kg. Solid waste is collected by the sanitation workers of the TP between 6 am and 11 am. The sanitary workers blow their whistle when they get into the residential area, and the residents bring their waste and drop it into the bin on the push-cart. Some residents, who are busy getting ready for work, keep their own bins outside their houses, and these are emptied by the sanitation worker.

Each sanitation worker allotted a push-cart is assigned to collect waste from 250 households. When the four push-cart bins are filled, they are emptied into tractors found at allotted transfer points along their designated route, and the workers resume collection from the remaining houses.

Waste from hotels and other commercial establishments is collected directly in trucks.

Figure 2.8: **Solid Waste Management Map of PNP**



Source: TNUSSP, 2016

2.3.1.2. Secondary collection

After the primary collection of waste from the households, the sanitation workers reach a common transfer point to empty their pushcart bins into the tractors. There are 34 transfer points in the whole of 18 wards. Four vehicles are allotted for secondary collection – three tractors with a capacity of 600 kg (two are owned by the TP and one is hired), one tipper with a capacity of 2 tonnes, and one TATA Ace with a capacity of 300 kg. These vehicles reach the transfer points at a stipulated time to receive the waste collected in the pushcarts.

Table 2.1: **Details of Vehicles for Primary and Secondary Waste Collection**

Sl. No.	Vehicle	Number	Capacity in tonnes per cart	No. of trips per day	Total capacity per day (in tonnes)
Primary Collection					
1	Push carts	58	0.05 – 0.08	2	3.5
Secondary Collection					
1	Tractors	3	0.6	3	5.4
2	Tipper	1	1.2	2	2.4
3	Tata Ace	1	0.3	2	0.6

Source: PNP TP Office, July 2016

2.3.1.3. Arrangements for segregation of solid waste

Though the Municipal Solid Waste Management Rules, 2015 emphasise segregation at source, this practice appears to be followed partially only in Wards 6, 8 and 9. The household waste from these wards is being segregated at source by residents into two categories – biodegradable and non-biodegradable. The household waste collected from rest of the wards is segregated by the sanitation workers into biodegradable and non-biodegradable waste. Only organic wastes are loaded into the truck. The recyclables are sold by the sanitary worker.

The mixed wastes that are collected from establishments are taken to the Old Recovery Park in Sathya Nagar and they are manually segregated by sanitation workers. Non-degradable waste is further segregated into 11 categories – glass bottles, papers, plastic covers, plastic bottles, metal, leather, coconut shells, beddings, cloth, etc., that are sold by the sanitary workers to scrap merchants or recyclers in PNP. The biodegradable waste is composted at the old recovery park.

There were campaigns that had been organised by the TP to create awareness about source segregation of waste among the public.

2.3.2 Arrangements for treatment and/or disposal of solid waste

2.3.2.1. Composting at New Recovery Park

The biodegradable waste that is generated by households, hotels and markets is estimated to be 4.5 tonnes per day, and is transported to the New Recovery Park. Biodegradable wastes are shredded and converted into organic manure in 35-45 days using the windrow composting method. Effective Microorganism (EM) solution is diluted and sprayed along with jaggery to enhance the process of composting. The manure thus produced is being sold to agricultural farms at Rs.5 per kg.

2.3.2.2. Composting at Old Recovery Park

The un-segregated waste from some commercial establishments is estimated to be around 2 tonnes. This waste is manually segregated by the sanitation workers at the Old Recovery Park into bio-degradable and non-bio degradable waste. The biodegradable waste is dumped in small cement tanks, where cow dung is mixed in, and compost is produced after 30-40 days. The non-degradable wastes are sold by the sanitation workers. The TP officials are planning to shift this process to the New Recovery Park.

2.3.2.3. Offal waste

The waste that is generated from the butcher shops is estimated to be 7 – 15 kg every day. The quantity varies depending on the days, e.g. Sunday sales will result in 15 kg of waste. These wastes are collected in separate bins that are kept in the trucks, which are used as fish feed at the Old Recovery Park where fish and ducks are reared. The poultry waste that contains wings and feathers, is dumped in the landfill at Erankattu Thottam on Athipalayam road.

2.3.2.4. Bio-methanation of food waste

A bio-methanation plant has been set up in PNP TP. This plant is designed to process 1 tonne of food waste per day and to generate energy worth 90 to 120 KW, which can be used by the TP to light 60 street lights of 150 W for 10 hours every night. The food waste from hotels and Premier Instruments & Controls Limited's (PRICOL) canteen will be treated in this unit. The plant is yet to begin operating. A trial run with a minimum quantity of food waste is done.

2.3.2.5. Landfilling/dumping of solid waste

The silt and other inert materials that are collected from the drains are estimated to be around 2 tonnes every day. These wastes are collected in trucks and are dumped at the landfill at Erankattu Thottam on Athipalayam Road.

Table 2.2: **Treatment and Disposal of Solid Waste Generated Daily**				
Sl. No.	**Location**	**Quantity of waste**	**Type of waste**	**Process**
1	Old Recovery Park	2 tonnes	Unsegregated solid waste	Segregation & composting
2	New Recovery Park	4.5 tonnes	Biodegradable waste	Composting
3	Old Recovery Park	7-15 kg	Offal	Fish feed
4	Bio-methanation plant	1 tonne	Food	Bio-methanation
5	Erankattu Thottam	2 tonnes	Silt/inert materials	Landfilling
Source: PNP TP Office, July 2016				

3 Sanitation and Wastewater Arrangements

3. Sanitation and Wastewater Arrangements

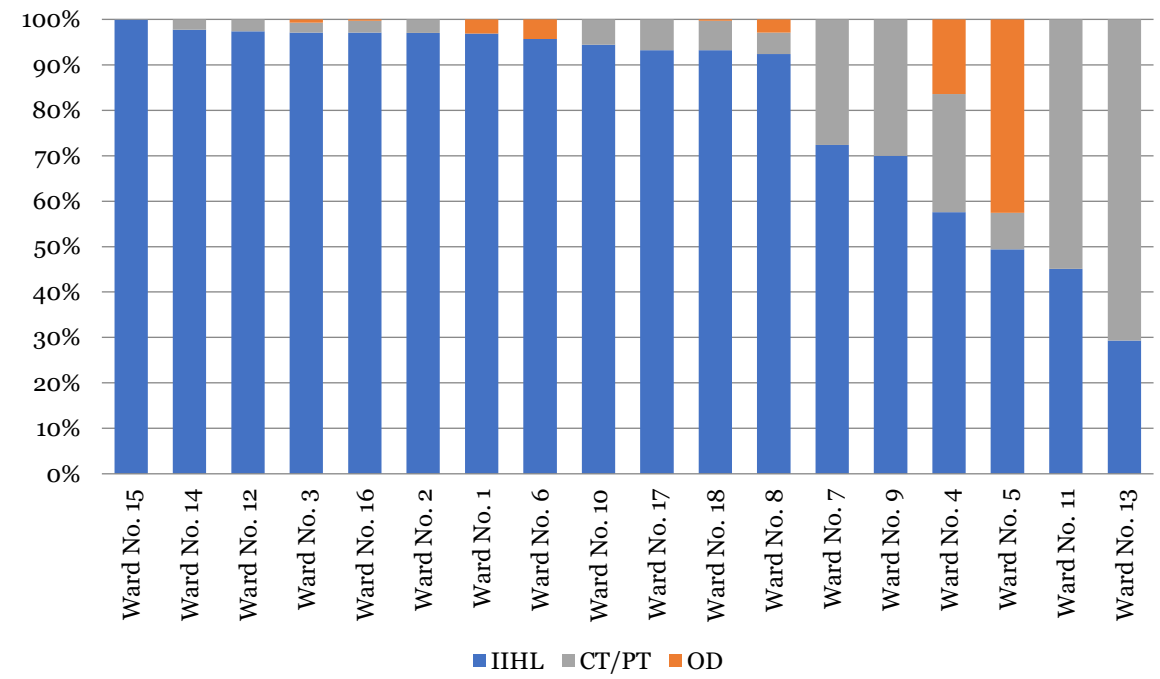
3.1 Access to toilets

3.1.1 Individual toilets

In 2011, 6,180 households (i.e. 83 per cent of total households) reported access to individual toilets, 1,003 households (14 per cent) depended on public sanitary conveniences (PSCs) and 266 households (3 per cent) had reported defecating in the open (Census 2011).

Ward-level analysis of the Census 2011 data indicated that the households defecating in the open are mainly from Ward No. 5 (140 households), followed by households in Ward No. 4 (71 households). Traces of open defecation (OD) were noticed in wards 6, 8, 13 and 16. People depend a great deal on PSCs in wards 11 and 13.

Figure 3.1: **Access to Toilets (Ward Wise) in PNP**



Source: Census 2011

Though Census 2011 data shows that 1,269 households do not have access to individual toilets and depend on PSCs or defecate in the open, the latest data from the TP Office which was collected for the Swachh Bharat Mission (SBM) indicates that the number of households without individual toilets is 709 out of the 8,585 enumerated households (8 per cent) in the town. The SBM data also indicates that only 576 households out of the 709 identified (81 per cent) have space within their compound to construct a toilet. The rest of the households (133) do not have any space and will have to be encouraged to use a community solution.

3.1.2 Individual Toilets in Slums

There are three slum settlements in the town –Kuppuchipalayam (Ward No. 5), Anna Nagar (Ward No. 7) and Vivekanandapuram (Ward No.13). Field visits and interactions with TP officials indicate

that most households without toilets in the town (there are 709 of them), are in these urban poor settlements. A detailed survey has been conducted by the TP to identify these households.

In PNP, four OD spots were identified during the field visits and all these places were located near two slums –Vivekanandapuram (Ward No.13) and Kuppuchipalayam (Ward No.5). The railway track and the open spaces nearby are the preferred sites for OD. Kuppuchipalayam slum has no PT or CT for men and children within the settlement. There is a PT for women, which is located 500 m away from the houses. At night, the women are wary of accessing this and prefer to defecate in the open if the need arises.

3.1.3 Public Sanitary Conveniences

The PSCs in the town cater to households without individual toilets and the floating population. There are 13 PSCs, including PTs and CTs, spread across 11 wards in the town. Most of the PSCs are close to an urban poor settlement. This includes one PT in PNP which is a pay-and-use toilet, operating from 5 am to 10 pm. An estimated 300-350 women and girls, and 200-250 men and boys, use this toilet daily, according to the caretaker.

3.1.4 User Perspective of PSC

User timing: Slum residents shared that the toilets are used by all sections of the community such as toddlers, boys, girls, working women, working men, aged people, and so on. The community has evolved timing arrangements based on preparations for school, livelihoods and other chores. The working men, women and school-going children generally use the toilets from 5 am to 9 am. The rush was highest between 6 am and 8 am. Women working on daily wages, domestic workers and housemaids use the toilets between 5 am and 6 am. Housewives in the community tend to use the toilets only after 10 am. Depending on availability, the aged people used the toilets any time after 10 am.

A detailed assessment on the PSCs by the City-Technical Support Unit presents the usage by time slots in PNP for all users combined. Peak usage is typically between 6 am in the morning and 10 pm, and stabilises afterwards only to peak again post 6 pm, especially among child users. The one facility that does not conform to this pattern is the one at the bus stand, which is a PT and hence is typically crowded through the day.

User Satisfaction

On the safety of access, 44 per cent of PNP users partially agreed it was safe. Importantly, more female users (63 per cent) than male users (57 per cent) partially agreed to this statement. In PNP, just 35 per cent of the users were satisfied fully with cleanliness. Users from PNP (61 per cent) report having to wait for long to use the toilet. A third of users indicated that availability water in the toilets was an issue.

Key concerns raised by the residents of the slums were:

1. There were no conveniences suitable for the elderly or the physically challenged.
2. The number of toilets was insufficient, causing long waiting times in the morning.
3. Bathing and washing facilities are important for the residents of the slums as they live in congested houses with irregular water supply.

3.1.5 Management arrangements of PSCs

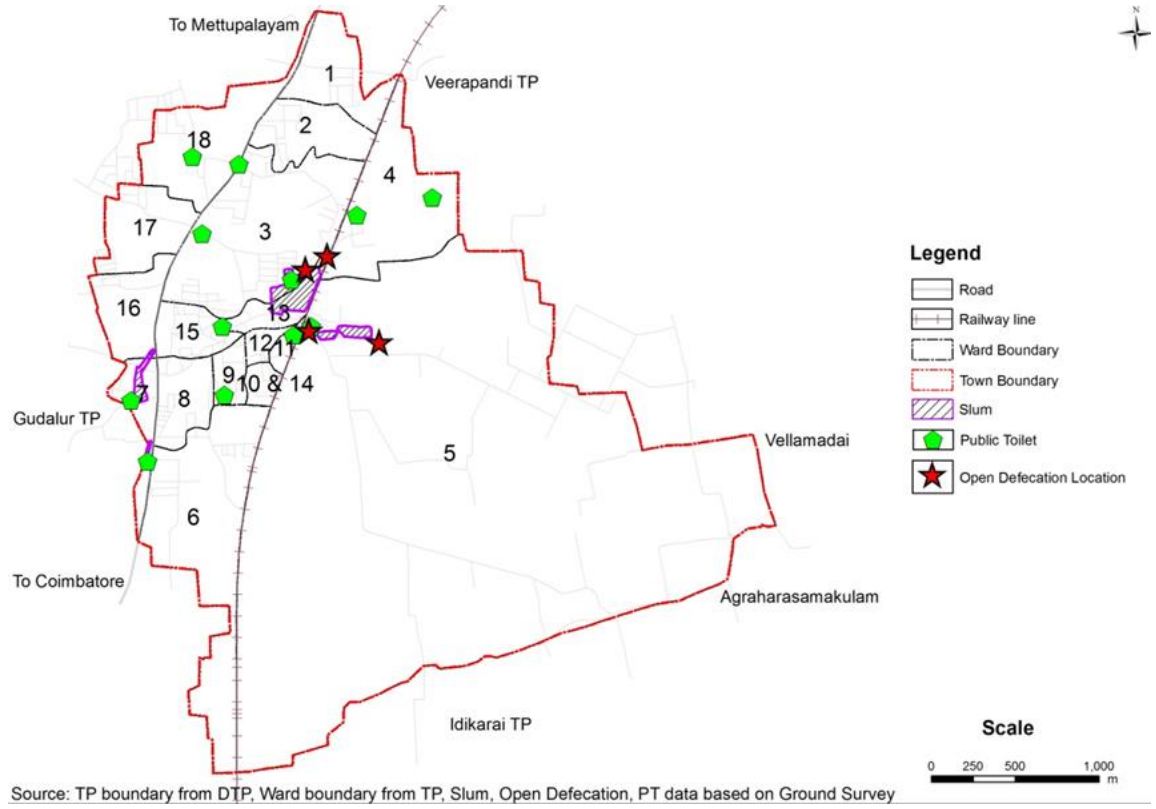
Sanitation workers from the TP maintain the toilets. However, these sanitation workers spend only a few hours in the morning on cleaning the toilets, being overloaded with other duties. The condition of infrastructure in some of the PSCs is poor. Mugs, buckets and dustbins are either missing or damaged. In some cases the toilet doors and windows are not in good condition, the seats of the toilet are sometimes in disrepair and some of the flushing systems do not work.

Management of the PSCs is not overseen by any user committee. Men, women and youth agreed that the community users do not play any role in keeping the toilet clean and do not want to take any

responsibility in future as well. However, they have suggested that formation of community user committees would improve the condition of toilets. Thus, it is felt that even with such arrangements in the future, these committees or user groups would require capacity building and continued support from the ULB.

No user fee is mandatory in any of the locations, as the TP makes the payment for the cleaner/caretaker. However, the cleaners informally demand Rs.2 from the users if they happen to see them while cleaning in the mornings.

Figure 3.2: **Public Sanitary Conveniences in PNP**



Source: TNUSSP, 2016

3.2 Open defecation

Most of the households without individual toilets are reported to be using the PSCs, while there are reports of a few members defecating in the open. The PNP TP officers are currently carrying out awareness campaigns to stop the practice of OD, as part of the initiative by the TP to attain Open-Defecation Free status. OD in urban slums occurs due to a combination of factors:

a. Lack of space to build household toilets,
b. Rush during peak hours at the CTs,
c. Improper maintenance and management of PTs, and
d. Unwillingness to invest in household toilets.

The regular OD spots have been identified and presented in Figure 3.2. It is reported that groups of 4-5 persons go out for defecation in the morning. They say they do this because it gives them a time of relaxation with friends and is part of their morning exercise.

3.3 Sanitation in Establishments

There are three Banks (one nationalised, one private and one co-operative), and one agricultural credit society in PNP (Census 2011).

Trade tax assessment data with the TP records 528 commercial establishments (listed in Annexure 2) and six function halls. Data on sanitation facilities in establishments has been compiled for a small sample only.

3.3.1 Schools and colleges

3.3.1.1. Government Schools

In PNP there are three government schools, one middle school, and two primary schools. The details of users and sanitation facilities are provided in Annexure 3. In the government schools, there were no separate toilets recorded for the school staff.

Free sanitary napkins, three per month, are issued to adolescent schoolgirls through the Government Hospital under the Directorate of Public Health in PNP government schools.

Generally, the toilets in the government schools are regularly cleaned by the temporary sanitary workers of the TP. The head masters usually verify and sign off a checklist every day. Recently, the Block Development Office (BDO) has started financing the operation and maintenance(O&M) of toilets in middle and high schools. The TP Office deploys a temporary sanitary worker to clean the toilets in the primary schools.

3.3.1.2. Private Schools

In PNP, seven private schools function in different locations. The management of the private schools maintains the school toilets with their own funds.

According to Swachh Bharat Swachh Vidayalaya guidelines, there should be separate urinals and toilets for boys and girls with seats such that there is one toilet seat for every 40 students. The private schools do not seem to be maintaining this standard for toilets, although there appear to be sufficient urinals available.

Box 3.1: **Menstrual Hygiene in Schools**
To encourage hygienic practice i.e. the use of sanitary napkins, the Government of Tamil Nadu rolled out a scheme called Pudhuyugam (New Era) in March 2012, focused on adolescent schoolgirls in rural areas. Through this, sanitary napkins are distributed for free in government schools by the Primary Health Centres. Each girl is eligible to get three packs of sanitary napkins once in two months, i.e. 18 packs per year (each pack has six napkins). Menstruating girls in government schools are well aware of this scheme and are making the best use of it. There is a regular and abundant supply of these sanitary napkins in the government schools in the two towns. In private schools, there are sanitary napkin vending machines that provide the girls with a napkin for Rs.5. It is found that despite the presence of a good incinerator facility, government schools in the two towns (PNP and NNP) are not using them properly due to lack of awareness on the importance of safe disposal. Most of the private schools have incinerators and the girls are also taught to use them properly. At a few schools which do not have incinerators, used napkins are safely collected by scavengers and burnt every day. From the interactions with schoolchildren, it is inferred that despite a very adequate supply of sanitary napkins, the awareness of proper usage and disposal needs to be focused upon.
Source: Primary interactions, 2016

3.3.1.3. Private Colleges

There are four colleges in PNP, of which three belong to the Sri Ramakrishna Mission Vidayalaya (SRMV). Sufficient toilet seats and urinals are reported in these institutions. The details of users and sanitation facilities are provided in Annexure 3.

3.3.2 Hospitals

The following healthcare facilities exist in the TP:

1. Three government hospitals,
2. One veterinary hospital,
3. One health centre/dispensary,
4. One family welfare centre,
5. One maternity and child welfare centre,
6. One maternity home,
7. 11 private hospitals/clinics (5 with only out-patient facilities), and
8. 10 private medical shops

The staffing and intake facility details are provided in Annexure 2. In the government hospitals of PNP, female patients can access 30 beds and six toilets. Male patients can use 10beds and three toilets. The availability of these sanitation facilities satisfies the norms prescribed in the Swachhata guidelines. However, there are no urinals for male patients and for physically challenged patients in the government hospital.

3.4 Sanitation in public spaces

3.4.1 Government offices

In PNP, there are 12 government offices. Out of these, four offices do not have any sanitation facilities. Staff and the people visiting these places depend on the nearest PT or toilets which are part of hotels, petrol bunks etc. The Assistant Educational Office (AEO) office at Shakthi Nagar is attached to a government middle school and the staff are using the school toilet. The libraries in Pioneer Nagar and Shakthi Nagar both do not have toilet facilities. The Tamil Nadu Electricity Board (TNEB) toilet at LMW Road has a super structure with a roof constructed of tin sheets. With respect to maintenance of toilets in government offices, it has been recorded that two offices clean their office toilets twice a day and the rest clean them at least once a day. The details of users and sanitation facilities are provided in Annexure 3.

The government offices in PNP TP office do not have separate toilets for men and women as recommended in the Swachh SOP[4], and no separate urinals. The Sub Registrar Office, Block Agricultural Office and TNEB do not have separate toilets for different sexes. Only the BSNL and Panchayat Union offices met the SOP criteria for toilets. Urinals are available in the BSNL office only, and not in the Union office.

3.4.2 Places of significant footfall

In PNP TP there are six function halls, one cinema, and one community hall. Sanitation facilities are available at the function halls but are considered inadequate when they function to capacity. Murugan Theatre, Ooty Road, has a capacity of 609, but has only 10 urinals, four male toilets and two female toilets. The Sunday market, has no toilet facility and people have to go to the pay-and-use PT at the PNP bus stand. The details of the sanitation facilities and users are presented in Annexure 3.

[4]According to Swachh Office Standard Operating Procedures (SOP), there should be a toilet seat for every 25 males and one for every 15 females. Urinals should be nil up to six persons, one for 7-20 persons, two for 21-45 persons and three for 46-70 persons.

3.4.3 Forest, parks and recreational spaces

In PNP, a total of eight parks and recreational spaces are available: six parks, four of which are for children, and two playgrounds. The MGR Nagar park has a play area and walking space while the Shakti Nagar playground has an auditorium opposite the Shakthi Nagar CT. There is no forest area in this panchayat and no toilet facility in the parks and recreational spaces.

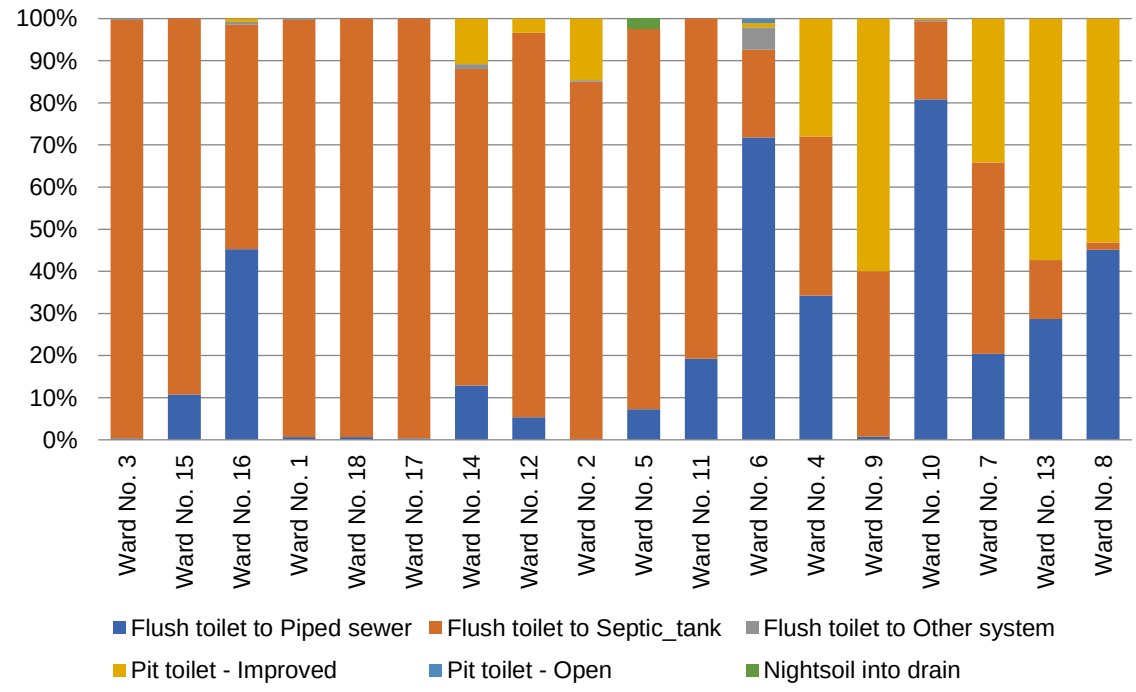
3.5 Containment

3.5.1 Household arrangements

The Census 2011 reported 6,101 households with access to sanitation facilities within the premises. Of these, 67 per cent reported having Septic Tanks (4,057), while 23 per cent were reported to be connected to piped sewers (1,372) and 10 per cent were connected to pit latrines (634). The remaining households were connected to other containment structures (not any of the above) and seven households reported being connected to the drain. Since the TP does not have a sewer system, the 23 per cent reported connected to sewers could be connected to the drain and also include households from the campuses of local industries, some of which have their own local wastewater treatment facilities.

Census data at the ward level shows that more than 95 per cent individual toilets in wards 1, 3, 5, 17 and 18 are connected to septic tanks. However, in terms of numbers, Ward No. 15 has 584 households connected to septic tanks. Individual toilets draining night soil directly in to open are noted in Ward No. 5. This shows the breakup of sanitary and insanitary toilets in the TP.

Figure 3.3: **Arrangements for Household Toilets (Ward Wise) in PNP**



Source: Census 2011

The TP office does not have any formal database on the containment systems at the household level.

In the Baseline Studies conducted in 2016 (TNUSSP, 2016), 475 non-slum households and 129 slum households were surveyed. In the survey sample, more than three-fourths of the slum and non-slum households reported having a septic tank and about 10 per cent had single pits. In the case of households with Septic Tanks in non-slum households, 33 per cent reported water-tight containment structures, while only six per cent reported the presence of partitions. In the case of households with Septic Tanks in slum households, 48 per cent reported water-tight containment structures, while only six per cent reported the presence of partitions. Thus, only eight per cent of non-slum household septic tanks and six per cent of slum household septic tanks are constructed to function as structures approximating a septic tank. In slum households, there is a higher proportion of water-tight structures but without partitions, making these function like storage tanks and lending credence to households' fear that they will fill up fast.

There are manufacturers of concrete rings doing business in the TP. They make concrete rings of different diameters ranging from 3 ft to 4 ft. The materials used are cement, jelly, sand and reinforced steel. They sell the 3 ft rings for Rs.400 and 4ft rings for Rs.500. Digging costs Rs.300 per foot. These rings are used as cesspits and also for water-holding sumps. Rings used for cesspits are provided with holes for the convenience of lifting and installing, and to allow sewage percolation into sub-surface soil.

3.5.2 Public sanitary conveniences

A preliminary scoping indicated that all the 13 PSCs in the town are connected to septic tanks for containment of fecal matter. It was observed that six septic tanks out of the 13 connected to these toilets are exfiltrating due to blockage or breakage. These six are connected to the PTs located in Kasthuripalayam, Vivekanandapuram, Anna Nagar, Ooty Road, Kanguvar Street No. 1 and Shakti Nagar. None of the 13 septic tanks are connected to soak away pits; the effluent from the outlets overflows into surface drains or into the open. Subsequently, the TP office has initiated repairs of these structures.

3.5.3 Establishments and institutions

In the baseline survey, 15 establishments were canvassed (12 in non-slum areas and 3 in slum areas) to understand the arrangements for sanitation. These included government offices, hospitals, hotels, nursing homes, private offices, eating places and petty shops.

One establishment in PNP uses a CT/PT because it does not have a toilet of its own. The main reason for not having a dedicated toilet facility in the establishment was that it is a rented premises and/or lacks space for it.

All the establishments with toilet facilities reported being connected to septic tanks. Only 46 per cent were reported to be water-tight and only 17 per cent also had partition walls. Thus, just 17 per cent of the on-site sanitation systems (OSSs) are probably working as septic tanks in practice, the rest being some variations of a pit.

Around 83 per cent of the OSSs are located in and around the building of the establishment, while in two instances, it is located below the pan. In addition, 78 per cent of the OSSs are accessible by roads that are wider than 10 ft while the width of the access roads to the other systems is between 5 to 10 ft. However, only 41 per cent of the systems are accessible by a cesspool machine hose pipe, as they have covers which can be removed. Hence, while a majority of the OSSs can be easily accessed by desludging trucks, the entire process of emptying the systems can be quite laborious since in half of the cases the covers of the on-site systems are sealed.

3.6 Emptying and conveyance of fecal sludge

3.6.1 Household arrangements

The OSSs connected to the households are currently emptied by private cesspool operators. There are four private operators residing within the TP cluster (PNP and neighbouring TPs) having eight cesspool vehicles. There are two more sludge operators who come into the TPs from Vadavalli to provide the service to households. Consultations with these six private players indicated that they empty 40 to 45 truckloads of septage from the household septic tanks/pits in a month and one service provider regularly empties 50-60 loads per month from the PTs. Since the average size of the cesspool vehicles deployed by the private players is 5 cubic metres, it is estimated that about 500-550 cubic metres of sludge is emptied in a month i.e. 18 to 18.5 cubic metres daily (average) from households and PTs. All the desludging operators offer septic tank cleaning in households, commercial and industrial sectors. They also sometimes offer blockage cleaning alongside. The customer profiles range from regular households to commercial hotels, marriage halls, industries, and poultry farms. Prominent industries around PNP are Kumaran Mills, LMW, Roots, Shiva Distilleries and so on. A few hotels, namely Anandha's and Amutha's are also regular customers of the desludging operators rendering service.

The operators charge households about Rs.1,000 to 1,500 per truckload of septage emptied. The number of trips depends on the size of the septic tank and the volume to be emptied. The private operators advertise their presence by distributing brochures/visiting cards and displaying posters. Households call these private operators whenever their OSSs need to be desludged.

Only two out of the four operators are registered with a ULB (One with Coimbatore City Corporation and another with Thudiyalur TP).

Some of the key challenges the private cesspool operators face during their operation are:

1. Access to the septic tank/pit as most of them are sealed and need to be broken open
2. Since most of the OSSs have an unlined bottom, the sludge solidifies at the bottom and it sometime needs to be scraped/broken manually
3. Lack of skilled operators and drivers
4. Criticism and exclusion from the households (looking upon desludging as a dirty job, etc.)
5. Lack of disposal points in the vicinity (the Ukkadam STP is too far and is available only for registered operators)

3.6.2 Public sanitary conveniences

The septic tanks connected to the PTs are frequently emptied as the number of people using them is high. The TP has a desludging machine (a tank with a sludge pump), that has to be pulled by a tractor as it is not attached to a vehicle. Earlier, this machine was used by the sanitation workers to desludge the septic tanks of PTs but due to heavy loads, blockages and solidification of sludge in the septic tanks, the TP hires a private operator's cesspool vehicle (with an air compressor) to empty these septic tanks. It is estimated that about 50-60 truckloads of septage is emptied in a month (i.e. about 50 cubic metres) from these septic tanks attached to the PTs.

3.7 Treatment of fecal sludge

There is no treatment facility available at the TP for treating sewage and septage. The Operative Guidelines for Septage Management in Tamil Nadu issued by the GoTN in 2014 directs the septage/fecal sludge from the PNP Union cluster to be transported to the sewage treatment plant (STP) at Ukkadam or the nearest decanting station provided for this STP in Coimbatore city for treatment. The installed capacity of the STP at Ukkadam is 70 MLD and it operates on Sequential Batch Reactor (SBR) technology. The current inflow is reported to be only 35 MLD.

The decanting station is located near the Ukkadam Bridge and is just 1km away from the STP. It is however observed that the designated point provided is just a disposal point and has no infrastructure as mentioned in the Central Public Health and Environmental Engineering Organization (CPHEEO) manual or the Operative Guidelines. The decanting station has no receiving tanks for septage, no screen chamber, and no sludge pumps that pump the septage to the STP inlet (as required by Government of India and GoTN guidelines). It has only the drainage channel and a few manually operated gates – these gates are reported not to have been operated since installation. Concrete chambers with four rectangular provisions were provided before the gates, where the desludging vehicles could offload the septage. The septage gets mixed with the sewage flowing in the drainage channel and flows through underground sewerage pipes to the STP. After objections from the local residents, an RCC slab cover was provided with two manholes that would reduce odour.

The location has been provided with fencing but left unattended without any person to monitor the trucks' movements or keep record of unregistered sludge operators coming in to offload.

Desludging operators report that security personnel used to be present a few months back, to check whether the truck is registered to the corporation to legally offload, and kept records of vehicle numbers and details of service providers. Only sludge operators who have paid Rs.4,500 as the registration fees for three months are allowed to offload the septage collected at this disposal point. It is reported that the Sanitary Inspector and Sanitary Supervisor of Ukkadam make frequent visits to ensure that only registered vehicles offload at the decanting facility. They also inspect the content disposed at the point. So far no records are accessible at the decanting facility about the trucks coming in to dispose, number of trips made or the type of effluent discharged.

The Corporation has control over the decanting stations and these are not covered under the O&M of STPs. The septage collection vehicles drop in and offload collected septage from 6 am to 6 pm and as per the District Collector's order, no vehicle is allowed to dump after the permitted timing. The order mentions strict restrictions on disposing oil and chemical effluents at the facility as these may affect the performance of the STP. It was also reported that the Coimbatore Corporation is proposing to set up a watch room with a trained professional to monitor and prevent the disposal of chemical effluents into the decanting facility.

3.7.1 Disposal

The private cesspool operators identified during the field survey empty septic tanks in the town and discharge their sludge into agricultural farms. Some of the cesspool operators also own agricultural land. Some of the farmers on the periphery of the town are interested and willing to receive septage in their farms as it is a good soil conditioner and the offloading provides irrigation water in the drier months. Most of the farm's soil conditioned using the septage from households is used for growing fodder crops (to feed animals). On seeing better yields, it is now being used in fields growing coconut and sugarcane as well.

Box 3.2: Land Application by Farmers

A resident of Vattamallai-palayam has 2 acres of farm land and also takes care of his relatives' farm. He is one of the farmers who uses septage in his farm for conditioning the soil. A few cesspool operators approached him to discharge a few loads of septage in his farm. After consulting with other farmers who were already using septage, he agreed to use it in his farm. But he was very specific in selecting service providers who would give him septage free of solid waste like sanitary napkins, covers, shampoo packets etc. He uses the septage to condition his 2 acres of land in batches, divided it into four patches, in which he grows fodder and coconut using septage, and maize and bananas using borewell water only – he has grown bananas using septage only once. This farmer applies sludge only on empty land to improve the top soil condition and does not use septage on standing

Box 3.2: Land Application by Farmers
crops. After applying septage, it dries for 15–30 days after which the land is ploughed. The sludge operators pay him a sum of Rs.200 to 300 to discharge septage in his field, as it saves them a considerable amount of money to do so. This farmer reports receiving about4-5 loads of septage in a week in season. Another farmer in Vellapanaicken-palayam who cultivates fodder crops CO3, CO4 and Napier grass, uses septage in his farm but from a specific sludge operator only. He accepts only two loads a week and the sludge operators approach him themselves to offload on his land. Unlike the other farmer, he irrigates his growing fodder crops with this, using a controlled flow to prevent damage to the ploughed field, and every load is discharged on a different patch. He also said that some cesspool operators dispose of sludge on his land without informing him. He irrigates the farm with septage based only on the moisture content in the field.
Source: TNUSSP primary studies, 2016

4 Institutional Arrangements and Municipal Finances

4. Institutional Arrangements and Municipal Finances

4.1 Local Governance in PNP

The PNP TP is governed by an elected council consisting of 18 members – one elected from each administrative ward by the voting population. The Chairperson of the TP is elected directly by the voter population and is the head of the local government for the TP. The Chairperson and the council perform the administration through the executive staff of the TP.

The TP executive is headed by the Executive Officer, who is assisted by staff to manage administrative and civic responsibilities. There are 37 full-time positions, one of which is vacant at the time of this report. The various positions and current staffing are detailed in Annexure 4. There is a large component of labour hired for performing the watch and ward and maintenance functions in the TP. There is a Junior Engineer assigned to oversee the civil works and upkeep, who has the responsibility for more than one TP.

4.2 Roles and Responsibilities for sanitation

The TP is responsible for maintaining public health and carrying out civic functions towards this. Solid waste management, maintenance of public streets and drains, and enforcing building rules and regulations form a major portion of the civic administration. Generation of own-source revenue through taxes and cesses and management of grants-in-aid and development scheme finances from state and national governments for carrying out civic and development works is a core activity. The institutional provisions for carrying out these functions are vested in the staff, finances and powers of the TP.

Solid waste management and maintenance of public streets are among the sanitation services taken up by the TP. The creation of suitable infrastructure, recruitment of staff/workers and management of these works forms a core duty of the TP. When it comes to development works related to sanitation, the TP is involved in providing community facilities in identified poor areas and assisting poor households through the prevalent state/national development schemes. The following sections detail these in PNP.

4.3 Personnel involved in SWM

The Sanitary Inspector is in charge of solid waste management of the TP. There is a Sanitary Supervisor who assists the Sanitary Inspector, and supervises the day-to-day activities of the workers.

There are 25 permanent sanitary workers including seven female workers, and 45 private workers who are paid daily wages, which includes 4 male workers. As the primary collection of waste is carried out by the female workers, each one is supplied with a pushcart and has been assigned to collect waste from 250 households. Women from self-help groups (SHGs), who are involved in door-to-door collection of waste, start their work at 6 am and finish at 11.30am.

All the permanent workers work from 6 am to 11.30 am and after a lunch break, they work from 2 pm to 5 pm. In the afternoon, the permanent women workers are engaged in street sweeping.

There are six drivers for four trucks and 37 male sanitary workers. Of these male workers, 19 are contracted for daily activities such as drain cleaning, assisting the truck drivers in secondary collection

of waste, composting at the New Recovery Park, etc. The waste management activities are carried out on all days of the week. Each worker gets one day off in a week, based on a schedule.

4.4 Key issues with workflow and workloads

The regular workflow in the TP is distributed among all the staff as follows. The Executive Officer is the head of the town Panchayat. There is a Junior Engineer and an overseer who are assigned to look after the civil works of four TPs. The overseer is in charge of civil works that are less than Rs.1 lakh. There are three Junior Assistants who have been assigned to look after activities regarding public health, accounts, building plan, property tax, commercial tax, water supply, election works, and so on.

There are three bill collectors with each one in charge of six wards. The office assistant is responsible for bank-related activities and for general communication. The Sanitary Inspector and Supervisor look after solid waste management. The pump mechanic is in charge of supplying water for the whole TP. There are 25 permanent and 45 contract-based sanitary workers who are involved in waste management, drain cleaning, sweeping and other related activities.

The position of Head Clerk is still vacant. The dependence on contractual labour (daily wages), owing to administrative restrictions and preference, leads to inefficiencies as the wages and workhours are lower than for the permanent staff. For the current workload, the TP would require one permanent computer operator to carryout data management activities.

4.5 Current financial status

The TP's annual expenditure for the financial year 2015-2016 was Rs.35.27 crore. The own-source revenue collected from taxes, charges and fees make up only about 9 per cent of this. Of this, taxes on property and profession account for about half.

A substantial portion of the development and maintenance works is managed through funds devolved and grants from the state and national governments (32 per cent), contributions from the state government (17 per cent) and other sources. The TP also receives contributions from private parties towards financing development works and has reportedly benefited from Corporate Social Responsibility (CSR) investments by industries working in the area.

The expenditure on salaries and wages makes up about 5 per cent of the annual expenditure. Water revenue brings in about Rs.46 lakh, while payments to the TWAD Board were Rs.3.8 crore. For the emptying of sludge from septic tanks in CTs and public buildings, the TP reported an expenditure of Rs.83,000.

Financial data from the TP was made available only for a year and hence the analysis in this section is limited. However, it is clear that the TP is rather dependent on grants and contributions from higher levels of government to take up and manage any development works.

While the current revenue stream affords it a certain cushion for managing daily expenditure on sanitation related services, it should be borne in mind that any intervention in the full chain of sanitation should not envisage capital investments from the TP (without adequate contributory financial flow arrangements) and should not burden the TP with any substantial additional O&M expenditure.

5 Action Plan for City Sanitation and Estimated Investments

5. Action Plan for City Sanitation and Estimated Investments

The sanitation situation in PNP and the developmental context presented in the earlier sections form the basis for consultation and discussions in charting the way forward to secure the full chain of sanitation in the TP. The weaker elements in the full cycle of safe sanitation were identified on the basis of the situation analysis, and are summarized across three broad themes – Containment, Wastewater Generation and Conveyance, and Treatment/Reuse –to develop a matrix of potential improvements, as detailed in Table 5.1.

Table 5.1: **Key Elements Necessary to achieve MuzhuSugadharam**

Sl. No.	Containment	Fecal Sludge Conveyance	Treatment/Reuse
1	Need to stop OD in identified wards/locations	Regularise de-sludging activity	Treatment facility for greywater and septic tank effluents
2	Insanitary toilets need to be converted	Safe emptying of septic tanks	Re-use for agriculture after treatment only
3	Improve operation of CT/PT	Ensuring fecal sludge is discharged at designated sites only	
4	Address floating population service requirements		

Source: TNUSSP Analysis, 2016

The elements identified were classified into the following:

1. Elements for which solutions were known and tested - *ready for action*
2. Elements that are being addressed by the TP or other stakeholders at the moment, but could benefit from supporting/enabling actions - *a supporting/enabling action*
3. Elements for which one has technical or managerial solutions but not tried out locally or to scale - *requiring a pilot approach*
4. Elements which require enhanced information/data before moving it to classes 1 or 2 – *Need for studies*

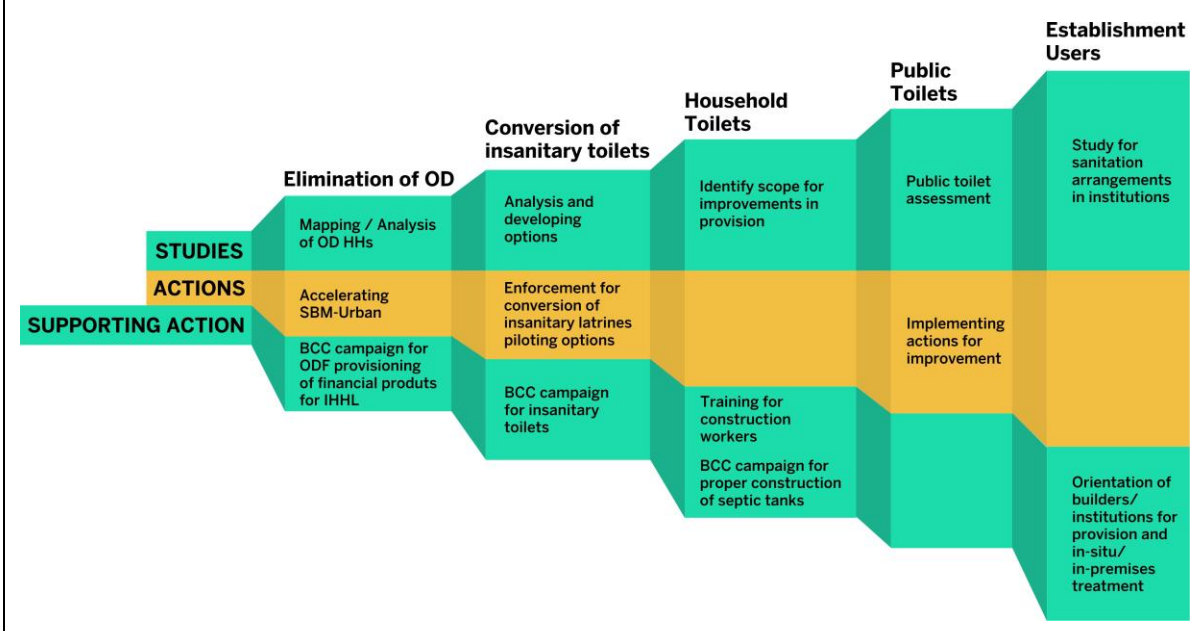
These different classes were felt to require different approaches, skillsets and timelines and have thus been building blocks of the draft action plan for improving sanitation outcomes in the TP.

These enabled the definition of a more concrete/objective set of activities to be defined within each class and address the elements identified in Table 5.1. These are presented for the three thematic areas of the sanitation chain.

5.1 Containment

The actions proposed to address the elements identified for improvement under 'Containment' are presented in Figure 5.1.

Figure 5.1: **Draft Action Matrix for Improving Access and Containment**



Source: TNUSSP analysis, 2016

The elimination of OD requires some preparatory work to identify the households that are practicing this. Preliminary work on this has been taken up already by the TP through discussions and interactions in the slums. It was felt that this requires a more targeted and nuanced approach. An alternative approach would be to use something like Community-Led Total Sanitation (CLTS) for behaviour change. The OD situation will also be impacted by improving the community toilet experience.

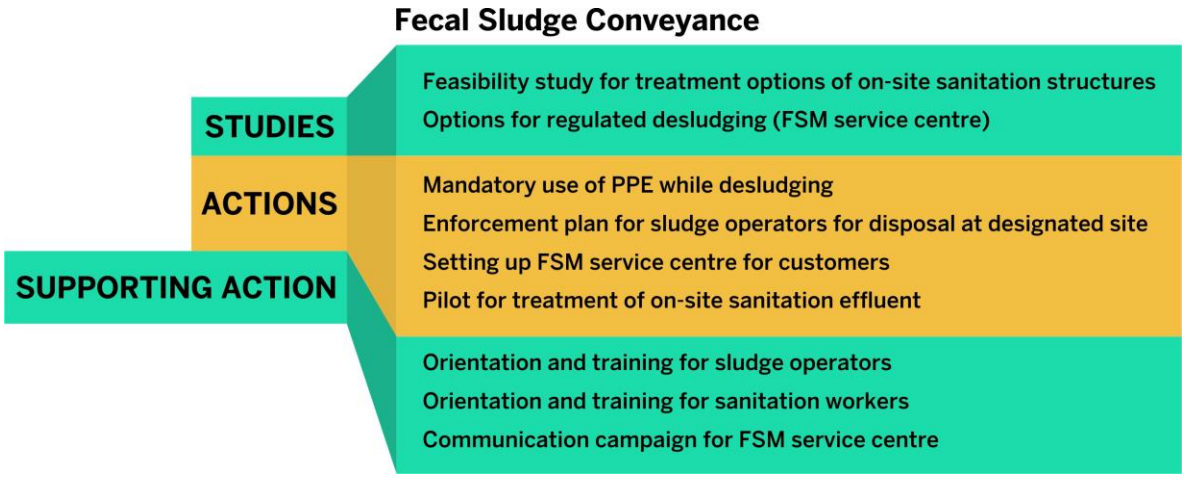
The ongoing SBM campaign places this in the radar of activities, but for the TP executive to achieve this within a year, accelerated efforts are required. Preliminary examination of financial support by utilizing the SHG network is also a possibility.

The containment structures that give rise to insanitary outcomes and risk public health need to be curbed and corrected. Since these are in contravention of existing building rules, enforcement is a possibility for the future. This would require creating awareness amongst households and masons, supplemented with training to enable compliance with construction standards. However, legacy structures will need attention and a two-pronged approach of using Behaviour Change and Communication (BCC) with the residents and simultaneously testing out (pilots of) technical options for household-level and neighborhood-level solutions is felt to be optimal.

5.2 Fecal Sludge Conveyance

The proposed actions to address elements identified for improvement in the fecal sludge 'Conveyance' part of the sanitation chain are presented in Figure 5.2.

Figure 5.2: **Draft Action Matrix for Improving Fecal Sludge Conveyance**



Source: TNUSSP analysis, 2016

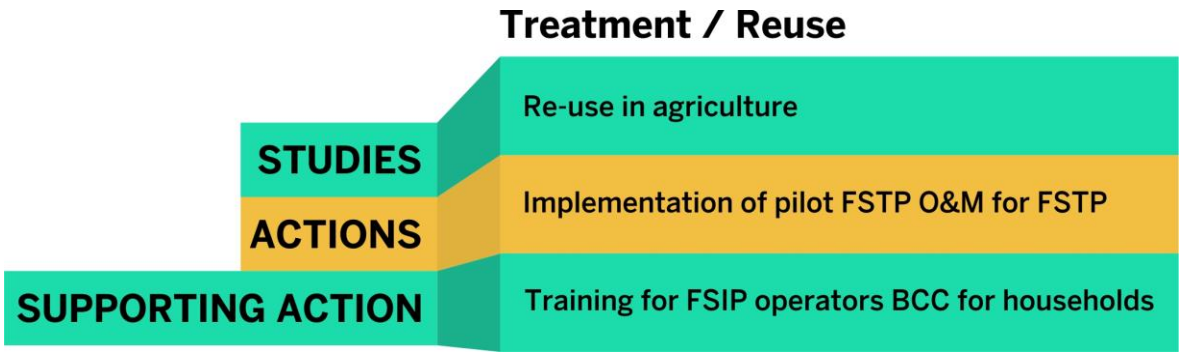
Conveyance of fecal sludge is currently undertaken by private operators. The Operative Guidelines promulgated by the State recommend the registration of these service providers to enable light-touch regulation for optimal public health outcomes. The guidelines also mandate disposal at designated sites and this needs to be enabled realistically for the TP.

As in other industries, worker safety is an issue requiring focus and continued efforts in the sanitation sector. This would be enabled through a mix of training and communication.

5.3 Treatment / Reuse

The actions proposed to address the elements identified for improvement in the 'Treatment/reuse/disposal' part of the sanitation chain are presented in Figure 5.3.

Figure 5.3: **Draft Action Matrix for Improving Treatment / Reuse**



Source: TNUSSP analysis, 2016

Fecal sludge is already being used in agriculture, albeit with not much monitoring or knowledge of the impacts.

A designated site for fecal sludge disposal is required at PNP, along with a treatment facility. The operations and maintenance of the treatment plant should not become a burden for the TP administration and hence a suitable plan with adequate financial and technical inputs is required.

5.4 Investment estimated for city sanitation plan

Towards mapping/analysis of OD households and sanitation arrangements in PNP funds from SBM-U, Corporate Social Responsibility, ULB OSR, ULB grants in aid, user contribution, MLAADS- Member of Legislative Assembly's – Area Development Scheme can be accessed. Details of investments estimated for CSP are presented below.

Table 5.2: Investments Estimated for City Sanitation Plan of PNP

Sl. No.	Activity	Start Year	End Year	Investment Required (Rs.)
1	Mapping of households (HHs)	2017	2017	2,79,670
2	Identification of HH need intervention	2017	2017	1,50,000
			Sub total	429,670
Accelerating implementation of SBM-U				
1	Upgrading existing CT/PTs	2018	2020	10,20,000
2	Support construction of new IHHL through provision of financial products	2017	2020	7,22,000
3	Construction of new CT/PTs	2018	2019	50,000
			Sub total	17,92,000
Provisioning of financial products				
1	Supporting development of financial products for enterprises in sanitation	2017	2018	8,90,000
BCC campaign for elimination of OD, conversion of insanitary toilets and proper construction and maintenance of septic tanks				
1	Stakeholder interactions	2018	2019	80,000
2	Constituting ward / community level committees to promote behaviour change and proper construction and use of toilets	2017	2019	6,30,000
			Sub total	7,10,000
Situation analysis and developing options for insanitary latrines				

Table 5.2: Investments Estimated for City Sanitation Plan of PNP				
Sl. No.	**Activity**	**Start Year**	**End Year**	**Investment Required (Rs.)**
1	Pre-feasibility study to identify and assess suitability of different options for conversion of insanitary toilets	2017	2017	7,50,000
Piloting/ enforcement for conversion of insanitary latrines				
1	Supporting conversion of insanitary toilets	2018	2018	7,18,000
2	Supporting policy and institutional changes/policy interventions for conversion of insanitary toilets	2017	2020	
			Sub total	7,18,000
Addressing deficiencies in design of household septic tanks				
1	Addressing deficiencies in design of septic tanks	2018	2019	90,000
CONVEYANCE				
Management of fecal sludge				
1	Pre-feasibility study to identify and assess suitability of different options for treatment of sludge and wastewater from on-site sanitation structures	2017	2018	10,00,000
2	Implementation of FSM collection, treatment and disposal plan	2018	2021	30,80,000
			Sub total	40,80,000
Treatment and disposal of wastewater and fecal sludge				
Enhancing fecal sludge treatment capacity				
1	Pre-feasibility study to identify and assess suitability of different options for treatment of fecal sludge	2017	2017	5,00,000
2	Creation of fecal sludge treatment and reuse capacity	2017	2019	21,90,000
			Sub total	26,90,000
			Total	1,21,49,670
Source: TNUSSP analysis, 2016				

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Annexures

Annexure 1: Potable water quality and charges in Periyanaicken-palayam

Table A.1: Drinking Water Quality Test Results in Periyanaicken-Palayam							
S. NO	**Parameter**	**Permissible Limits**	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**	**Sample 5**
PHYSICAL EXAMINATION							
1		15	Colourless	Colourless	Colourless	Colourless	Colourless
2	Odour	Agreeable	Odourless	Odourless	Odourless	Odourless	Odourless
3	Turbidity Nt units	5	None	None	None	None	None
CHEMICAL EXAMINATION							
4	pH	6.5-8.5	6.8	6.7	6.9	6.8	6.9
5	Alkalinity	600	150	100	150	100	150
6	Hardness	600	100	150	100	100	100
7	Total salts mg/l	2000	301	300	301	240	301
8	Iron as Fe mg/l	0.3	0	0	0	0	0
9	Ammonia as NH_3 mg/l	0.5	0.5	0.5	0.5	0.5	0.5
10	Nitrite as NO_2 mg/l	-	0.2	0.2	0.2	0.2	0.2
11	Nitrate as NO_3 mg/l	45	20	20	20	20	20
12	Chloride as Cl mg/l	1000	100	100	100	100	100
13	Fluoride as F mg/l	1.5	1.0	1.0	1.0	1.0	1.0
14	Phosphate as PO_4 mg/l	-	0	0	0	0	0
15	Residual Chlorine	1	0.2	0.2	0	0.2	0.2
BACTERIOLOGICAL EXAMINATIONS							
16	Facal coliform	-	-	-	-	-	-
Source: PNP TP Office, July 2016							

Table A.2: Water Charges in Periyanaicken-Palayam					
S. No.	**Type of Connection**	**No. of connections**	**Connection Charge (Rs.)**	**Monthly User Fee (up to13.5KL) (Rs.)**	**Cost perKL (beyond 13.5KL) (Rs.)**
1	Household	5904	3,000	60	6
2	Commercial	197	5,000	140	13
3	Industrial	42	5,000	200	16
4	**Total**	**6,143**	---	---	---

Source: PNP TP Office, 2016
Note: There are 130 public taps provided in low-income areas/slums

Annexure 2: Institutions and Establishments in Periyanaicken-palayam and their sanitation facilities

A2.1. List of Hospitals

1. One allopathic hospital (10 beds, 3 doctors, 50 para medical staff)
2. One alternative medicine hospital (0 beds, 1 doctor, 2 paramedical staff)
3. One health centre/dispensary (10 beds, 1 doctor, 5 paramedical staff)
4. One Family Welfare Centre (0 beds, 1 doctor, 4 paramedical staff)
5. One Maternity and Child Welfare Centre (10 beds, 3 doctors, 7 paramedical staff),
6. One maternity home (10 beds, 3 doctors, 7 paramedical staff),
7. One TB hospital (10 beds, 1 doctors, 4 paramedical staff),
8. One veterinary hospital (1 doctor, 4 paramedical staff)
9. Non-government. hospitals/clinics: 5 with out-patient facilities, 6 with both in-patient and out-patient facilities, and one charitable hospital/nursing home.
10. Ten non-government medical shops.

A2.2. Details of Healthcare Institutions

PNP Government Hospital (GH) opened in December 1999, providing service for ante natal care (ANC), post-operative cases, Acute Diarrhoeal Diseases (ADD) and general cases. Staff availability in the GH is five doctors, seven staff nurses, two auxiliary nurse midwives, two hospital workers and three sanitary workers. The GH consists of a male ward, female ward, labour ward, and postnatal ward, each with to beds. The post-operative ward has six beds and the tuberculosis treatment centre also available. Total outpatient cases treated at the GH for the year 2015-16 is 1, 17,290 (Male- 64, 260/ Female-52,410/Child-1,620).

Table A.3: Sanitation Facility in Healthcare Institutions –Periyanaicken-palayam

S. No	Type of Institution	Staff in service			Doctors in service			Toilet availability for patients			Toilet availability for staff			Frequency of cleaning	By whom	Containment
	Government Hospital															Desludging interval
		M	F	Total	M	F	Total	M	F	Total	M	F	Total			
1	Government Hospital, PNP	2	11	**13**	3	2	**5**	3	6	**9**	2	5	**7**	Daily	By hospital sanitary workers	Depends upon the containment fill. Last desludged three months back

Source: Field survey, July 2016

A2.3. Details of Educational Institutions, Libraries and Reading Rooms

Government Primary School (Numbers)	3
Private Primary School (Numbers)	9
Government Middle School (Numbers)	2
Private Middle School (Numbers)	9
Private Secondary School (Numbers)	7
Private Senior Secondary School (Numbers)	5
Private Degree College-Arts and Science Only (Numbers)	1
Private Degree College-Arts, Science and Commerce (Numbers)	2
Private Degree College-Others (Status A(1)/NA(2))	2
Private-Management Institute (Numbers)	1
Private-MS Office (Numbers)	1
Private-Desktop Publishing (Numbers)	1
Government-Non Formal Education (Numbers))	6
Private-Special School for Disabled (Numbers)	1
Private-Working Women's Hostel (Status A(1)/NA(2))	2
Government-Public Library (Numbers))	1
Private-Public Library (Numbers)	3
Government.-Public Reading Room (Numbers))	1
Private-Public Reading Room (Numbers)	3

A2.4. Other Facilities used by Public

Private-Stadium (Numbers)	2
Private-Cinema Theatre (Numbers)	1
Government.-Auditorium/Community Hall (Numbers)	1

Table A.4: Details of Commercial Establishments in Periyanacken-palayam

Sl. No.	Type of Establishment	Number of Units
1	Provision store	22
2	Petty shop	28
3	Hotel	29
4	Bakery	36
5	Tea shop	13
6	Mutton stall	16
7	Chicken shop	13
8	Tailor shop	34
9	Rice shop	9

Table A.4: Details of Commercial Establishments in Periyanacken-palayam		
Sl. No.	**Type of Establishment**	**Number of Units**
10	Fancy store	29
11	Agencies	13
12	Hardwares	28
13	Medical shop	23
14	Fruit shop	11
15	Fish stall	6
16	Flower shop	10
17	Banana shop	7
18	Banana leaf shop	5
19	Textile shop	18
20	Oil store	5
21	Optical store	2
22	Jeweller	7
23	Saloon	15
24	Finance shop	6
25	Cycle shop	6
26	Lodge	2
27	Watch shop	3
28	Footwear shop	4
29	Bags shop	5
30	Utensil shop	8
31	Flour mill	3
32	Studio	7
33	Workshop	32
34	Courier service	4
35	Computer service	6
36	Timber shop	5
37	Xerox shop	6
38	Mechanic shop	10
39	Beef stall	3
40	2-wheeler showroom	8
41	Old iron store (recycler stall)	6
42	Chat stall	15
43	Other stores	10
	Total	528
Source: PNP TP Office		

Annexure 3: Educational Institutions in Periyanaicken-palayam and their sanitation facilities

Government schools: In PNP there are three government schools, one middle school, and two primary schools. The middle school has 148 students and 8 teachers. There are two toilet blocks within the school; one was constructed under the Sarva Shiksha Abhiyan (SSA) scheme and another with PRICOL's CSR funds two years ago. The toilet block constructed under the SSA has five seats for boys and four seats for girls. The SSA toilet outlet is connected to the septic tank of the Shakti Nagar CT. Currently, this septic tank is exfiltrating. The toilet block constructed with support from PRICOL is exclusively for girls, it has seven seats and an electric incinerator for disposal of sanitary napkins. The outlet of this toilet is connected to a septic tank, and since it is just two years old, it has never required emptying. There are no separate toilets for the school staff.

The primary schools in Kasthuripalayam and Jothipuram have 31 and 30 students respectively, and two teachers each. There are only two seats, one for boys and one for girls, in each of the primary schools. The toilet blocks are connected to septic tanks with a large capacity. Both septic tanks have not been desludged in the past 10 years due to large capacity and less usage. There are no separate toilets for the school staff.

Free sanitary napkins, three per month, are issued to adolescent schoolgirls through the Government Hospital under the Directorate of Public Health in PNP government schools.

Generally, the toilets in the government schools are cleaned by temporary sanitation workers of the TP. The toilets are regularly cleaned and the headmaster verifies and signs off a checklist every day. Recently, since the last three months, through a government initiative, the Block Development Office (BDO) has beenpayingRs.750 every month to the middle school and Rs.1, 000 to the high school for cleaning of toilets. A cheque is issued to the headmaster and it is deposited to into the temporary sanitation worker's bank account every month. Similarly, for the purchase of consumables like brooms, disinfectants etc., Rs.300 is funded by the BDO every month to the middle school and Rs.500 to the high school. There is no funding from the BDO to maintain the toilets in the primary schools; the TP Office deploys a temporary sanitation worker to clean the toilets in these schools. Sanitation facilities in primary educational institutions at PNP are presented in Table C.1.

Private schools: PNP has seven private schools functioning in different locations. Pioneer Mills Higher Secondary School in Jothipuramhas12toilets for boys and 23 for girls; this is at an average of 36 boys per seat and 24 girls per seat. In GKD Matriculation Higher Secondary School, there is a toilet for every 68boys and every 56girls. The other four schools are located in SRMV campus spread over about 300 acres. This campus has Shivananda Higher. Secondary School, with both Tamil medium and English medium available. The English medium section has a toilet for every eight boys and for every 21 girls, while the Tamil medium has only boys – with an average of 66 boys per seat. TAT Kala Nilayam and Vidayalaya schools are also a part of this campus. TAT Kala Nilayam has an average of 53 boys per seat and 27 girls per seat, while Vidayalaya has an average of 18 boys per seat. Urinals are available in all schools at an average of 30-40seats for the boys and 15-20 for the girls.

In Pioneer School, there are four containments that are desludged once in three months and in GKD Matriculation Higher Secondary School, the four containments are desludged once in six months. All four school containments on the SRMV campus are taken care of by the maintenance division, which built the containment with three chambers and a soak pit to collect the wastewater which is used for

plantation, and the solid waste dumped near the pit. The toilets for the private schools are cleaned by people appointed by the management of each school, and in SRMV, cleaning is done by a sanitation worker from the maintenance division. See sanitation facilities in higher secondary education institutions in PNP, presented in Table C.2.

Private colleges: Three of the four colleges in PNP belong to SRMV. In Pioneer College of Arts & Science, the total number of toilet seats available is 32 – one for every 80 men and one for every 29 women. In RMV College of Education, there is a toilet for roughly every 20 male students. In Maruthi College of Physical Education, there is a toilet for every eight male students. In RMV College of Arts & Science, there is a toilet for 100 male students.

In Pioneer College the containment is desludged once in three months. The three colleges of SRMV use the same three-chambered containment and soak pit looked after by the maintenance division and their toilets are cleaned by the sanitation worker appointed by the maintenance division. Details of the sanitation facilities in PNP colleges in PNP are presented in table C.3.

Places of significant footfall: In PNP TP there are six function halls, one cinema theatre, and one community hall. In KR Kalyanamandapam the seating capacity is 250, with three toilets for men and three for women. The same number of male and female toilets is available in Balakrishna Kalyanamandapam, but the seating capacity is 500, and it has three more general toilets. In GKD Kalyanamandapam, there are only three male toilets and three female toilets for a capacity of 500. In Nathan Hall, Ooty Road, and in Ayur Ambrose Hall, Veerapandipirivu, which each have a capacity of 400, there are three male toilets and three female toilets. Murugan Theatre, Ooty Road, can seat 609 but has only 4 male toilets and 2 female toilets, and 10 urinals for men. The Sunday market there has no toilet facility, shoppers have to access the PT in the PNP bus stand at the rate of Rs.2 for the toilet and Re. 1 for the urinal.

The containment is desludged once in two years at KR Kalyanamandapam, GKD Kalyanamandapam, Murugan Theatre and Balakrishna Kalyanamandapam. Nathan Hall's containment was desludged five years ago, while Ayur Ambrose Hall's was desludged three years ago. In Vivekanandapuram Community Hall, the containment has not been desludged since it opened four years ago. In all the above places. The containments are large and don't require frequent desludging, owing to less usage.

The details of sanitation facilities in public halls in PNP is presented in table C.5.

Table A.5: Sanitation Facilities in Primary Educational Institutions –Periyanaicken-Palayam

Sl. No	Institution	Students Strength			Teachers Strength			No of Toilets available						Frequency of cleaning	By Whom	Containment Desludging interval
								For Students			For Staffs					
		M	F	Total	M	F	Total	M	F	Total	M	F	Total			
1	Panchayat Union Middle School, PNP	61	87	148	2	6	8	5	11	16	-	-	-	Daily	Panchayat sanitation worker	One new unit by PRICOL corporate and the other one attached to the Shakthi Nagar CT

Table A.5: Sanitation Facilities in Primary Educational Institutions –Periyanaicken-Palayam

Sl. No	Institution	Students Strength			Teachers Strength			No of Toilets available						Frequency of cleaning	By Whom	Containment Desludging interval
								For Students			For Staffs					
		M	F	Total	M	F	Total	M	F	Total	M	F	Total			
2	Panchayat Union Primary School, Kasthuri palayam	14	17	31	-	2	2	1	1	2	-	-	-	Daily	Panchayat sanitation worker	Not desludged in 10 years
3	Panchayat Union Primary School, Jothipuram	18	12	30	-	2	2	1	1	2	-	-	-	Daily	Panchayat sanitation worker	Not desludged in 10 years

Source: Primary survey, TNUSSP 2016

Table A.6: Sanitation Facility in Higher Secondary Education Institutions –Periyanaicken-Palayam

Sl. No.	Institution	Students Strength			Teachers Strength			No of Toilets available						Frequency of cleaning	By Whom	Containment Desludging interval
								For Students			For Staff					
		M	F	Total	M	F	Total	M	F	Total	M	F	Total			
1	Pioneer mills Higher Secondary School	440	562	1,002	7	38	45	12	23	35	2	2	4	Daily	School appointed person	Desludging once in 3months –total 4 containments
2	GKD Matriculation Higher. Secondary School, Sri Ramakrishna Vidyalaya Post	1,023	1,077	2,030	3	27	30	15	19	34	2	3	5	Daily	School appointed person	Desludging once in 6months – total 4 containments
3	Swami Shivananda Higher Secondary School (English) Sri Ramakrishna Vidyalaya campus	392	316	708	5	30	35	5	15	20	-	3	3	Daily	School appointed person	Desludged based on the containment fill
4	Swami Shivananda Hr. Sec. School (Tamil) SRMV campus	600	-	600	30	-	30	9	-	9	5	-	5	Daily	SRMV sanitation worker	Desludged based on the containment fill
5	TAT Kalanilayam, SRMV campus	377	323	700	18	14	32	7	12	19	2	3	5	Daily	SRMV sanitation worker	Desludged based on the containment fill
6	Sri KR.Rengasamy Naidu HSS	580	437	1,017	11	23	34	11	15	26	2	4	6	Daily	School appointed person	Desludging once in 6months

Table A.6: Sanitation Facility in Higher Secondary Education Institutions –Periyanaicken-Palayam

Sl. No.	Institution	Students Strength			Teachers Strength			No of Toilets available						Frequency of cleaning	By Whom	Containment Desludging interval
								For Students			For Staff					
		M	F	Total	M	F	Total	M	F	Total	M	F	Total			
7	The Vidayalaya High School, SRMV campus	260	-	260	14	-	14	6	-	6	3	-	3	Daily	SRMV sanitation worker	Desludged based on the containment fill

Source:Primary survey, TNUSSP 2016

Table A.7: Sanitation Facility in Colleges –Periyanaicken-Palayam

Sl. No	Institution	Students Strength			Teachers Strength			No of Toilets available						Frequency of cleaning	By Whom	Containment Desludging interval
								For Students			For Staffs					
		M	F	Total	M	F	Total	M	F	Total	M	F	Total			
1	Pioneer mills College of Arts & Science	400	800	1,200	15	55	70	5	27	32	2	3	5	Daily	College appointed sanitary worker	Desludging once in three months. Total 4 containments
2	College of Education	120	-	120	15	2	17	6	-	6	1	1	2	Daily	SRMV sanitary worker	Desludged based upon containment fill.
3	Sri Ramakrishan Mission Vidyalaya, Maruthi College of Physical Education	150	-	150	25	-	25	20	-	20	5	-	5	Daily	SRMV sanitary worker	Desludged based upon containment fill.
4	SRMV College of Arts &Science	1,000	-	1,000	120	-	120	10	-	10	2	-	2	Daily	SRMV sanitary worker	Desludged based upon containment fill.

Source: Primary survey, TNUSSP 2016;

Table A.8: Sanitation Facilities in Public Offices –Periyanaicken-Palayam

Sl. No	Name of the office	No. of staff working		Toilet availability	No. of toilet seats / pans				Ownership of the building	Water availability	Electricity	Doors condition	Super structure condition	Sub structure condition	Frequency of cleaning
		M	F		M	F	Gen	Urinal							
1	Town Panchayat Office	10	7	Yes	0	0	4	0	Owned	Yes	Yes	Good	Good	Good	Daily twice
2	Sub Registrar Office, Railway Feeder Road	5	4	Yes	0	0	3	0	Owned	Yes	Yes	Good	Good	Good	Daily twice

Table A.8: Sanitation Facilities in Public Offices –Periyanaicken-Palayam															
Sl. No	Name of the office	No. of staff working		Toilet availability	No. of toilet seats / pans				Ownership of the building	Water availability	Electricity	Doors condition	Super structure condition	Sub structure condition	Frequency of cleaning
		M	F		M	F	Gen	Urinal							
3	Panchayat Union Office, Ooty Road	13	8	Yes	2	2	0	0	Owned	Yes	Yes	Good	Good	Good	Daily
4	Block Agri. Office, Ooty Road	3	2	Yes	0	0	1	0	Owned	Yes	Yes	Good	Good	Good	Daily
5	Statistical Department, Ooty Road	1	1	Yes	0	0	1	0	Owned	Yes	Yes	Good	Good	Good	Daily
6	PNP Panchayat Union Veg. Growers' Cooperative Marketing Society Ltd, Ooty Road	2	1	No	0	0	0	0	Owned	NA	NA	NA	NA	NA	NA
7	BSNL, Ooty Road	11	6	Yes	2	1	0	2	Owned	Yes	Yes	Good	Good	Good	Daily
8	Library, Shakthi Nagar	0	1	No	0	0	0	0	Owned	NA	NA	NA	NA	NA	NA
9	Asst. Educational Office, Shakthi Nagar	6	4	No	0	0	0	0	Owned	NA	NA	NA	NA	NA	NA
10	Library, Renganathapuram	0	1	Yes	0	0	1	0	Owned	Yes	Yes	Good	Good	Good	Daily
11	Library, Pioneer Nagar	1	0	No	0	0	0	0	Owned	NA	NA	NA	NA	NA	NA
12	TNEB, LMW road	7	3	Yes	0	0	2	0	Rented	Yes	Yes	Good	Bad	Good	daily
Source: Primary survey, TNUSSP 2016															

Table A.9: Sanitation Facilities in Places with Significant Footfall								
S.No	Institution	Seat Capacity	No of toilet seats/pans				Containment - Desludginginterval
			M	F	Gen	Urinal	
1	KR KalyanaMandapam, near LMW Pirivu, OotyRoad	250	3	3	0	0	Desludging once in 2 years
2	BalakrishnaKalyanaMandapam, Bhagat Singh Nagar	500	3	3	3	0	Desludged 2 years back
3	Nathan Hall, OotyRoad	400	4	4	0	0	Desludged 5 years back
4	Ayar Ambrose Community Hall, VeerpandiPirivu	300-400	4	4	0	0	Desludged once in 3 years
5	Murugan Theatre, OotyRoad	619	4	2	0	10	Desludged 2 years back

Table A.9: Sanitation Facilities in Places with Significant Footfall							
S.No	**Institution**	**Seat Capacity**	**No of toilet seats/pans**				**Containment - Desludginginterval**
			M	**F**	**Gen**	**Urinal**	
6	Vivekanandapuram, Community Hall	100-150	1	1	0	0	Not desludged past 4 years
7	GKD KalyanaMandapam, Railway Feeder Road	500	3	3	0	0	Desludging once in 2 years
8	Sunday Market	NA	0	0	0	0	NA
Source: Primary survey August, 2016 *NA – Not Applicable							

Table A.10: Parks and Recreational Spaces in Periyanaicken-Palayam						
Sl. No.	**Name of the park/ space**	**Ward no.**	**Toilet available**	**If yes, specify**	**CT/PT in the vicinity**	**If yes, specify**
1	Amrithanandamayee Nagar Park	1	No	NA	No	NA
2	Pioneer Nagar Playground	1	No	NA	No	NA
3	TVK Nagar Playground	18	No	NA	No	NA
4	Thiru. Vi Ka Nagar Children's Park	18	No	NA	No	NA
5	MGR Nagar Park	3	No	NA	No	NA
6	Renga Nagar Children's Park	16	No	NA	No	NA
7	Shakthi Nagar Playground	15	No	NA	Yes	Shakti NagarCT
8	Kamraj Nagar Children's Park	6	No	NA	No	NA
Source: Primary survey, 2016						

Annexure 4: Staffing in Periyanaicken-palayam

Table A.11: Details of Staff in Periyanaicken-Palayam Town Panchayat				
Sl. No	**Position**	**Total no. of sanctioned posts**	**Present strength**	**Vacancies**
1	Executive Officer	1	1	-
2	Head Clerk	1		1
3	Junior Assistant	3	3	-
4	Bill Collector	3	3	-
5	Office Assistant	1	1	-
6	Sanitary Inspector	1	1	-
7	Sanitary Supervisor	1	1	-
8	Pump Mechanic	1	1	
9	SanitationWorker (full time)#	25	25	
10.	Sanitation Worker (on contract)*	-	45	-
11.	Other workers (on contract)		24	
	Total	**37**	**81**	**-**
#The monthly income ranges between Rs. 18,000 to 23,000 per month based on seniority. *Sanitation workers on contract are paid Rs. 200 to 275 (paid on monthly basis). Their timings of operation are 6 to 11 am and 2 to 5 pm				
Source: PNP TP, August 2016				

The 45 contracted sanitary workers are also members of SHGs. In addition to this there are five workers appointed on a few days, at the compost for various processes. Apart from this six are assigned to be drivers for solid waste collection. The 18 others are assigned tasks like water tank operation, watchmen for parks, and helper for drainage cleaning on a temporary basis.

TN US SP

TAMIL NADU URBAN SANITATION SUPPORT PROGRAMME

Tamil Nadu Urban Sanitation Support Programme (TNUSSP) supports the Government of Tamil Nadu and cities in making improvements along the entire urban sanitation chain.

The TNUSSP is implemented by a consortium of organisations led by the Indian Institute for Human Settlements (IIHS), in association with CDD Society, Gramalaya and Keystone Foundation.

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