



# Management of Decentralized Domestic Wastewater Treatment Facilities in Mandalay City

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**Mandalay City Development Committee**



# Mandalay City Profile

**Location** : 96° 06' E , 21° 59' N ,  
74.07 m A.M.S.L

**City Area** : 123.26 km<sup>2</sup>  
( 16.86 km from North to South,  
8.75 km from East to West)

**Composed** : 6 townships  
( divided by 96 wards, 42 village tracts  
and 170 villages)

**Annual Average Rainfall** ≈ 956 mm

**Annual Average Evaporation Rate** ≈ 1728 mm

**Annual Average relative Humidity** ≈ 66 %



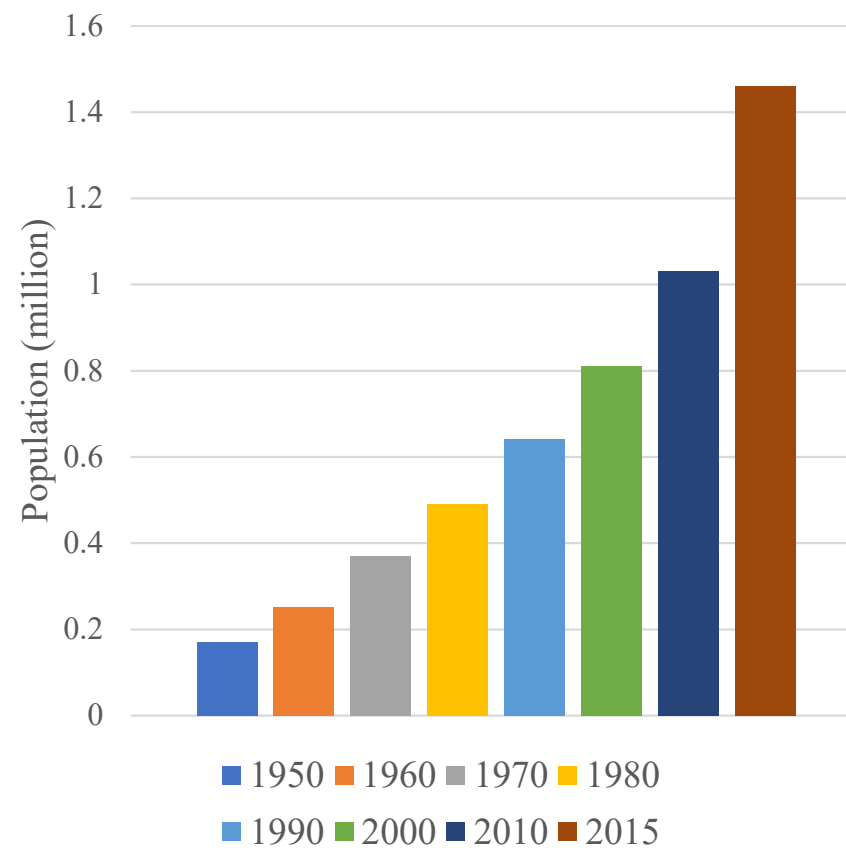




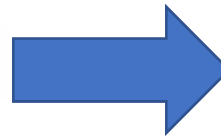
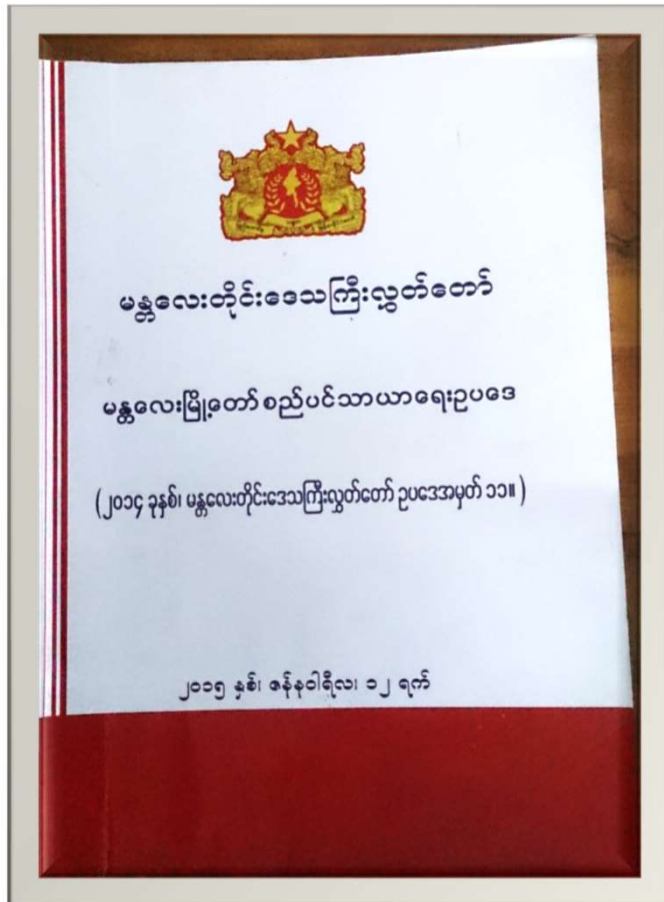
# Mandalay City Profile



## Population Growth of Mandalay City



# MCDC Rules and Regulations on Water & Sanitation



## Chapter XVI

### Section 69. (m)

Managing water for consuming, wasted polluted water and liquid of excrement in accord with the standards of WHO or concerned ministry as prescribed by time to time.

**Amending Law on Mandalay  
City Development Law, 2014**



# **Sanitation**

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# Responsibilities for Sanitation



- Instructing and permitting the septic tank construction
- Providing mobile toilets
- Solving the complains from public in terms of wastewater pollution
- Construction and management of public toilets
- Providing desludging service
- Supervising the wastewater disposal from industrial zone





# Existing Working Capacity Night Soil Trucks



No	Model/Made	Year	Operation Condition	Working Capacity (gal/trip)	Working Load (trip/day)	Total collection load (m <sup>3</sup> /day)		Total load (m <sup>3</sup> /month) (22 working days in a month)	
						Minimum	Maximum	Minimum	Maximum
1	Japan	1972	Yes	1000	1 to 2	4.5	9.1	99	200.2
2	Japan	1982	Yes	1000	1 to 2	4.5	9.1	99	200.2
3	DF-3/China	1994	Yes	1000	1 to 2	4.5	9.1	99	200.2
4	DF-4/China	1994	Yes	1000	1 to 2	4.5	9.1	99	200.2
5	DF-5/China	1994	Yes	1000	1 to 2	4.5	9.1	99	200.2
6	Japan	1999	Yes	1000	1 to 2	4.5	9.1	99	200.2
7	China	2013	Yes	1000	2 to 4	9.1	18.2	200.2	400.4
8	China	2013	Yes	1000	2 to 4	9.1	18.2	200.2	400.4
Total						45.2	91	994.4	2002



# Existing Sanitation Coverage



Townships			% household septic tank Coverage	% sanitation coverage	Open Defecation/Use of other's facilities (%)
	Household Septic Tanks	Pit Latrines			
Aungmyethazan	63	25	70%	98%	2%
Chanayethazan	56	34	62%	100%	0%
Maharaungmye	48	28	53%	84%	16%
Chanmyathazi	30	58	33%	98%	2%
Pyigyitagun	32	53	36%	94%	5%
Amarapura	20	23	22%	48%	52%
Patheingyi	23	57	26%	89%	11%
<b>TOTAL</b>	<b>272</b>	<b>278</b>	<b>43%</b>	<b>87%</b>	<b>13%</b>





# Charges For Desludging



Location of the  
Oxidation Pond



From 5 townships  
29100 Kyats



From Amarapura  
Township  
38100 Kyats

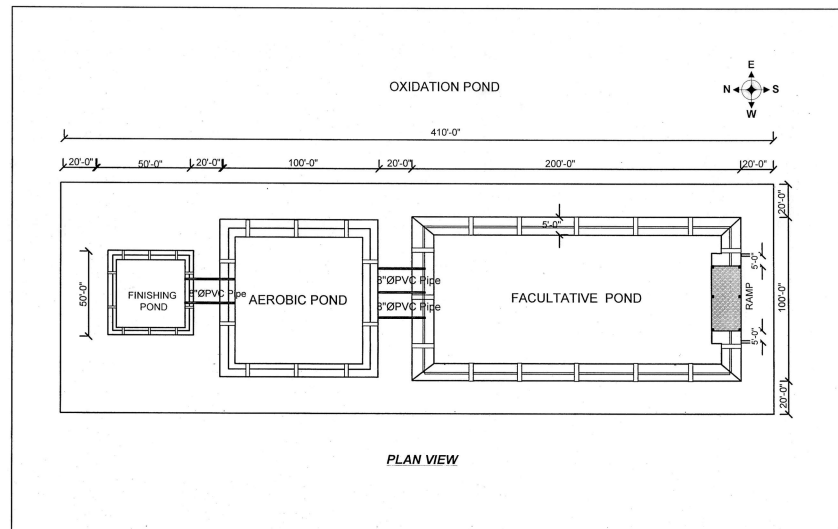


# Night Soil Treatment ( Oxidation Pond)



## Location

11km from north of Mandalay City  
Aye Yake Nyein Cemetery



## Pond Size

Facultative Pond (200'x100'x6')

Aerobic Pond (100'x100'x5')

Finishing Pond (50'x50'x4')



# **Wastewater**

**(1) Domestic**

**(2) Industry Wastewater**

**Mandalay City Development Committee**





# Overview On Domestic Wastewater Situation

Grey Water & Effluents  
from Septic Tank

Directly discharge to 9  
main drains

No.	Name of Drain	Length
1.	Shwe Ta Chaung	7.14 miles
2.	Ngwe Ta Chaung	4.7 miles
3.	Mingalar	0.96 miles
4.	Columbo	3.57 miles
5.	Nadi	5.78 miles
6.	Payandaw	7.01 miles
7.	Thingazar	2.95 miles
8.	Myaung Gyi	1.76 miles
9.	Tat Myaw	2.79 miles
Total Length of Drains		36.64 miles



# Domestic Wastewater Management



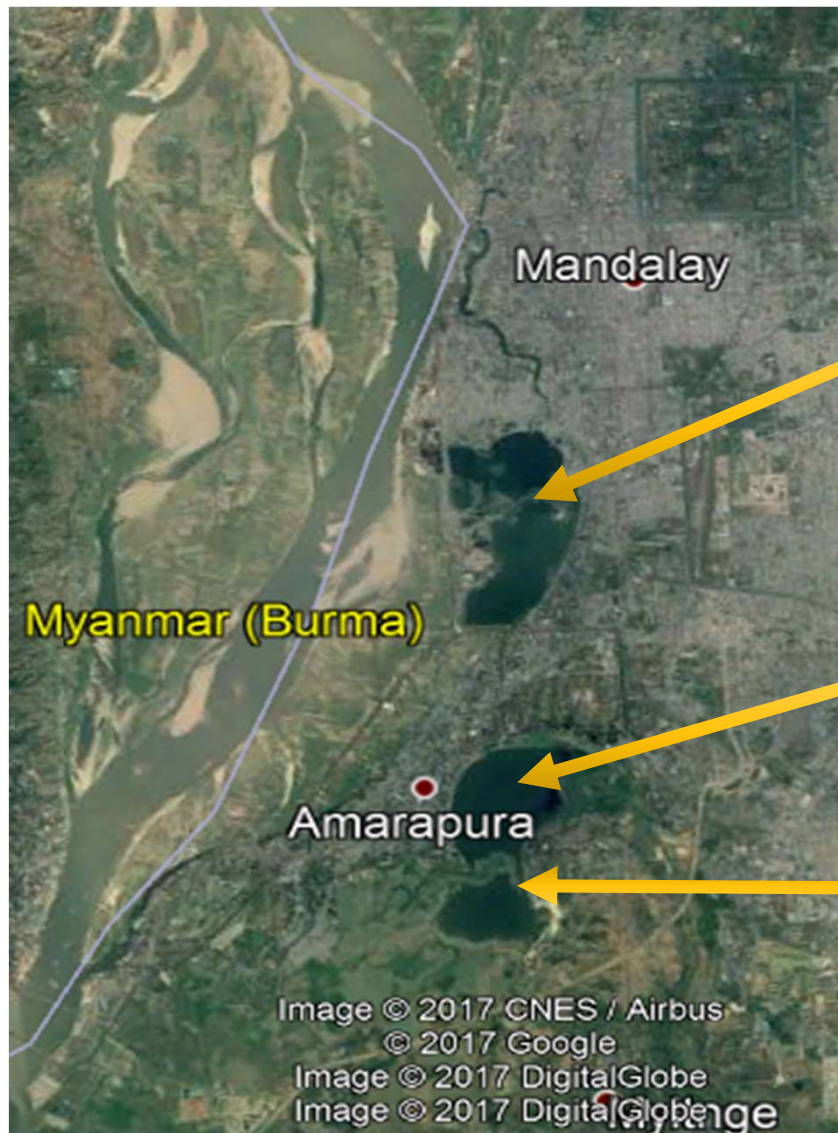
No.	Pumping Station	Discharge ( m <sup>3</sup> /hr )
1	Kat Kyaw	4,090
2	Shwe Gae	7,272
3	Thingazar	4,545
4	Nagarni Pagoda <i>Kandawgyi</i>	2,045
5	Sangha Hospital <i>Kandawgyi</i>	4,540
6	Zaung Kalaw	4,540



**INLET POINT OF  
THINGAZAR CREEK**



# Environmental Conservation for Enduring KanDawGyi Lake and TaungTaMan Lake



KanDawGyi Lake



TaungTaMan Lake



TaungTaMan Lake At 2015





# Brief Information on Industrial Wastewater Situation



All wastewater generated industries from the Mandalay Industrial Zone are disposing their wastewater to the **Doke Htawaddy River** through (10) inches main pipe Line without any treatment.



The First Central Industrial Wastewater Treatment Plant is now being constructed by Hydrotek Supreme Mandalay Co. Ltd.





# **New On-site Domestic Wastewater Treatment Project (Jokhasou System)**

**Mandalay City Development Committee**

# Hnin Si Housing



**Will be constructed soon by A.C.R.  
ThuKhaChanThar Co. Ltd (Daiki Axis)**

## SPECIFICATION MBS-900SP

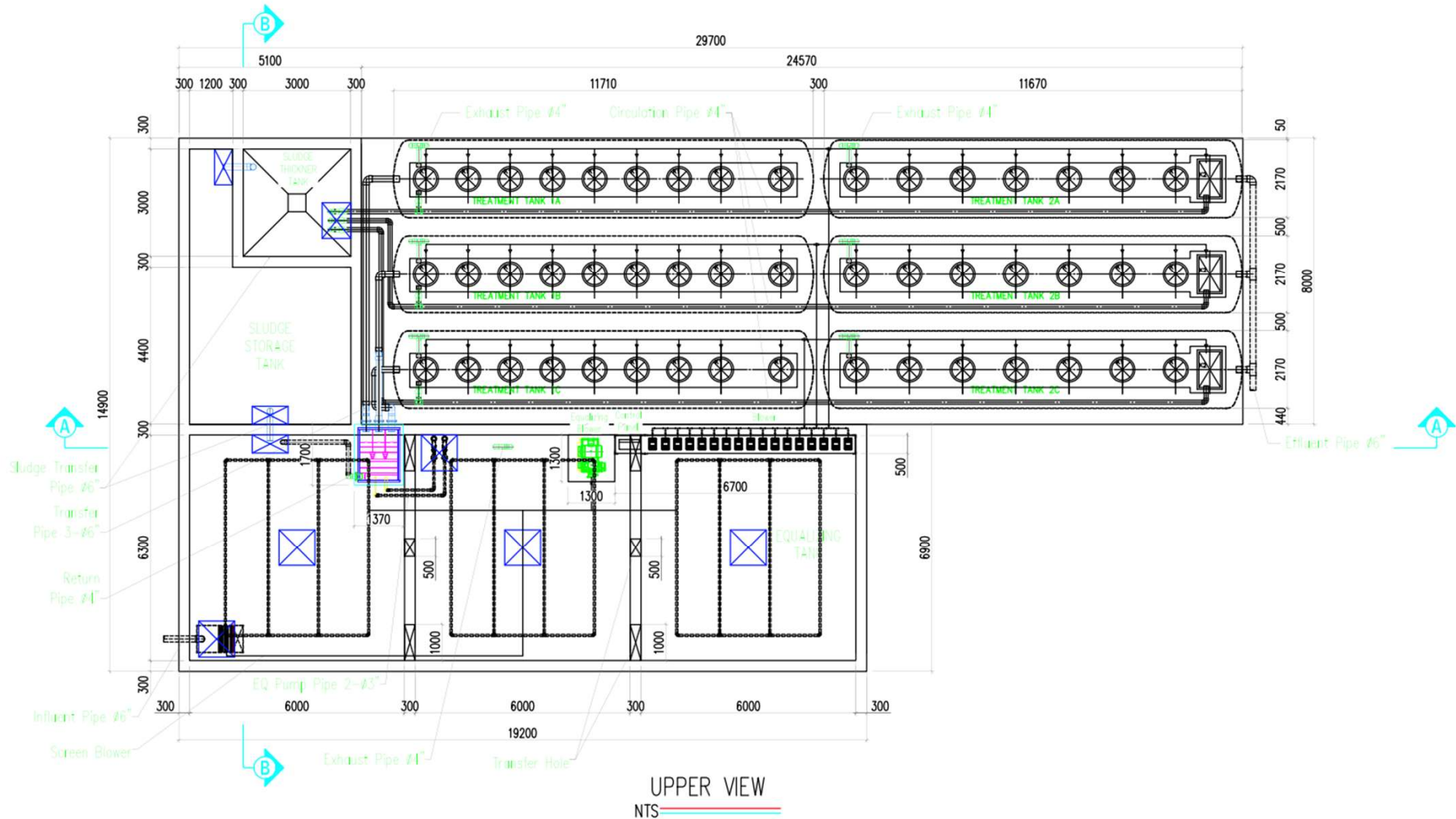
Design Flow	900	m <sup>3</sup> /day
Influent BOD	160	mg/Lt
Effluent BOD	50	mg/Lt
Influent COD	400	mg/Lt
Influent pH	7.5	
Influent Conductivity	995	
Influent TDS	544	
Effluent Coliform	400	MPN/100mL

## EFFECTIVE CAPACITY

Equalizing Tank	453.6	m <sup>3</sup>
Sludge Thickner	30.53	m <sup>3</sup>
Sludge Storage	95.04	m <sup>3</sup>
Moving Bed 1 Chamber	114.072	m <sup>3</sup>
Moving Bed 2 Chamber	36.006	m <sup>3</sup>
Sedimentation Chamber	75.057	m <sup>3</sup>
Disinfectant Chamber	1.26	m <sup>3</sup>



# Plan View of the treatment facility (Johkasou)





# **Future Paln**

**Mandalay City Development Committee**



# Mandalay Urban Services Improvement Project

- Loan Amount - US\$ 60 million
- Project name - Mandalay Urban Services Improvement Project
- Implementing Sector - Improvement of waste water and drainage management
- Implementing Period - 8 years ( from 2016 to 2023)
- Project Implementation - Suez in association with Myanmar Koei Consultant
- Loan Agree; signing date - 9.9.2016
- Consultant firm - Suez in association with Nippon Koei
- Consultant Agree; - 6.12.2016 (signing date)



# Propose Emission Standards for MUSIP



No.	Primary Controlling Pollutants	Short Term	Medium Term	Long Term
1	Chemical Oxygen Demand (COD)	120	100	60
2	Biochemical Oxygen Demand (BOD <sub>5</sub> )	60	30	20
3	Suspended Solid (SS)	50	30	20
4	Grease	20	5	3
5	Total Nitrogen (as N)	N/A	N/A	20
6	Ammonia Nitrogen (as N)	N/A	25	8
7	Total Phosphorus (as P)	5	3	1.5
8	Color (times of dilution)	50	40	30
9	PH	6 - 9		
10	Fecal Coliform	N/A	10 <sup>4</sup>	10 <sup>4</sup>

# Issues and Challenges



Low priority on sanitation

Budget limitation

Less experience on  
and wastewater tre

**Need sustainable  
planning for sanitation  
and wastewater**

awareness and  
Building Plan

Strong regulations and  
enforcement require

No emission guidelines on  
domestic wastewater

**No Sewage Treatment Plant, No Wastewater Treatment Plant, No Sewer Network**

# Thank You For Your Attention...

