

REVISED ACTION PLAN FOR
RESTORATION OF
UMSHYRPI RIVER IDENTIFIED AS
(Priority-I) POLLUTED RIVER STRETCHES
OF MEGHALAYA

[In compliance with the Direction of Hon'ble National Green Tribunal dated 19/12/2018 in connection with Original Application No. 673/2018 in the matter of News Item Published in the Hindus titled as "More River Stretches are now Critically Polluted : CPCB"]

Submitted by

**River Rejuvenation Committee
Government of Meghalaya**

OCTOBER 2019

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Executive Summary

Umshyrpi River originates from the foothills of Shillong peak and flows across the Shillong city from Southeast to Northwest direction. It passes through some congested localities viz. Dhankheti, Malki, Laban and Rilbong. On its way the river joined by many streams which pass through some localities viz. Laban, Lawsohtun, Kench's Trace. The Umshyrpi River joins with Umkhrah at the northwest direction of the Shillong city to form the Wah Ro-Ro. The Wah Ro-Ro joins with the Umiam River, which is the main source of water to Umiam reservoir. All along the course both the rivers receive the untreated sewage, solid waste, municipal waste etc. generated in the city and its outskirts and adversely affecting the river water quality.

There is no major industrial unit on the catchment of the river. However many small scale units are in operation in the city. Some of these units are in automobile repairing and servicing workshop, steel and wooden furniture, tyre retreading, printing press, bakeries and confectioneries, flour mills, rice mills and other handicraft units. There are 12 drains originating from different localities as mentioned above which mostly carry sewage / municipal wastes and these ultimately emptied in to the river Umshyrpi thereby adversely affecting the river water quality.

Based on the water quality for the year 2016-2017 submitted by Meghalaya State pollution Control Board, the Umshyrpi river from Dhankheti to Umshyrpi bridge of approximately 5kms length has been identified as polluted stretch by Central Pollution Control Board due to high concentration of BOD which is above 30mg/l.

Hon'ble NGT Order: in O/A No. 673 of 2018: Principal Bench, New Delhi in their Order dated 20th September, 2018 in O.A. No.673/2018 regarding monitoring and restoration of water quality of identified polluted river stretches have inter alia directed all States and Union Territories to prepare action plans within two months for bringing all the polluted river stretches to be fit at least for bathing purposes (i.e. BOD < 3 mg/L and FC < 500 MPN/100ml) within six months from the date of finalization of the action plans. This action plan has been prepared accordingly. The action plan includes components like identification of polluting sources including functioning/ status of STPs/ ETPs/ CETP and solid waste management and processing facilities, quantification and characterization of solid waste, trade and sewage generated in the catchment area of polluted river stretch. The action plan addresses issues relating to; ground water extraction, adopting good irrigation practices, protection and management of Flood Plain Zones (FPZ), rain water harvesting, ground water charging, maintaining minimum environment flow of river and plantation on both sides of the river. The action plan focuses on proper interception and diversion of sewage carrying drains to a proposed Decentralized Sewage Treatment Plant (STP). The action plan provides for speedy and definite or specific timelines for execution of steps.

1. INTRODUCTION

This Umshyrpi River originates from the foothills of Shillong peak. (The Umshyrpi River joins with Umkhrah at the northwest direction of the Shillong city to form the Wah Ro-Ro. The Wah Ro-Ro joins with the Umiam River, which is the main source of water to Umiam reservoir). As it flows through the heart of the Shillong city from Southeast to Northwest direction it receives all types of wastes generated in the city either directly or through drains and has been converted into a mere sewage carrier.

a) Major Towns or Cities in the catchment of Umshyrpi River

It passes through some congested and heavily populated localities viz. Dhankheti, Malki, Laban and Rilbong. On its way the river is joined by many streams which pass through some localities viz. Laban, Lawsohtun, Kench's Trace.

Map of the Umshyrpi River is shown in **Figure 1**.

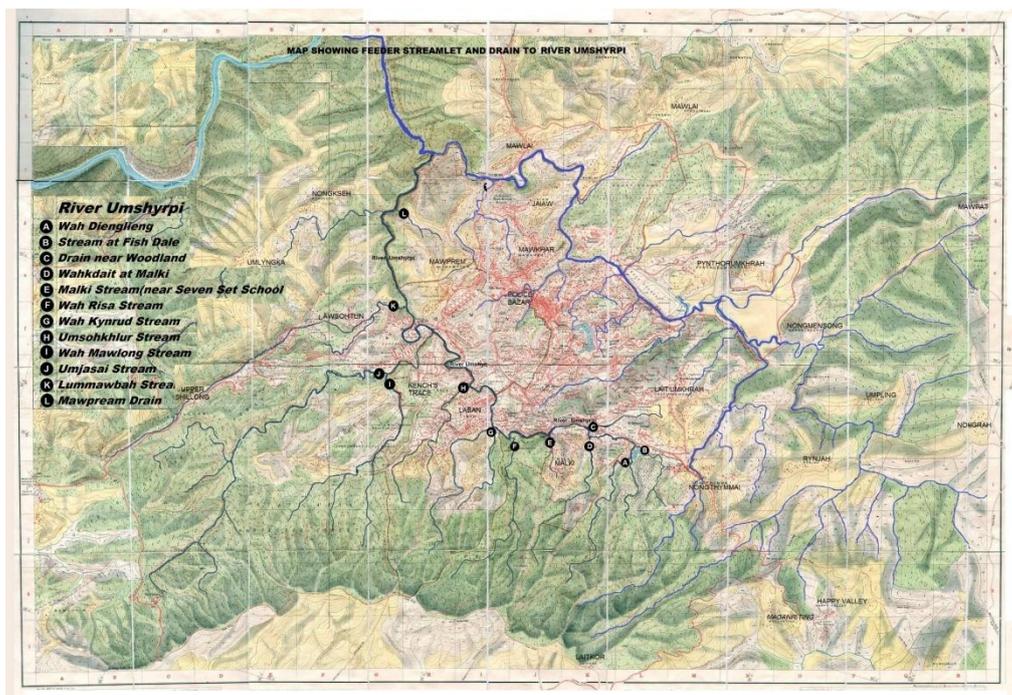


Figure 1 : Map of Umshyrpi

(b) Major Industrial Areas in the Catchment of River Umshyrpi

There is no major industrial area but isolated industries are present in the catchment area of the River.

(c) Major Drains contributing to Pollution in River Umshyrpi

There are 12 major drains which flow through some localities viz Laban, Lawsohtun, Kench's Trace, Malki, which are discharging the untreated sewage and municipal wastes into the Umshyrpi river. Table 1 below indicated the identified drains and their co-ordinates

Table 1: Major Drains contributing to Pollution of River Umshyrpi

River	Outfalls	GPS Coordinates
Umshyrpi	Wah Dienglieng	25°33'50.17"N, 91°53'40.15"E
	Stream at Fish Dale	25°33'58.76"N, 91°53'41.06"E
	Drain Near Woodland Hospital	25°33'59.44"N, 91°53'22.97"E
	Wahkdait at Malki	25°33'55.88"N, 91°53'23.28"E
	Malki Stream (near Seven Set School)	25°33'50.73"N, 91°53'8.81"E
	Wah Risa Stream	25°33'46.81"N, 91°52'56.12"E
	Wah Kynrud stream	25°33'48.85"N, 91°52'47.20"E
	Umsohkhur Stream	25°34'2.25"N, 91°52'33.60"E
	Wah Mawlong Stream	25°33'48.09"N, 91°52'9.83"E
	Umjasai stream	25°33'55.99"N, 91°52'0.04"E
	Lummawbah Stream	25°34'9.29"N, 91°52'3.58"E
	Mawprem Drain	25°34'49.94"N, 91°51'55.80"E

2.0 OBJECTIVES/ACHIEVABLE TARGETS FOR RESTORATION OF POLLUTED UMSHYRPI

It is an important aspect for restoration of Umshyrpi River in context of meeting water quality for designated uses. It would not be possible to achieve the river quality of Class 'B' since the Umshyrpi river is flowing across the Shillong City and it is passing through the most congested and densely populated localities. The water of the river has never been used for bathing purposes but it has been used for agricultural purposes and hydro power generation at the downstream of the river. Efforts would be made to improve the river quality class by prevention and control measures. However, goals can be met for Class 'E' i.e, for irrigation, industrial cooling and controlled waste disposal. The water quality can be maintained at the level as per **the Primary Criteria for irrigation stipulated by CPCB**

Sl. No	Parameters	Class 'E' Water Quality Criteria for Irrigation
1	pH	6 to 8.5
2	Dissolved Oxygen (DO)	-

3	Sodium Absorption Ratio	≤ 26
4	Boron	
5	Free Ammonia	-
6	Electrical Conductivity at 25 ° C µmhos/cm	≤ 2250
7	BOD	=
8	FC	=

3.0 Water Quality of the River ,drains and ground water sources (located in the catchment of the river of the Umshyrpi River) for the year 2018 & 2019 (Jan-September):

3.1 Water Quality of the River

Water quality monitoring of the Umshyrpi river is being carried out by the Meghalaya State Pollution Control Board under National Water Quality Monitoring Programme at the following

Sampling Location:

1. Risa colony
2. Near Law College, Dhankheti
3. Umshyrpi Bridge

Based on the monitoring data the river has been identified as polluted stretches from location near law college at Dhankheti to location at Umshyrpi bridge .

The data for the year 2018 and 2019 (Jan-May) are given in **Tables 2 – 5** below for the identified stretches

Table-2: Water Quality Data of Umshyrpi River near Law College, Shillong 2018

MONTH	pH 6.5 - 8.5	DO mg/l	BOD mg/l	FC MPN/100ml	TC MPN/100ml
JAN	7.4	2.0	40.0	22000	52000
FEB	7.5	2.7	24.0	23000	58000
MARCH	7.2	2.3	32.0	25000	63000
APRIL	7.3	2.0	34.0	27000	70000
MAY	7.1	2.2	30.0	31000	79000
JUNE	7.1	1.8	34.0	35000	94000
JULY	7.0	1.5	38.0	49000	110000

AUGUST	7.1	1.4	33.0	58000	130000
SEPTEMBER	7.1	2.2	28.0	63000	140000
OCTOBER	7.1	1.5	44.0	70000	150000
NOVEMBER	7.3	1.9	30.0	79000	170000
DECEMBER	7.3	1.5	34.0	84000	200000
AVERAGE	7.20	1.9	33.4	47166	109666.
RANGE	7-7.5	1.4-2.7	24-44.0	22000-84000	52000-200000

Table-3: Water Quality Data of Umshyrpi River near Umshyrpi Bridge, Shillong 2018

MONTH	pH 6.5 - 8.5	DO mg/l	BOD mg/l	FC MPN/100ml	TC MPN/100ml
JAN	7.5	4.8	14.0	12000	35000
FEB	7.6	4.2	13.5	14000	36000
MARCH	7.1	3.8	13.8	17000	39000
APRIL	7.2	4.3	18.0	19000	47000
MAY	7.1	4.8	15.0	21000	49000
JUNE	7.1	5.8	10.0	27000	58000
JULY	7.1	5.6	9.5	48000	79000
AUGUST	7.3	5.8	8.9	41000	84000
SEPTEMBER	7.2	5.6	12.0	43000	94000
OCTOBER	7.2	3.8	16.0	47000	110000
NOVEMBER	7.3	4.1	18.0	49000	120000
DECEMBER	7.4	3.9	22.0	49000	130000
AVERAGE	7.25	4.7	14.22	32250	73416
RANGE	7.1-7.6	3.8-5.8	8.9-22.0	12000-49000	35000-130000

Table-4: Water Quality Data Umshyrpi river near Law College, Shillong (Jan to September)

MONTH	pH	DO mg/L	BOD mg/L	FC MPN/100ml	TC MPN/100ml
JAN	6.9	1.2	35.0	94000	210000
FEB	6.9	1.0	36.5	110000	220000
MARCH	7.3	0.5	44.0	120000	240000
APRIL	7.3	0.8	42.0	130000	280000
MAY	7.1	1.0	40.0	120000	240000

JUNE	6.9	1.5	35.0	110000	220000
JULY	7.2	2.5	31.4	42000	100000
AUGUST	7.6	2.8	26.0	35000	84000
SEPTEMBER	7.5	3.1	24.0	27000	79000

Table-5 : Water Quality Data Umshyrpi river near Umshyrpi Bridge, Shillong (Jan to September 2019)

MONTH	pH	DO mg/L	BOD mg/L	FC MPN/100ml	TC MPN/100ml
JAN	7.2	3.5	26.0	58000	140000
FEB	7.1	3.4	26.4	64000	150000
MARCH	7.1	3.0	31.0	70000	170000
APRIL	7.1	4.0	28.0	79000	210000
MAY	7.1	4.2	27.5	70000	170000
JUNE	6.9	5.0	22.0	63000	150000
JULY	6.9	5.5	20.0	30000	70000
AUGUST	7.3	5.6	18.5	35000	85000
SEPTEMBER	7.3	5.8	17.0	17000	44000

3.2 The water quality characteristic of waste water from the drains and the flow

Tables 6 below provided the water quality characteristic of the drains and the flow

Table 6: Water Quality Data of drains/streams discharging into the Umshyrpi River

Sl. No.	Stream/Drain	Flow (MLD)	pH	Dissolved oxygen (mg/l)	BOD (mg/l)	Total Coliform (MPN/100ml)	Feecal Coliform (MPN/100ml)	Zn (mg/l)	Cr (mg/l)	Ni (mg/l)	Cu (mg/l)	As (mg/l)
1.	Wah Dienglieng	3.97	7.0	8.5	2.0	150	44	BDL	BDL	BDL	BDL	BDL
2.	Stream at Fish Dale(Drain from Fire Brigade & Streamlet behind Fishery Office -Fruit Garden)	4.62	6.6	6.2	13.2	5200	2000	BDL	BDL	BDL	BDL	BDL
3.	Woodland Hospital drain from Laitumkhrah	4.7	6.8	2.5	80.0	85000	35000	BDL	BDL	BDL	BDL	BDL
4.	Wahkdait at MalkI	5.13	6.5	6.0	12.5	10000	4800	BDL	BDL	BDL	BDL	BDL
5.	Malki stream near Seven Set school (from RF-Malki Mission – Nongshilliang)	6.69	6.8	5.5	12.2	25000	12000	BDL	BDL	BDL	BDL	BDL
6.	Um Risa stream from RF-Nongmalki-Crinoline Falls	1.21	7.0	7.8	2.4	4200	2000	BDL	BDL	BDL	BDL	BDL
7.	Umkynrud stream from Lumparing village	5.95	6.8	6.6	8.8	12000	5500	BDL	BDL	BDL	BDL	BDL
8.	Umsohkhur stream from Kench’s Trace-Raid Laban	3.17	6.8	4.5	30.0	35000	17000	BDL	BDL	BDL	BDL	BDL
9.	Ummawlong stream from Lawsotun-Sericulture farm	1.04	7.0	5.2	15.0	15000	8000	BDL	BDL	BDL	BDL	BDL
10.	Umjasai stream from Lawsotun -Mahadev Khola (Defence land)	4.31	6.5	5.4	15.6	18000	8500	BDL	BDL	BDL	BDL	BDL
11.	Stream from Lummbawbah & Upper Shillong)	1.03	6.8	2.8	30.0	22000	10000	BDL	BDL	BDL	BDL	BDL
12.	Mawprem Drain(Mawbah drain, Barapathar - Reid Chest Hospital	1.43	6.5	0.80	80.5	75000	35000	BDL	BDL	BDL	BDL	BDL

3.3 GROUND WATER QUALITY :

The available ground water quality data from areas in the vicinity of the river Umshyrpi as per the data available with Meghalaya State Pollution Control Board are given in Table 7 below:

TABLE-7 : GROUND WATER QUALITY DATA IN THE CATCHMENT OF UMSHYRPI RIVER

Sampling Locations →	Borewell Harisaba, Laban	Borewell Lumkartik Harisaba, Laban	Borewell Oxford Hill, Kench's Trace, Laban	Borewell Laban, Shillong	Borewell , Laban, Shillong.	Borewell , Laban,	Drinking Water Standards as per IS 10500:2012
Parameters ↓							
pH	4.1	4.4	5.0	5.9	4.8	7.7	6.5-8.5
Conductivity (mg/l)	190.0	330.0	105.0	114.0	-		-
Turbidity (NTU)	2.8	2.9	1.9	3.2	-		1.0
Chloride (mg/l)	32.0	55.0	12.0	7.0	-		250.0
Alkalinity (mg/l)	12.0	10.0	10.0	14.0	-		200.0
Total Hardness (mg/l)	28.0	64.0	18.0	26.0	-		200.0
Nitrate-N (mg/l)	9.72	24.1	4.8	3.7	-	0.51	45.0
Iron (mg/l)	0.38	0.4	0.24	1.0	2.4		0.3
Total Coliform (MPN/100 ml)	<1.1	<1.1	2.6	2			Shall not be detectable

From the result table, it has been observed that out of 6(six) ground water samples tested, 5(five)nos are acidic in nature. Iron concentration is beyond the prescribed standard limit in 4 (four) samples. Total coliform is also detected in 4(four) samples. The rest of the analyzed parameters are found within the standard limit for all the collected groundwater samples.

Some of the quality assessment of the ground has also been carried out by the Central Ground Water Board .

It may be noted that the from the ground water analysis, in some of the samples the ph value is in the range of 3.8 - 4. Low ph value may be attributed to the geological condition of the catchment area. The area has abundance of pine trees which grows on laterite soil condition. As per literature it is known that the lateritic soil is acidic in nature.

Capping and other measures will be initiated at the locations where groundwater is contaminated and PHE & CGWB will be consulted for taking remedial measures.

The Meghalaya has monitored the ground water quality of new monitoring stations and the additional parameters viz Faecal Coliform and Metals were also analysed .Table 7A below indicated the analysis data .

TABLE 7A : GROUND WATER QUALITY DATA IN THE CATCHMENT OF UMSHYRPI RIVER AT, SHILLONG - SEPTEMBER 2019

Sampling Locations→	Drinking Water Norms as per IS 10500:2012	Laban, Shillong Borewell	Deep Tube Well at Last Stop, Laban, Shillong
Parameters ↓			
pH	6.5-8.5	5.9	4.4
Conductivity (mg/l)	-	114.0	49.0
Turbidity (NTU)	1.0	3.2	1.0
Chloride (mg/l)	250.0	7.0	12.0
Alkalinity (mg/l)	200.0	14.0	8.0
Total Hardness (mg/l)	200.0	26.0	16.0
Nitrate-N (mg/l)	45.0	3.7	1.5
Iron (mg/l)	0.3	1.0	0.54
Total Coliform (MPN/100ml)	Shall not be detectable	2	<1.8
Faecal Coliform (MPN/100ml)	Shall not be detectable	Not Detected	<1.8
Zn (mg/l)	5.0 mg/l	BDL	BDL
Cr (mg/l)	0.05	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL
Cu (mg/l)	0.05	BDL	BDL
As (mg/l)	0.01	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL
Manganese(mg/l)	0.1	BDL	BDL

4.0 IDENTIFICATION OF SOURCES OF POLLUTION:

Major sources of pollution in River Umshyrpi are:

- i.** Sewage / municipal drainage from the Shillong city.
- ii.** Improper disposal of solid waste into the drains.
- iii.** Industrial effluents from the isolated located industries.

5.0 . COMPONENTS OF ACTION PLAN

Following components have identified for preparation of action plan for rejuvenation of Umshyrpi river in compliance to the Hon'ble NGT Orders as detailed below:

The proposed action plan covers following components:

SOURCE CONTROL

Source control includes industrial pollution and disposal of domestic sewage as detailed below:

5.1 Channelization, treatment, utilization and disposal of treated domestic sewage

- (a) Identification of towns and villages in the catchment of river Umshyrpi and estimation of quantity of sewage generation.
- (b) Storm water drains now carrying sewage and sullage joining river Umshyrpi and interception and diversion of sewage to STPs.
- (c) Treatment and disposal of septage and controlling open defecation.
- (d) Identification of areas for installing decentralized sewage treatment plants.

5.2 Industrial Pollution Control

- (a) Inventorization of industries
- (b) Category of industry and effluent quality
- (c) Treatment of effluents, compliance with standards and mode of disposal of effluents

5.3 Solid Waste Management

- (a) Collection, segregation, transportation, disposal and treatment of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.
- (b) Restriction of illegal disposal of solid waste along the river bank of Umshyrpi and flood plain zones.
- (c) Burning of solid waste should be strictly prohibited.
- (d) Construction and demolition wastes should be disposed in designated areas and no case it should be disposed into river beds or flood plain zone.

5.4 Flood Plain Zone

- (a) Regulating activities in flood plain zone.
- (b) Management of Municipal, Plastic, Hazardous, Bio-medical and Electronic wastes.

- (c) Afforestation in the catchment and aesthetic plantation programs.
- (d) Improve irrigation practices.

5.5 Ecological/Environmental Flow (E-Flow)

- (a) Issues relating to E-Flow
- (b) Irrigation practices

6..0 . DETAILED GAP ANALYSIS

6.1 SEWAGE MANAGEMENT: Umshyrpi Catchment

As per the information acquired from Shillong Municipal Board, the design population will have to be estimated with due regard to all the factors governing the future growth and development of the project are in the industrial, commercial, educational, social and administration spheres. Special factors causing sudden immigration or influx of population have also been foreseen to the extent possible.

The sewage flow is considered as 80% of the net water supplied to the consumer. Considering 135 lpcd water supply, the rate of sewage generation works out as 108 lpcd and the same has been adopted. The population in the catchment of Umshyrpi river as per 2011 census is about 143229 and projected population is about 206400. Apart from the living population, Shillong being a tourist place has a **floating population**. As per the tourism latest report, the total number of Tourists per day in Shillong within the catchment of Umshyrpi rive is **approximately 2500**. The sewage generation of the floating population is also considered. Main source of water for Shillong is from Greater Shillong Water Supply Scheme (PHED) which is a surface water source of Umiam River, Mawphlang. The detailed gap analysis is given in the **Table 8** below for the Umshyrpi River:

Table 8 : Gap Analysis with regard to Sewage

River	Town	Population (2011)	Population (2032)	Projected Total Water Consumption (135 lpcd) (MLD)	Projected Estimated Average Sewage Generation(MLD)*	Existing STPs		Gap (MLD)
						Nos	Capacity	
Umshyrpi	Shillong	143229	206400	27.86	22.30	-	-	22.30

Base on the projected population, the estimated gap in sewage management is **22.30 MLD**. Taking into account 2500 floating population per day, the Gap of **22.30 MLD** is multiplied by a factor of **1.011**. Hence the **Gap is 22.54 MLD**

Presently, Septic tanks have been made by individual households for disposal of sewage and the supernatant is directly or indirectly disposed of in nearby drains which join the 12 drains which joins the Umshypi river. There is no underground planned pipe sewerage system in Shillong and thus sewage management is being done with natural slope in open drain system leading to valleys.

Due to the land constraint in city of Shillong, laying of sewer pipe lines and having a common Sewage Treatment Plant is not feasible. Hence decentralized type of Sewage Treatment Plants are proposed at the outfalls of the major drains.

6.2 INDUSTRIAL EFFLUENT MANAGEMENT

In the catchment of Umshyrpi River there are only 9 numbers of industries which are in operation. The number of industries categorically located in and around the catchment areas of the two identified polluted river stretches are as follows in **Table 9**

Table 9 : Number of Industries Operating in the Catchment

Sl. No.	River	Identified River Stretch	Type of Industries/category	Number of Industries
2.	Umshyrpi	Dhankheti, Malki, Laban, Lawsohtun, Kench's Trace and Rilbong	Red Category	2
			Water polluting /small scale	7

The total water consumption of the industries, the total effluent generated and number of captive ETPs along with the Gap Analysis within the catchment of Umshyrpi River are given in the Table 11 below:

Table 10: Gap Analysis of Effluent Generated by Industries

Sl. No.	River	Type of Industries / category	No. of Industries	No. of Industries having Captive ETPs	No. of Industries not having Captive ETPs	Total Water Consumption by the Industries (MLD)	Industrial Effluent Generated by the Industries (MLD)	Industrial Treated Effluent	GAP	Mode of Disposal
1	Umshyrpi	Red Category	2	1	1	0.5688	0.455	0.365	0.09	Treated Effluent is Disposed off to Drains
		Water polluting /small scale	7	1	-					

In the catchment of Umshyrpi River out of the total of 9 numbers of industries, 8 industries have captive ETPs while 1 industry under red category do not have a captive ETP.

The samples of effluent from the captive ETPs are tested from time to time to check if the industries are complying as per the treated effluent standards. Therefore under Section 5 of the Environment (Protection) Act, 1986, non compliant industries are issued directions by the Meghalaya State

Pollution Control Board. The detailed gap analysis of industrial effluent is given in **Annexure I** for the Umshyrpi River.

In the river catchment there are 9 numbers of industries majorly comprising of hospitals, servicing units such as car washing, hotels, restaurants, bakeries.

8 out of 9 numbers of industries have been issued consent under Air (Prevention & Control of Pollution) Act, 1981 and Water (Prevention & Control of Pollution) Act, 1974. For which industries where they have establish ETPs

1 out of 2 hospitals have been granted authorization under Bio medical Waste Rules, 2016. 3 hospitals are not having ETPs which are generating around 90KLD waste water. Presently, these hospitals are discharging waste water into nearby drains without imparting any treatment.

6.3 SOLID WASTE MANAGEMENT

Sl. No.	Town or City	Population (2017)	Expected population (in 2035)	Future Total solid waste generation (at 0.35 kg per head per day) in TPD	Existing treatment facility		GAP
					Total no. of Treatment facilities	Total capacity	
1	Shillong	143229	206400	72.24	A compost Plant is under construction for bio-degradable waste	170 TPD (under construction)	72.24

Under the Ministry of Housing & Urban Affairs and Asian Development Bank funded North Eastern Region Capital Cities Development Investment Program (NERCCDIP), the Urban Affairs Department through the State Investment Program Management and Implementation Unit (SIPMIU) and the Design Management and Supervision Consultants appointed under the project in collaboration with the Shillong Municipal Board, interventions has been made for improvement of Solid Waste Management in Shillong.

For treatment of the bio-degradable waste, a 170 TPD Compost Plant is under Construction at Marten, Shillong which is expected to be completed in September- October 2019.

For Scientific disposal of waste a 6500 sqm sanitary landfill site has been developed and commissioned on 2nd October 2017 at Marten, Shillong. An additional 15000 sqm sanitary landfill site is also completed.

6.4 INDUSTRIAL HAZARDOUS WASTE

Automobile Service Centres are already covered under consent mechanism under Water Act (Prevention and Control of Pollution) Act 1974 and to bring all these under the HW & OW (M&H) Rules, 2016 and regulate them through authorization process.

6.5 BIOMEDICAL WASTE MANAGEMENT

There are about **25 numbers of Non bedded Clinics/Laboratory and 13 numbers of bedded Hospitals/ Nursing Homes** operating in Shillong city. It is estimated that about 334.5 Kg/day biomedical waste is generated from these healthcare facilities. There is one Common Bio-medical Waste Treatment Facility (CBMWTF) in the state of Meghalaya but it is non functional. The Common Bio-medical Waste Treatment Facility (CBMWTF) is under repair and renovation.

Hospitals generating bio-medical waste should have deep burial provision for temporary disposal of generated biomedical waste till existing CBMWTF is upgraded/ new CBMWTF becomes operational.

6.6 CONSTRUCTION & DEMOLITION WASTE

The concerned departments viz. PWD, CPWD, Urban Affairs Department, Meghalaya Urban Development Authority etc have been requested to identify land for disposing off the construction and demolition waste. As such no major large scale construction or demolition is carried out within the catchment area of the two rivers. Small scale housing construction and demolition is carried out where in the waste is used for land filling and levelling.

Presently there is no proper inventory with regard to the generation of construction and demolition waste, same is required to be carried out to develop adequate infrastructure for management of C&D waste generating in the catchment of river Umshyrpi.

7.0. UMSHYRPI RIVER REJUVENATION PLAN:

7.1 Action plan for management of sewage:

- (a) Each household within the catchment area of the river Umshyrpi needs to have a septic tanks and a soak pit.
- (b) The flow in each drain should exclude monsoon flow. Further, any drain if receiving fresh water from any escape channel etc, should be examined for its diversion rather than mixing with sewage.
- (c) **Decentralized Sewage Treatment Plants (STPs)** will be installed at outfalls of the major drains of the UmshyrpiRiver along with channelization and diversion works of drains. Sludge generation will be 1% after sedimentation tank. It will be collected in sludge holding tank. Settled sludge will be disposed off to solid waste landfill and supernatant will be recycled back to STP inlet.

A concept “On fecal sludge treatment plant, intermediate sewage pumping stations and nallah waste water treatment plant (STP)” has been prepared by Department of Urban Affairs, Shillong for the 2(two), outfalls of the Umshyrpi river stretch which are under their jurisdiction. The funds for carrying out the proposed works has been approved under AMRUT Scheme

Preliminary consideration of drains is as mentioned as below;

- Junction of Wahsohkhlor and Umshyrpi

- (d) Construction of a Septage Treatment Plant has been initiated in the existing municipal dumpsite.
- (e) Bio-remediation will be carried out for the other drains
- (f) Interception and diversion of sewage from all drain contributing to pollution included in the DPR for ensuring tapping and conveyance of sewage to STPs .
- (g) Installation supply and commissioning of cesspool truck/sucking machine including GPS tracking for collection from the septic tanks of households.
- (h) Installation of Plant 1.5 MLD capacity inclusive of wastewater collected from Nallah behind Shillong Municipal Board Office and Septage collected from septic tanks of individual households.

7.2 Action plan for management of industrial effluents:

- (a). All the industries (water polluting) will be directed to have captive ETPs and ensure to compliance to effluent discharge norms.
- (b). All the water polluting industries will be directed to have online Continuous Effluent Monitoring System (OCEMS).
- (c). Industries will be directed to adopt best practices to minimize water consumption and for recycling of treat waste water.
- (d).Provision of waste water treatment system.
- (e). Hotels/Restaurants particularly located on road-side should not dispose untreated sewage and solid waste into nearby public drain or rivers. Such establishments should be properly regulated and levied with fines in case of any violation.

7.3 Action plan for management of Solid Waste Management:

- i.** Implementation of Door-to-Door collection.
- ii.** Source segregation as biodegradable and non-biodegradable wastes.
- iii.** Identification of suitable site for setting up common waste processing and secure landfill facility.
- iv.** Transportation, disposal and treatment facilities of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.
- v.** Restriction illegal disposal of solid waste along the river bank and flood plain zones.
- vi.** Prohibition on burning of solid wastes.
- vii.** Development of integrated solid waste management facility (provision of segregation,treatment,compost, pellats making as well as landfill with leachate treatement provision in accordance with solid waste management rules, 2016 as further amendments made thereof.
- viii.** Biomining and Capping of existing municipal dumpsite in accordance with the SWM rules, 2016

Construction of a Septage Treatment Plant has been initiated in the existing municipal dumpsite.

7.4 Flood Plain Zone (FPZ)

Department of Water Resources should identify /demarcate Flood Plain Zone and regulate the activities. Such regulations would also cover;

- i) Plantation in Flood Plain Zone (FPZ) – By Forest and Environment Department, Meghalaya
- ii) Checking and removal of encroachments periodically- District Administration
- iii) Prohibition of disposal of municipal and bio-medical waste particularly in drains-By District Administration/Shillong Municipal Board;
- iv) Department of Water Resources, Meghalaya may notify FPZ - within one year.

7.5 Greenery development- Plantation plan/Biodiversity Parks:

The Umshyrpi river flows through the main part of Shillong city . The plantations and the soil & water conservation structures can help to control the flow of runoff water directly to rivers or low lying areas in rainy seasons reducing thereby soil erosion. These helps to impounded and re-charge the ground water. These in turn, rejuvenate the local streams. These measures in turn help to maintain the health of the rivers and also help in reducing pollution in river by maintaining continuous inflow of river water towards downstream. Along the banks of the river, majority of the land falls under private ownership, hence the land owners would be encourage to raise plantation. The Forest and Environment Department has prepared a proposal for plantation on both sides of the river .

A Park under the Forest and Environment Department is present within the catchment area of the river Umshyrpi

Sand Mining in river stretches:

There has been no account of sand mining in the river stretches.

7.6 Environmental Flow (E-Flow):

The river Umshyrpi carry natural waters during the monsoon and even during the lean season as the two rivers are perennial rivers. Provisions of roof top rain water harvesting in Govt. building, commercial buildings, hotels and Houses will be emphasized. By-laws are made in the Urban Affairs Department for provisions of roof top rain water harvesting.

8.0 MONITORING OF ACTION PLAN

In compliance with the order passed on OA No. 673/2018 dated 20.09.2018 by the Hon'ble National Green Tribunal (NGT) Principal Bench, New Delhi, "River Rejuvenation Committee" was constituted by the Governor of Meghalaya vide order N0. ENV.5/2018/44 Dated 24.01.2019.The proposed Action Plans will be monitored by the River Rejuvenation Committee (RRC) which has been constituted by Government of Meghalaya. CPCB experts also shall be invited for the RRC review meetings for taking feedback and suggestions.

Action Plan for River Rejuvenation of polluted river stretches shall be prepared and monitored by the Committee.

River Rejuvenation Committee:-

1. PCCF & HOFF, Forest & Environment Department, Meghalay a - Chairman
2. Director, Urban Affairs Department, Meghalaya - Member Convener

3. Director, Commerce and Industries Department, Meghalaya - Member
 4. Member Secretary, Meghalaya State Pollution Control Board - Member

9.0 ACTION PLAN:

Action plans with time lines and executing authorities with the budget estimates are given in the following Table below:

Sl. No	Action Plan for rejuvenation of River Umshyrpi	Execution Agency/ Department	Time Target	Amount (in rupees)	Remarks
1. SEWAGE MANAGEMENT					
	(i) Installation and commissioning of decentralized STPs at the 2 outfalls of Umshyrpi River and	Urban Affair Department Shillong Municipal Board KHADC	30 th March 2021	41.64 Crores	Funds for installation of STPs at the 2 (two) outfalls has been approved under the AMRUT Scheme.
	(ii) Chanelization including diversion of sewage generated from household/ townships/interception of all the drains presently carrying sewage and for ensuring proper treatment through the upcoming Decentralized Sewage Treatment Plants at the major outfalls of the drains.	Water Resources Department		17.99 Crores	Funds will be sought for the other 10 remaining outfalls.
	(iii) Installation supply and commissioning of 26 Numbers of cesspool truck/sucking machine(13 numbers: 2000 Liters capacity and 13 numbers: 6000 Liters capacity)	Urban Affairs Department & Shillong Municipal Board			Cost is not included as the project proposal is common for Umkhrah and Umshyrpi River (Cost is included in the Umkhrah Action

	<p>including GPS tracking for collection from the septic tanks of households.</p> <p>(iv) Faecal Sludge Treatment Plant for treatment of Septage from individual households (1.5 MLD) along with site development works</p> <p>(v) Bio-remediation of other minor drains</p>	Meghalaya Basin Development Authority (MBDA) and Urban Affairs Department		2.86 Crore	Plan) Fund to be sought
	<p>Utilisation of treated waste water</p> <ol style="list-style-type: none"> 1. Irrigating the nearby plantation areas within the vicinity of Faecal Sludge Treatment Plant 2. Use of treated waste water for construction of infrastructure projects or building activity. 3. Flushing/cleaning of sewage drains. 4. Fire brigades 5. Flushing purposes in the upcoming buildings especially Govt building etc. 6. Operation and maintenance of STP 	<ol style="list-style-type: none"> 1. Urban Affair Department 2. Shillong Municipal Board 		-	After commissioning the project "Pollution abatement of river Umshyrpi" utilization of treated waste water will be started.
2. INDUSTRIAL POLLUTION CONTROL					

	Action against the industries not installed ETPs or ETPs exist but not operating or ETP outlet or treated effluent is not complying to the effluent discharge standards or norms.	MSPCB	Continuous Process		Directions, show cause notices and Closure notices are issued.
3. SOLID WASTE MANAGEMENT:					
	<p>Solid Waste Management Project.</p> <p>1. A Solid Waste Management Project is being initiated by the Urban Affairs Department for the development of the scientific waste management facilities for Shillong City will include Recycling Plant, bio-fertilizer production, particle board from waste matters and bricks will be manufactured. Only 5 to 10 % of the waste will land filled.</p> <p>2. Development of integrated solid waste management facility (provision of segregation, treatment, compost, pellets making as well as sanitary landfill with leachate treatment provision in accordance with solid waste management rules, 2016 as further amendments made thereof.</p>	<p>1. Urban Affairs Department</p> <p>2. Shillong Municipal Board</p>	30 th March 2021		<p>Financial assistance awaited.</p> <p>Cost is not included as the project proposal is common for Umkhrah and Umshyrpi River.</p> <p>(Cost is included in the Umkhrah Action Plan)</p>
4. E-WASTE AND PLASTIC WASTE ASSESSMENT:					
	1. Inventory (Assessment, quantification and characterization) of waste on E-Waste & Plastic waste	Meghalaya Pollution Control Board	30 th March 2021	-	Meghalaya State Pollution Control Board has yet to complete inventory, assessment, quantification and characterization of E-Waste & Plastic waste in 2018.
	2. Development of collection centres.				Karo Sambhav has set up a collection

					centre in Shillong
5. BIO-MEDICAL WASTE MANAGEMENT:					
	Development of one Common Biomedical waste treatment facility	Urban Affairs Department, Shillong Municipal Board	30 th March , 2021	1.4 Crores	
	Installation of Captive ETPs at all the Government Hospitals	Health Department (Engineering Wing)	30 th March 2021	2 Crores	Works has started. Show Cause Notice has been issued by MSPCB to the Health Department
HAZARDOUS WASTE and Other Waste MANAGEMENT:					
	Automobile Service Centres be covered under Consent under Water Act (Prevention and Control of Pollution) Act 1974 and authorisation under HW & OW (M&H) Rules, 2016 as amended	Meghalaya State Pollution Control Board	Continuous activity		
6. Groundwater Quality					
	Groundwater quality monitoring at salient points in the catchment of river Umshyrpi	Meghalaya State Pollution Control Board, CGWB, PHED	Continuous activity	-	-
7. Flood Plain Zone:					
	Prohibition on illegal disposal of waste and removal of encroachment from river banks.	District Administration & Urban Affairs Department	Continuous activity	-	
8. Environmental Flow (E-Flow) and Groundwater recharge measures:					
	Provisions of roof top rain water harvesting in Govt. building, commercial buildings, hotels and Houses	District Administration/ Urban Affairs Department	Continuous activity	-	By-laws are made in the Urban Affairs Department.
	Setting up of Hydrological Stations. (non- recurring cost)	Water Resources Department	30 th March 2021	0.054	

9. GREEN DEVELOPMENT:					
	Plantation on both sides of the river and in the private land and individual land owner	Forest & Environment Department	30 th March 2021	0.25 Crore	Financial Assistance yet to be acquired
10. CLEANING & AWARENESS ACTIVITIES					
	Public awareness programme through add on media	Forest & Environment Department, MSPCB, District Administration	Continuous	0.25 Crores	It will covers in the project "Pollution abatement of rivers Umkhras and Umshyri" .
	GRAND TOTAL AMOUNT			66.444 Crores	