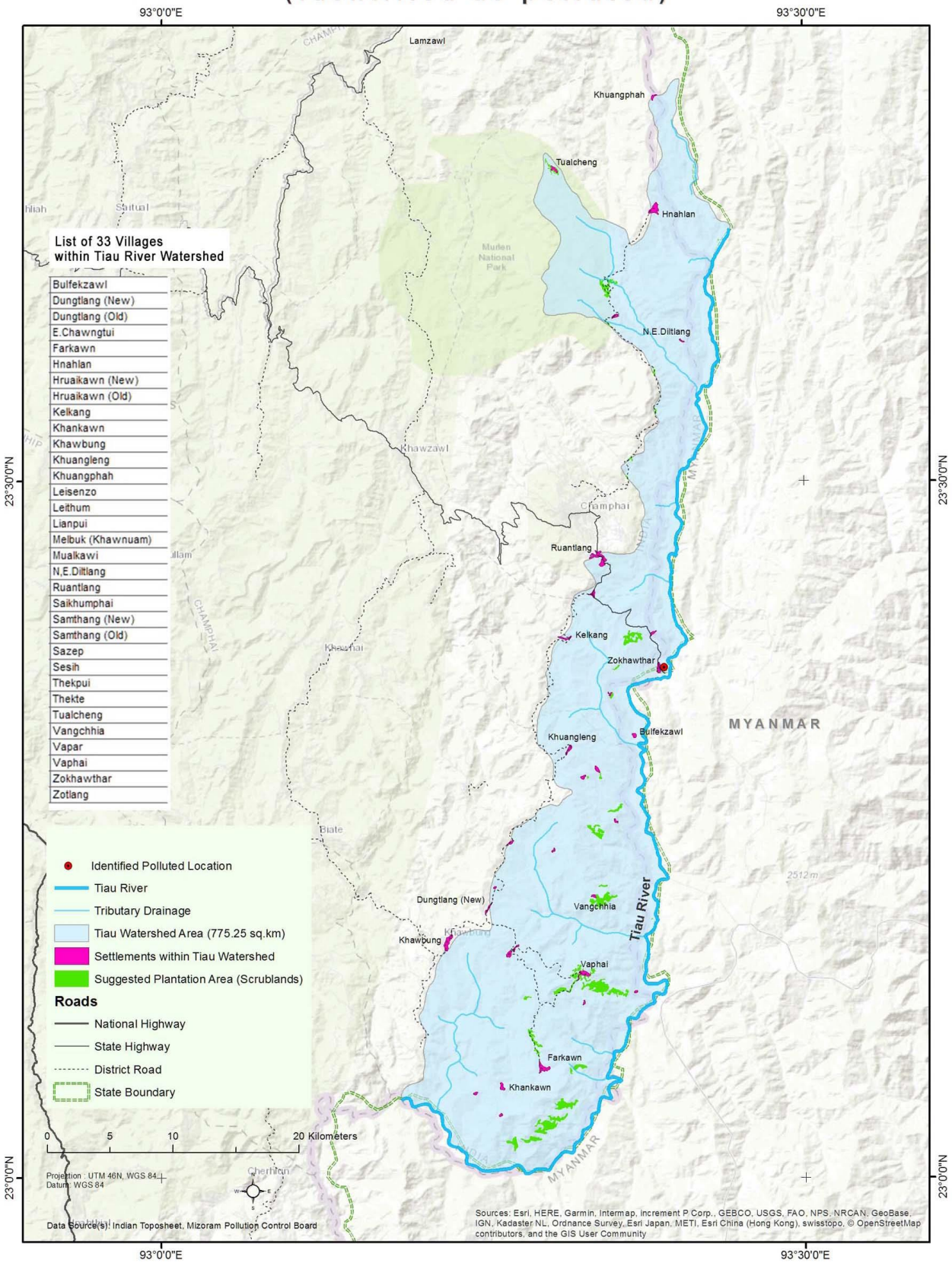
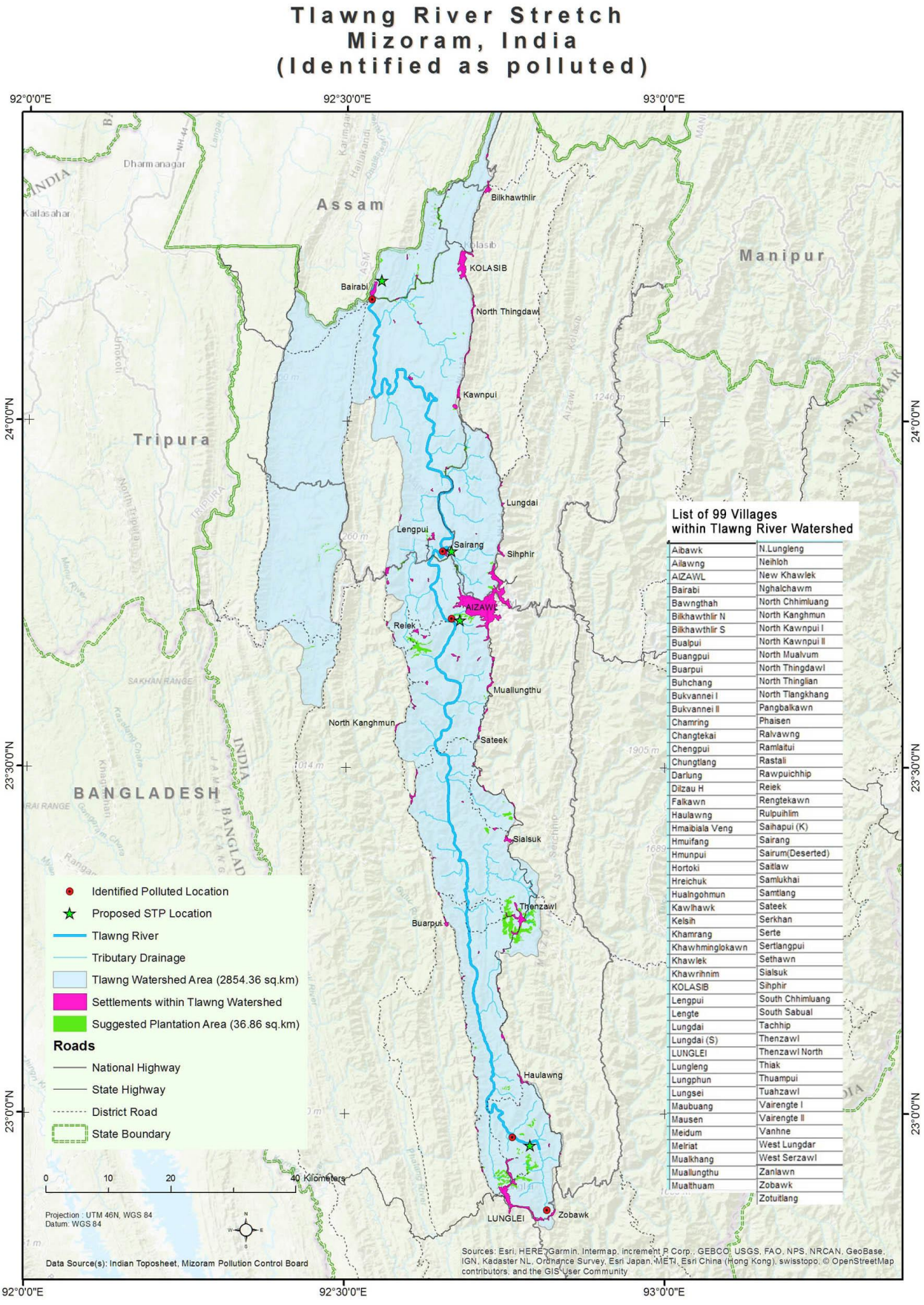
Annexure 1(i)

Tiau River: Map showing tributaries/drains



Annexure 1(ii)

TlawngRiver: Map showing tributaries/drains

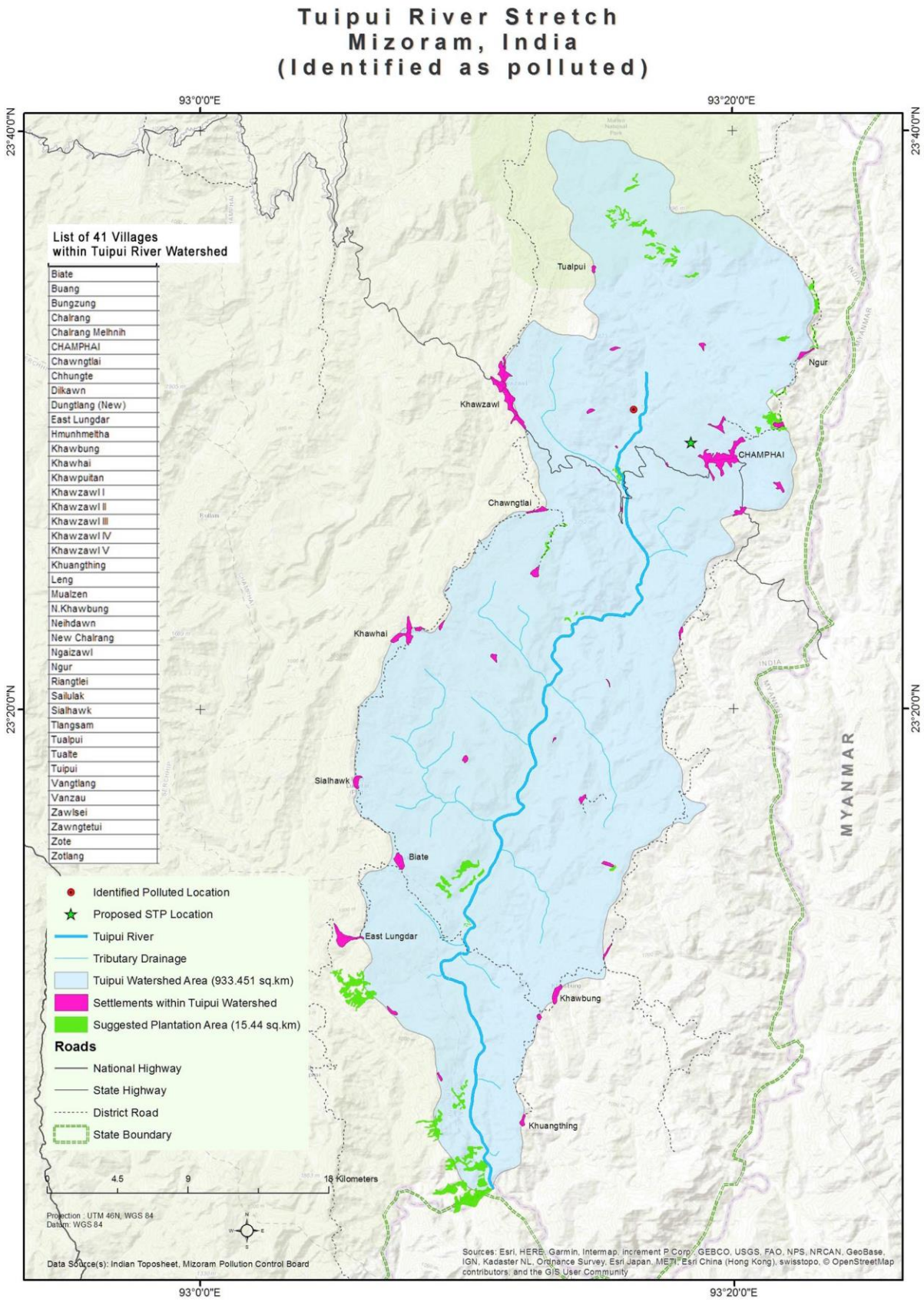


List of 99 Villages within Tlawng River Watershed

Aibawk	N.Lungleng
Ailawng	Neihloh
AIZAWL	New Khawlek
Bairabi	Nghalchawm
Bawngthah	North Chhimluang
Bilkhawthlir N	North Kanghmun
Bilkhawthlir S	North Kawnpui I
Bualpui	North Kawnpui II
Buangpui	North Mualvum
Buarpui	North Thingdawl
Buhchang	North Thinglian
Bukvannei I	North Tlangkhang
Bukvannei II	Pangbalkawn
Chamring	Phaisen
Changtekai	Ralvawng
Chengpui	Ramlaitui
Chungtlang	Rastali
Darlung	Rawpuichhip
Dilzau H	Reiek
Falkawn	Rengtekawn
Haulawng	Ruipuihlim
Hmaibiala Veng	Saihapui (K)
Hmuifang	Sairang
Hmunpui	Sairum(Deserted)
Hortoki	Saitlaw
Hreichuk	Samlukhai
Hualngohmun	Samtlang
Kawlhawk	Sateek
Kelsih	Serkhan
Khamrang	Serte
Khawhminglokawn	Sertlangpui
Khawlek	Sethawn
Khawrihnim	Sialsuk
KOLASIB	Sihphir
Lengpui	South Chhimluang
Lengte	South Sabual
Lungdai	Tachhip
Lungdai (S)	Thenzawl
LUNGLEI	Thenzawl North
Lungleng	Thiak
Lungphun	Thuampui
Lungsei	Tuahzawl
Maubuang	Vairengte I
Mausen	Vairengte II
Meidum	Vanhne
Melriat	West Lungdar
Mualkhang	West Serzawl
Muallungthu	Zanlawn
Mualthuam	Zobawk
	Zotuitlang

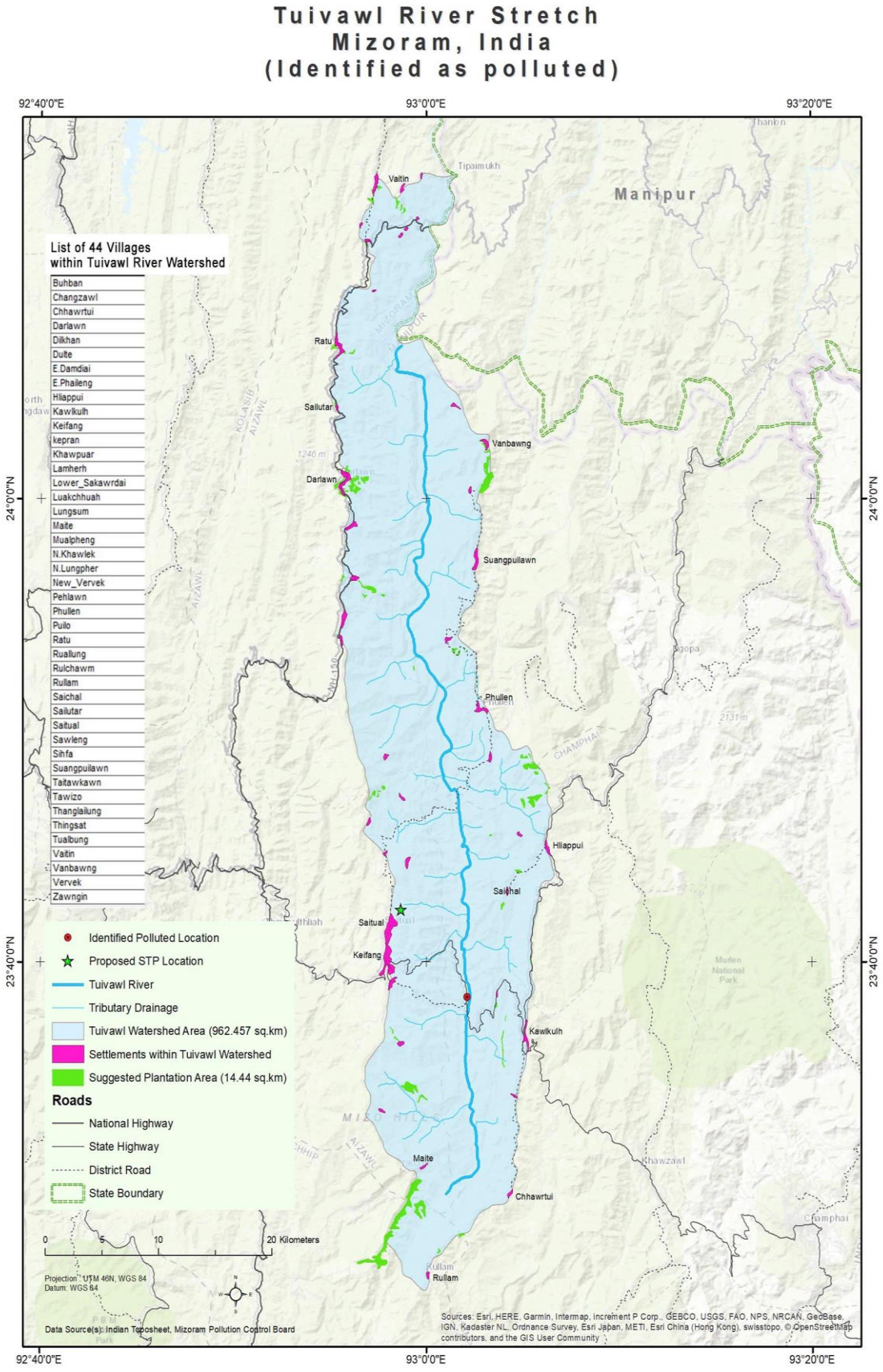
Annexure 1(iii)

Tuipui River: Map showing tributaries/drains



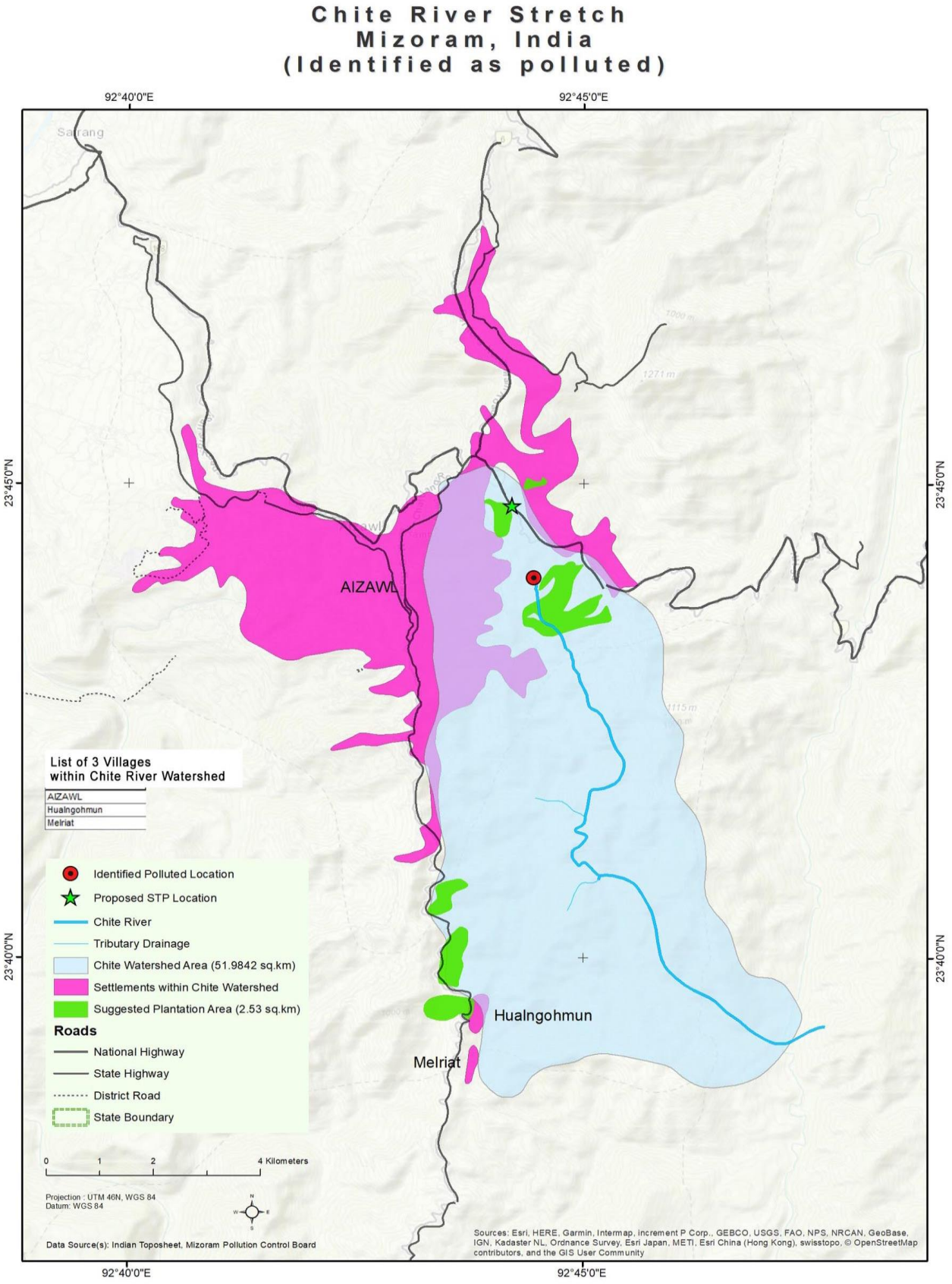
Annexure- 1(iv)

Tuivawl River : Map showing tributaries/drains



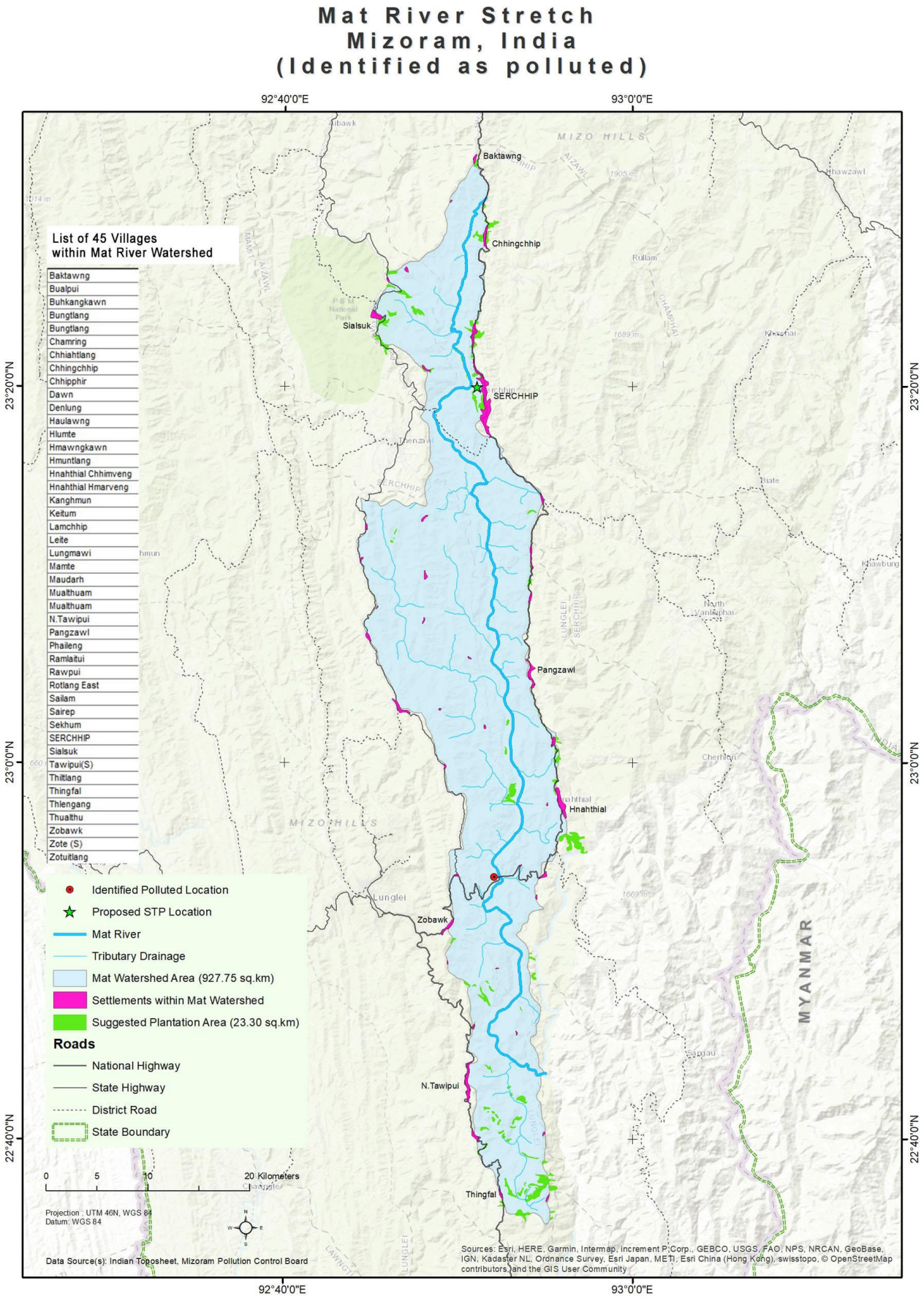
Annexure 1(v)

Chite River: Map showing tributaries/drains



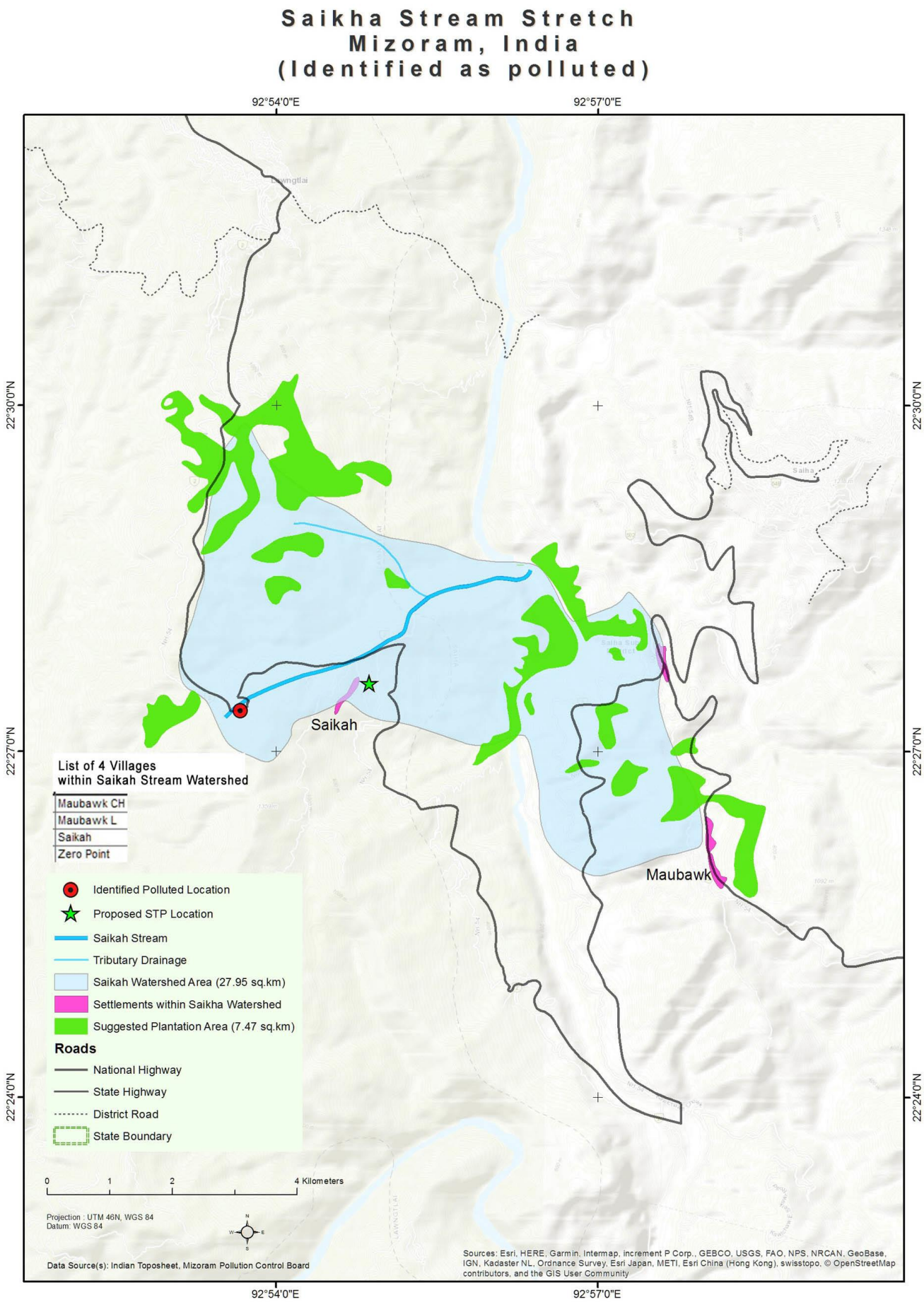
Annexure 1(vi)

Mat River : Map showing tributaries/drains



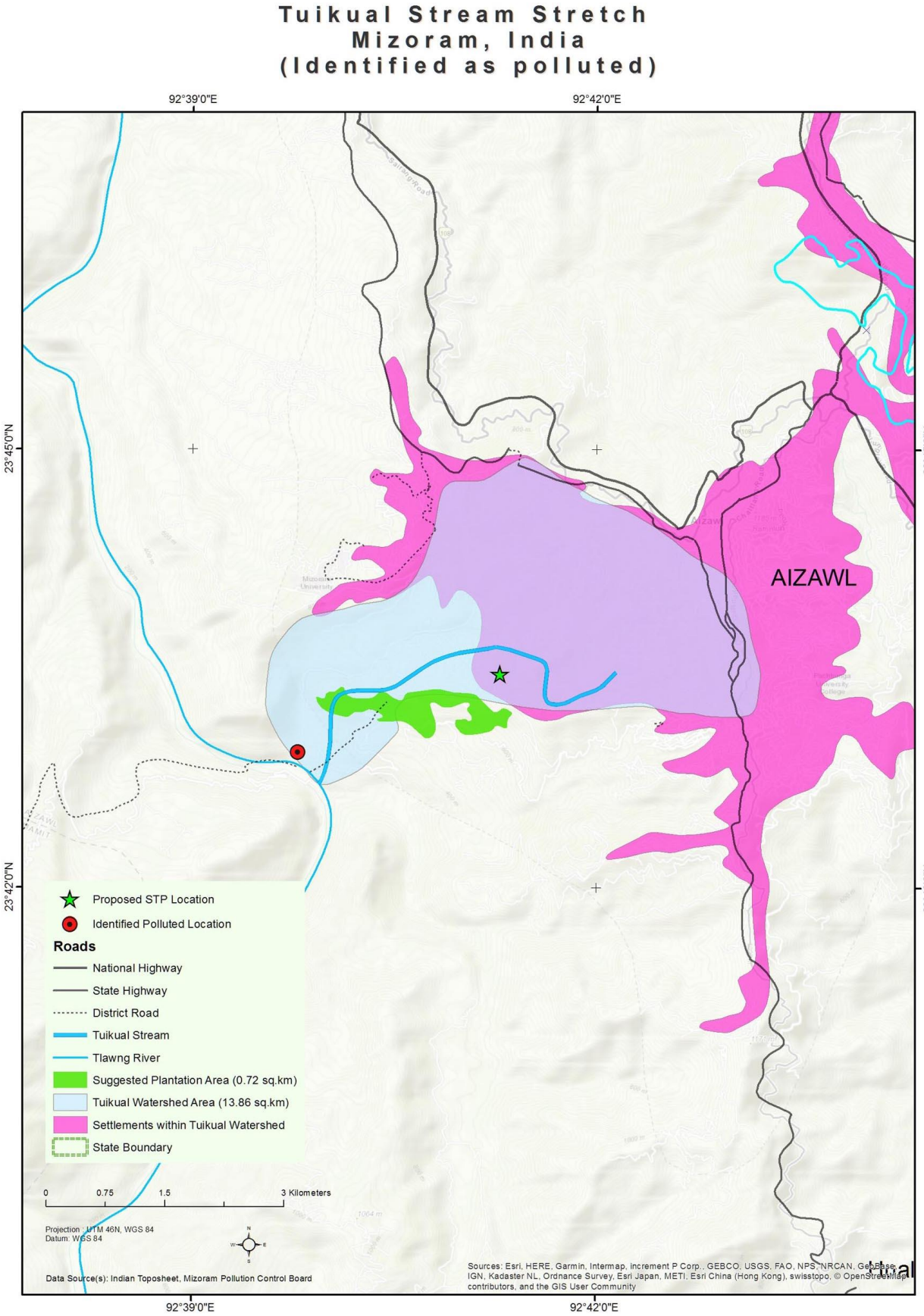
Annexure 1(vii)

Saikah Stream: Map showing tributaries/drains



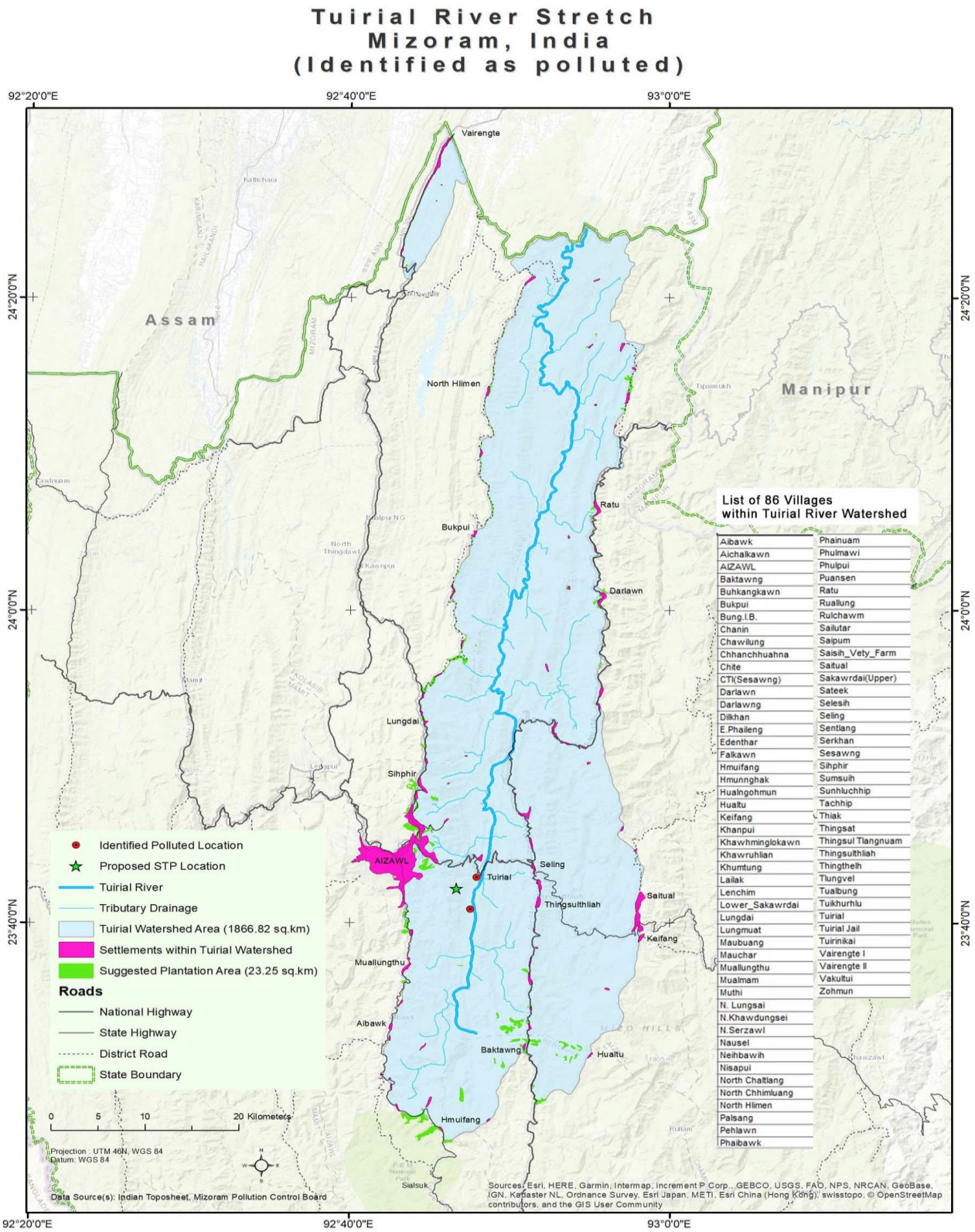
Annexure 1(viii)

Tuikual Stream: Map showing tributaries/drains



Annexure 1(ix)

Tuirial River: Map showing tributaries/drains



Annexure-2

Inventorised water polluting industries in the catchment area of Tiau river

Sl. No	*Name of industry*	*Location*	*Category*	*Quantity of Effluent/waste Generation (Litres/annu)*	*Types of waste*	*Consent Status*	*Authorization status*	*ETP Status*	*Disposal method*	*Action against violators*	*Proposed action*
1	Puia Automobile Workshop	Farkawn	Orange	40	Hazardous Waste	Not applied	Not applied	Not Available	All the used oil generated are collected by owner of the furniture workshops for use as lubricant in their machines/collected by builder of wooden house for protection of pillar from termites and other insects.	Informed to apply for consent -	Regulating the existing industries, upcoming industries and developmental projects in the catchment area.
2	Vena Two wheeler Workshop	Farkawn	Orange	25	-do						
3.	Two Wheeler Workshop	Vaphai	Orange	20	-do-						
4.	Two wheeler workshop	Khankawn	Orange	31	-do-						
5.	R. S Two Wheeler	Khawbung	Orange	27	-do-						
6.	Vala Two Wheeler	Khawbung	Orange	25	-do-						
7.	Two Wheeler Workshop	Khuangleng	Orange	15	-do-						
8.	Paua Two Wheeler Workshop	Zokhawthar	Orange	32	-do-						
9.	Diliana Two Wheeler Workshop	Zokhawthar	Orange	28	-do-						
10.	Two wheeler Workshop	Hnahlan	Orange	34	-do						
11.	Two wheeler Workshop	Khuangleng	Orange	28	-do-						

Sl. No	*Name of industry*	*Location*	*Category*	*Quantity of Effluent/waste Generation (Kg/day)*	*Types of waste*	*Consent status*	*Status of Authorization*	*ETP Status*	*Disposal method*	*Action against violators*	*Proposed action*
12.	Sub Centre	Bulfek zawl	Red	0.45	BMW	N/A	Being applied	Not Available	Captive Treatment (Deep burial/ sharp pit) -do-	-Nil-	Autoclave, sterilization of solid wastes and shredder for plactic wastes are proposed for these SC/PHC
13	Sub Centre	Dungtlang	Red	0.5	-do-	N/A					
14.	Sub Centre	Farkawn	Red	0.5	-do-	N/A					
15.	Primary Health center (10 Bedded)	Farkawn	Red	1.35	-do-	Valid Consent					
16.	Primary Health center (10 Bedded)	Hnahlan	Red	1.3	-do-	Valid Consent					
17.	Sub Centre	Hnahlan	Red	0.9	-do-	N/A					
18.	Sub Centre	Kelkang	Red	0.5	-do-	N/A					
19.	Sub Centre	Khankawn	Red	0.5	-do-	N/A					
20.	Primary Health center	Khawbung	Red	0.53	-do-	Valid Consent					
21.	Sub Centre	Khawbung	Red	0.5	-do-	N/A					
22.	Sub Centre	Khauangleng	Red	0.15	-do-	N/A					
23.	Sub Centre	Khuangphan	Red	0.2	-do-	N/A					
24.	Sub Centre	Lianpui	Red	0.8	-do-	N/A					
25.	Sub Centre	Sazep	Red	0.8	-do-	N/A					
26.	Sub Centre	Tualcheng	Red	0.9	-do-	N/A					
27.	Sub Center	Vapai	Red	0.7	-do-	N/A					
28.	Sub Center	Zokhawthar	Red	0.9	-do-	N/A					

ANNEXURE-3

Details of Solid waste generation and gap analysis for Tiau river

Sl No	*Selltlements in the catchment*	*Quantity of wastes*	*Existing infrastructure /disposal mode*	*Gap analysis*	*Target/Achievable goals with Proposed Action*
1.	33 villages with 5771 number of households	5970 Kg/day	Nil. No proper solid waste management system. Wastes are disposed by open dumping in identified dumping site.	5970 Kg/day	*Target/Achievable goals:* 526 kgs per day (Zokhawthar village) for the 1st Phase. *Proposed Action:* To develop proper system for solid waste management as per provisions of the Solid Waste Management Rule, 2016; by introducing waste segregation at source into biodegradable, non-biodegradable waste, plastic wastes, E-waste and Domestic Hazardous Waste; Door to door waste collection system is proposed for collecting segregated wastes from households under the supervision of Village Council. However, for treatment and disposal of solid wastes, biodegradable wastes are proposed to be treated at household level through the system of home composting. Remaining wastes shall be collected by Village Council and transport to the nearest Waste Collection Centre set up by Public Health Engineering Department. The Plastic wastes from the Waste Collection Centre shall be transported by Village WATSAN Committee to Block Headquarters wherein cleaning and compression will be done by Baling Machine, which will be chanelized to the nearest reliable plastic recycling factory outside the state.

ANNEXURE – 4(a)

WATER QUALITY DATA OF 9(NINE) POLLUTED RIVER STRETCHES

FOR THE MONTH OF JANUARY, 2020

Sl. No	Station Code	B. CORE PARAMETERS								C. GENERAL PARAMETERS										
		Water Temp (°C)	*D.O (mg/L)*	*pH*	*Conductivity µs/cm*	*B.O.D (mg/L)*	*Nitrogen Nitrite ($N\text{-}No_2$) (mg/L)*	*Faecal Coliform MPN*	*Total Coliform MPN*	*Turbidity NTU*	*Total Alkalinity (mg/L)*	*Chlorides (mg/L)*	*Ammonia-N (mg/L)*	*Total Hardness (mg/L)*	*Calcium (mg/L)*	*Magnesium (mg/L)*	*Sodium (mg/L)*	*K (mg/L)*	*TSS (mg/L)*	*Total Phosphate (mg/L)*
		14	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
1	3756	15	6	7.38	147	1.2	0.014			22.6	32.1	10.4	0.369	42	10.4	3.8	3	0.5		0.051
2	3709	17	7.5	8.09	132	1.6	0.014	0	2400	7.9	50.9	7.8	0.296	62	16	5.3	1	0.5		0.038
	3734	24	7	5.9	85	1.4	0.008			1.1	26.4	7.8	0.285	34	8	3.4	4.5	1		0.035
	3736	25	7.1	7.01	81	1.2	0.004			0.3	28.3	10.4	0.16	26	6.4	2.4	0.5	0		0.079
	3754	19	5.9	7.05	125	1.2	0.007			0.9	79.2	33	0.251	70	17.6	6.2	1.5	0.5		0.039
3	3757	14	6.5	7.1	63	1.4	0.002			0.2	37.7	7	0.023	46	10.4	4.8	1	0		0.011
4	3720	12	8.1	7.2	105	1.5	0.004			0	22.6	12.7	0.16	34	8.8	2.9	4	0		0.014
5	3718	17	5	8	744	1.1	0.392	16	2400	45	109.4	61.7	3.578	128	40	6.7	27.5	1.5		0.228
6	3735	24	7.3	6.89	75	1.4	0.007			0.5	32.1	12.2	0.194	30	8	2.4	3	0		0.021
7	3740	18	4.1	5.12	62	1.2	0.004			0.4	22.6	7	0.274	30	8	2.4	1	0		0.035
8	3712	17	5.4	7.59	205	1.1	0.006	0	2400	1.2	88.7	37.4	0.148	102	29.6	6.7	4	0.5		0.024
9	2052	15	6.6	6.47	167	1.4	0.011	43	2400	0.2	81.1	11.7	0.277	72	18.4	6.2	1.5	0		0.075
	2053	16	6.7	6.58	161	1.5	0.013	39	2400	1.4	79.2	12.7	0.262	70	18.4	5.8	2	0.5		0.065

Tributaries of Tuirial Stream

Sl. No	Name and location of Stations	B. CORE PARAMETERS								C. GENERAL PARAMETERS									
		Water Temp (˚C)	*D.O (mg/ L)*	*pH*	*Conductivity µs/cm*	*B.O.D (mg/L)*	*Nitrogen Nitrite ($N\text{-}NO_2$) (mg/L)*	*Faecal Coliform MPN*	*Total Coliform MPN*	*Turbidity NTU*	*Total Alkalinity (mg/L)*	*Chloride (mg/L)*	*Ammonia-N (mg/L)*	*Total Hardness (mg/L)*	*Calcium (mg/L)*	*Magnesium (mg/L)*	*Sodium (mg/L)*	*K (mg/L)*	*Total Phosphate (mg/L)*
1	Chite Stream	17	5	8	744	1.1	0.392	16	2400	45	109.4	61.7	3.578	128	40	6.7	27.5	1.5	0.228
2	Lawibual Stream	18	4.1	7.2	464	0.9	0.453			37.5	164.2	73.9	3.108	182	59.2	8.2	21	1	1.001
3	Damdiai	17	5.9	8.24	245	1.3	0.188			0.9	103.8	56.6	0.855	122	36.8	7.2	2.5	0.5	0.027

Tributaries of Tlawng

Sl. No	Name and location of Stations	B. CORE PARAMETERS								C. GENERAL PARAMETERS									
		Water Temp (˚C)	*D.O (mg/ L)*	*pH*	*Conductivity µs/cm*	*B.O.D (mg/L)*	*Nitrogen Nitrite ($N\text{-}NO_2$) (mg/L)*	*Faecal Coliform MPN*	*Total Coliform MPN*	*Turbidity NTU*	*Total Alkalinity (mg/L)*	*Chloride (mg/L)*	*Ammonia-N (mg/L)*	*Total Hardness (mg/L)*	*Calcium (mg/L)*	*Magnesium (mg/L)*	*Sodium (mg/L)*	*K (mg/L)*	*Total Phosphate (mg/L)*
1	Challui	16	6.4	8.11	249	1.5	0.016			1.1	47.2	7	0.315	60	16	4.8	0.5	0.5	0.052
2	VaipuanphoStream	17	6.4	6.12	136	1.3	0.009			0.8	22.6	9.6	0.118	34	8	3.4	2.5	0.5	0.021
3	Serlui Stream	16	5.9	6.52	198	1.2	0.004			2	22.6	11.9	0.198	32	8	2.9	1.5	0	0.035
4	Tuikual Stream	17	5.4	7.59	205	1.1	0.006	0	2400	1.2	88.7	37.4	0.148	102	29.6	6.7	4	0.5	0..024
5	Sakhisih stream	16	5.4	6.2	395	1.2	0.019			1.2	71.7	27.8	0.338	82	21.6	6.7	14.5	0.5	0..089
6.	Tut River	12	6.6	4.94	162		0.008			1.4	50.9	27.8	0.243	56	12.8	5.8	0.5	0	0.013
7.	Teirei River	14	6.7	7.68	142		0.009			2.5	39.6	13	0.304	48	12	4.3	2.5	0.5	0.02

Tributary of Chite

Sl. No	Name and location of Stations	B. CORE PARAMETERS								C. GENERAL PARAMETERS									
		Water Temp (˚C)	*D.O (mg/ L)*	*pH*	*Conductivity µs/cm*	*B.O.D (mg/L)*	*Nitrogen Nitrite ($N\text{-}NO_2$) (mg/L)*	*Faecal Coliform MPN*	*Total Coliform MPN*	*Turbidity NTU*	*Total Alkalinity (mg/L)*	*Chloride (mg/L)*	*Ammonia-N (mg/L)*	*Total Hardness (mg/L)*	*Calcium (mg/L)*	*Magnesium (mg/L)*	*Sodium (mg/L)*	*K (mg/L)*	*Total Phosphate (mg/L)*
1	Lawibual Stream	18	4.1	7.2	464	0.9	0.453			37.5	164.2	73.9	3.108	182	59.2	8.2	21	1	1.001

Annexure- 4 (b)

Groundwater Quality in the catchment of polluted Rivers

Sl. No	*Name and location of Catchment Area*		B. CORE PARAMETERS				C. GENERAL PARAMETERS							
			Water Temp (˚C)	*D.O (mg/L)*	*pH*	*Nitrogen Nitrite ($N\text{-}No_2$) (mg/L)*	*Turbidity NTU*	*Total Alkalinity (mg/L)*	*Chlorides (mg/L)*	*Ammonia-N (mg/L)*	*Total Hardness (mg/L)*	*Calcium (mg/L)*	*Magnesium (mg/L)*	*Total Phosphate (mg/L)*
1	**Tuirial Catchment Area**	Bawngkawn Hand Pump, Near HB Petrol Pump, Aizawl	21	2.8	5.97	0.15	3	73.5	43.5	0.106	96	27.2	6.7	0
		Selesih Hand Pump, Aizawl	20	2.9	6.32	0.094	2	73.5	43.5	0.391	90	27.2	5.3	0
		Chaltlang hand pump Near Remi tyre works, Aizawl	21	0.8	5.97	0.15	3	80.9	44.3	0.106	94	28	5.8	0
		S.Hlimen Hand Pump, Aizawl	21	2.2	6.2	0.066	10.7	55.1	34.8	0.555	80	18.4	8.2	0.134
2	**Tlawng Cachement Area**	Zobawk Veng Handpump, Lunglei	25	4.1	6.36	0.091	20	73.5	26.1	0.973	50	12.8	4.3	0.279
		Tuikual Hand Pump, Aizawl	22	2.5	6.32	0.094	2	82.7	43.5	0.391	102	30.4	6.2	0
3	**Tuipui Catchment Area**	Bethel veng Hand-pump, Champhai	18	0	7.69	0	0.5	55.1	21.7	0.167	100	27.2	7.7	0.066

ANNEXURE 5

Details of waste generation and treatment gaps and proposed action for Tiau river

Sl No	*Name of wastes*	*Quantity of wastes*	*Existing infrastructure/disposal mode*	*Gap analysis*	*Proposed Action*
1.	Hazardous (Used oil from automobile repairing workshop)	305 litres/ annum	There is no left over of used oil as all the used oil generated are immediately collected by owners of the furniture workshops for use as lubricant in their machines and also by builders of wooden houses for protection of pillars from termites and other insects.	Nil. There is no left over of used oil.	Regulate the units to obtain Consent/Authorization from MPCB and to develop disposal mechanism for the used oil for proper and safe disposal as per the rule
2.	Bio-Medical wastes (from PHC & Sub-Centres)	11.48 Kg/day	Deep burial/ sharp pit/ Primary treatment (for PHC)	Nil. All the Bio-Medical Wastes are disposed as per the Rules and primary treatment done for effluents of PHC	For improvement, auclaving sterilization for yellow categorized wastes is suggested
3.	Sewage (33 villages in the catchment)	0.8 MLD	Nil	0.8 MLD	Onsite Liquid Waste Treatment for greywaters at individual households for Zokhawthar village with a target of 0.08 MLD for the first phase.
4.	Solid Wastes	5970 Kg/day Kg/day	Nil	5970 Kg/day Kg/day	To develop proper system for solid waste management as per provisions of the Solid Waste Management Rule, 2016; by introducing waste segregation at source into biodegradable, non-biodegradable waste, plastic wastes, E-waste and Domestic Hazardous Waste; Door to door waste collection system is proposed for collecting segregated wastes from households under the supervision of Village Council. Treatment and disposal of the collected wastes will be as per provisions of the Rules by Village Councils, Village WATSAN Committee (PHED) in consultation with MPCB