



**ENVIRO INFRASTRUCTURE CO.
LTD.**

**Draft EIA/EMP and RA/DMP Report for
Expansion of Common Effluent
Treatment Plant at Umaraya Village,
Padra Taluka, Vadodara - 2250 KLD to
4500 KLD**

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Environment *for* Development

1 EXECUTIVE SUMMARY

1.1 Introduction about EICL

M/s. Enviro Infrastructure Company Ltd (EICL) is a promoted group company formed by various medium to small scale industries, having their manufacturing units in the industrial belt along Padra Jambusar road, Vadodara district. The principle objective of EICL is a Centralized Collection, Treatment & Disposal of their combined effluents.

Since May 2000 the company operates a 2250 KLD design capacity of Common Effluent Treatment Plant located at Plot No 612 / B, VECL Road, Village: Umaraya, Taluka - Padra, Vadodara District.

1.2 Project Objective

The project is about an existing Common Effluent Treatment Plant of 2250 KLD design capacity which needs expansion to double the capacity for treatment of additional effluents.

M/s EICL, under the directives of Gujarat Pollution Control Board (**Noted vide Minutes of Meeting with VECL Member units and CETP held on 05-08-2011 at EICL CETP** – Umaraya, Padra, Vadodara, intends to augment their Common Effluent Treatment Plant from 2250 KLD to 4500 KLD capacity.

1.3 Importance of the Project

Expansion in EICL capacity will lead to growth in industrialization by expansion of existing units, development of many new units along Padra Jambusar Belt of Vadodara District as units will avail the combined treatment and disposal facilities. Thus due to proposed expansion, additional capacity for safe and environmentally sustainable mode of effluent treatment and disposal will be generated in the industrial belt along Padra Jambusar Road.

The growths in industrialization will inturn generate additional employment opportunities along the industrial belt of Padra Jambusar Road in Vadodara District.

1.4 Categories of the Project

Sector	Category	Project & Activity	Remarks
7 (h)	B	Common Effluent Treatment Plants	Expansion of Common Effluent Treatment Plant from 2250 KLD to 4500 KLD capacity

1.5 Project Description

1.5.1 Location of Project

EICL is located at 612 B, VECL Road, Umraya Village, Padra Taluka, Vadodara.

1.5.2 Area Statement

It is intended to undergo expansion of the Common Effluent Treatment Facility within the existing premises of CETP. Enough land is available for proposed expansion.

Total area of the project is about 37804 m². Area of existing units and structures is 4515.6 m². Area of proposed units and structure is 4416.3 m². Greenbelt area is 17234 m² i.e. 45% of total plot area.

1.5.3 Size or Magnitude of Operation

Sufficient land is available for proposed expansion from 2250 KLD to 4500 KLD treatment capacity within the existing land premises. Hence no alternate site is considered to be used.

1.5.4 Cost of Project

The estimated cost of proposed CETP expansion is INR ~ 22 crores. Budgetary expenditure on Total Environmental Control Measures is estimated as INR ~ 2256.6 Lacs and Budgetary Recurring Expenditure is estimated as INR ~ 1058.22 Lacs / Annum.

1.5.5 Treatment Facility at EICL

EICL, Umaraya has various unit operations as under for treatment of combined effluents received from their member units:

Existing	Proposed
Equalization cum Collection and Primary treatment of Flash Mixer and Clariflocculator	Equalization cum Collection and Primary treatment of Flash Mixer and Clariflocculator
Two Stage Biological Treatment System	Two Stage Biological Treatment System
Tertiary treatment of Pressure Filters, Chlorination Treatment.	Tertiary treatment of Pressure Filters, Chlorination & Ozonation Treatment.
Final Treated Effluent Storage Tank	Final Treated Effluent Storage Tank

1.5.6 Mode of Disposal

Mode of Disposal of Treated Effluents: Vadodara Enviro Channel Ltd (VECL) Channel leading to estuary portion of river Mahi in Gulf of Cambay.

1.5.7 Power Requirement

Source of Power and Backup

Source of Power	Existing	After Expansion
Madhya Gujarat Vij Company Ltd.	200 kVA	500 kVA
DG Sets	1 Nos. 250 kVA	1 No. 500 kVA
Fuel consumption (HSD in DG Set) – at 100% Load	57.2 lit/hr	100 lit/hr

1.5.8 Raw Water Requirement

The proposed project is a centralized treatment facility of the combined effluents received from different industries. CETP utilizes raw water from their existing borewell within the site premises. As the premise is not located in semi-critical, critical and over-exploited zone specified by CGWA, no special permission is required to withdraw groundwater.

Principal areas of fresh water consumption in the CETP premises are;

- Domestic consumption and
- Chemical Preparation.
- Backwashing of Filters
- Lab Washings
- Green Belt for gardening

It is planned to reuse treated waste water from the CETP to be used for chemical preparation and backwashing of filters. Moreover no additional water will be required for green belt development as existing Green Belt will be maintained. A summary of existing and proposed water consumption details are presented as below:

Description	Domestic (KL / day)	Greenbelt (KL / day)	Lab Washings (KL / day)	Chemical Preparation (KL / day)	Backwashing of Filters (KL / day)	Total (KL / day)
Existing Raw Water Consumption from Borewell	1	8	0.5	37	40	86.5
Additional Raw Water Requirement from Borewell	1	0	0.5	74 (Recycle Treated Water)	80 (Recycle Treated Water)	1.5
Total Proposed Raw Water Requirement from Borewell	2	8	1	0	0	16 **
** - Since TDS Levels in ground water bore well on site is high a 16 KLD RO Plant is proposed. Permeate of 11 KLD will be used domestic, green belt and lab washings where as 5 KLD of rejects will be discharged to Equalization Tanks of CETP.						

1.5.9 Wastewater Receipt of Member units

Details regarding memberunits and proposed member unit are given in below given table.

S. No.	Description	Quantity (KLD)
1	Present Member Units Of CETP (80 Nos)	1944.2
2	Units Awaiting NOC/Consent/EC Clearance To Be Granted Permissions (13 Nos)	198.5
3	Temporary Members for 6 months (2 Nos)	112
4	Units Applied For New Membership – Tentative Committed Quantity (33 Nos)	2768.7
	Total	5023.4

The committed quantities of effluents of new membership is tentative and hence as a conservative figure the CETP is proposed for an expansion of 4500 KLD from present design capacity of 2250 KLD. EICL will ensure that in no case the effluents received in the CETP inlet will exceed 4500 KLD capacity. The present CETP Treatment capacity will be augmented in such a way that it can treat combined effluents to a flow of 4500 KLD.

1.5.10 Wastewater Collection from member units

EICL has a GPS enabled online tracking system for their own tankers for collection of waste water from member units to CETP. GPS system is installed in all the tanker trucks; which enables to have a track on movements of all the tankers for collection of waste water from member units.

1.5.11 Effluent Collection Tanker Trips (Present+ Proposed)

Units in KLD	Flow in m ³ /day	Tanker Trips (Nos per day) considering average effluent carrying capacity of 18 KL	No of Tankers required considering average 3.5 trips of each tanker per day
Existing	1500	84	24
	2250	125	36
After Expansion	4000	225	65
	4500	250	72

1.5.12 Measures taken at EICL to maintain Inlet Quality Norms

- Each of the tankers received within the premises of EICL are tested for principal parameters of pH, TDS, Turbidity (SS), Ammonical Nitrogen and COD before discharging into the Equalization Tanks.
- For Specific parameters as identified in particular member unit's additional analysis is also carried out for heavy metals such as Total Chromium and Lead.
- In no case any highly acidic / alkaline effluents, very high TDS effluents are taken in the Equalization Tanks of CETP.
- The tankers are made to wait around 1.5 hours of time, till the initial analysis for the above principal parameters are not ascertained and a green signal from the Laboratory is not given for emptying into Equalization Tanks
- If the parameters are met as per the inlet norms of CETP design that the tanker is made to empty in the equalization Tanks and if not met with than the tanker is rejected.

EICL is rejecting tankers of member units if parameters are higher than below mentioned limits.

S. No.	Parameters	Inlet Norms of EICL
1	pH	6-9
2	Chemical Oxygen Demand	2000 mg/l
3	Ammonical Nitrogen	50 mg/l
4	Suspended Solids (measured as Turbidity)	600 mg/l

1.5.13 Procedure Followed for Tanker Rejection

The tankers not meeting the norms of Inlet are rejected. The rejection procedure is as under:

- Informing the company immediately of tanker rejection.
- Rejection of Tanker Manifest is filled in and the tanker is sent back to the company with the manifest.
- EICL ensures that the tanker is sent back to the same industry and emptied into their initial collection sump of ETP from which the effluents was taken earlier.
- The tanker rejection is immediately reported to GPCB, to the industry. All the tanker rejections are taken seriously and records are maintained properly by EICL and actions are taken on the industry for rejection of tanker.
- All the tanker rejections are also discussed in the monthly Board meetings agenda.

1.5.14 Measures taken at EICL to maintain Outlet Norms

Quality of final effluent: Laboratory analysis for pH, TDS, COD, SS, NH₃-N, T-chromium, Lead and Oil & grease etc. Online TOC Meter (measuring COD of the outlet at every 2 hrs intervals), pH and Flow Meter have been installed at the outlet of Final Collection Sump in the CETP Premises.

1.5.15 Treated Effluent Disposal

EICL after treatment of combined effluents from their member units is disposing off treated effluents in Vadodara Effluent Channel Ltd (VECL) channel earlier known as Effluent Channel Project Ltd (ECPL). EICL has an existing membership for discharge of treated wastewater i.e. 2250 m³/day to conveying system of VECL channel. In principal approval for discharging additional 2250 KLD is availed from VECL vide their Letter Ref No VECL/BRD/MD/1501 dated 4/02/2013.

1.5.16 Performance Evaluation and Treatability based on existing CETP

The efficiency of removal of pollutants as per performance evaluation study and treatability of combined influents based on present CETP operations is presented as below:

S. No.	Description	Parameters								
		pH	COD		BOD		SS		O & G	
			Value	% Reduction	Value	% Reduction	Value	% Reduction	Value	% Reduction
1	Inlet	6.5-7.5	2000		500		600		20	
2	After Primary Treatment	7.5	1700	15	475	5	180	70	10	50
3	After 1 st Stage Aeration Tank	7.2	680	60	143	70	90	50	9	15
4	After 2 nd Stage Aeration Tank	7	204	70	29	80	63	30	8	10
5	After Polishing Treatment	7.5	184	10	24	15	56.7	10	8	0
6	Before Disposal in Guard Pond	6.5-8.5	200		30		60		10	

Note: All values are in mg/lit except pH

1.5.17 Proposed Units of Treatment for Expansion of CETP to 4500 KLD

The new units proposed for CETP along with their dimensions and working volumes is presented below:

S. No.	Description	Units	Length (m)	Width (m)	Dia. (m)	Height/Depth - SWD (m)	Working Volume (Cum)
1	Equalization tanks	2	28	14	-	3	1176
2	Flash mixer	1	4	4	-	3	48
3	Clariflocculator	1	-	-	15	3.5	618
4	1 st stage Aeration Tank	1	36.6	18.3	-	4	2679
5	2 nd stage Aeration Tank	1	36.6	18.3	-	4	2679
6	1 st Stage Secondary Clarifier	1	-	-	12	2.8	316
7	2 nd Stage Secondary Clarifier	1	-	-	12	2.8	316
8	Intermediate Collection sump	1	-	-	14	3	462

S. No.	Description	Units	Length (m)	Width (m)	Dia. (m)	Height/Depth - SWD (m)	Working Volume (Cum)
9	Final Collection Sump	1	60	25	-	3	4500

The present and proposed treatment units as highlighted above are sufficient and adequate to treat the combined influents from member units as per designed inlet norms of CETP.

1.5.18 Air Emission

Flue Gas Stack Details

S. No.	Source Of Emission / Stack attached to	Stack Diameter (m)	Stack Height (m)	Required Height of the stack as per GPCB (m)	Remark
Existing					
1	D G Set (250 kVA)	0.3	10	9.16	Adequate stack height
Proposed					
1.	D G Set (500 kVA)	0.3	14	13.4	Adequate stack height

1.5.19 Solid and Hazardous Waste Management

Hazardous Waste Generation Details

S. No.	Waste	Quantity			Schedule-1	Facility
		Existing	Proposed	Total		
1	ETP Sludge from primary and secondary treatment units	1500 MT/A	1500 MT/A	3000 MT/A	34.4	Collection, storage, transportation, Disposal at TSDf at NECL, Nandesari and GEPIL, Surat
2	Spent/Used oil from DG set (250 KVA)	1500 Lit/A	-	1500 Lit / A	5.1	Collection, storage, transportation, Disposal by selling to registered re-refiner

1.5.20 Workforce Management

Currently 20 no of persons are employed by for operations. It is anticipated that additionally 20 numbers of persons will be employed during operation of 4500 KLD CETP. This will make the total employment due to the project to a total of 40 persons.

1.6 Description of the Environment

1.6.1 Study Period

The Study period for monitoring is Summer Season i.e. March - May 2012.

1.6.2 Study Area

The study area is defined as area within 10.0 km radius from the plant.

1.6.3 Landuse of the Study area

A recent satellite image for the study area was collected using Google Earth and Ground truth study by the Functional Area Expert. The image was interpreted for identification of various land usage. Land use of study area is broadly classified into categories such as Agriculture Land, Vegetation Cover, Land without Shrubs, Habitation, Water Body, Industrial Area, Mud Flat, Mangroves, Salt Pans, Sea Area and Beach Area. The Major portion of land is covered by Agriculture land use (77.95%) and Vegetation Cover (13.9%). It can be inferred from the Land use of the project area that:

- The predominant landuse pattern prevalent in area is Agricultural Land.
- The present project is an expansion of the CETP within the same premises and no separate / other land is used for construction activity. Hence no change is anticipated surrounding land use pattern.
- Within the site also the existing green belt area will be maintained.

1.6.4 Climatology

Site-specific meteorological data shows that;

Site specific meteorological data shows that average wind speed in the summer season is 1.8 m/s and maximum wind speed of 6.0 m/s.

It can be observed that in the summer season, wind blows mostly from west south west sector. Calm wind contributes to about 10.87%.

Average temperature recorded for summer Season season was 30.7 °C with maximum temperature of 37.7 °C and minimum of 23.5 °C which is a characteristic of this study area.

The average relative humidity recorded was 44.4 % with maximum relative humidity of 62.5% and minimum of 27.7%.

1.6.5 Ambient Air

The ambient air monitoring work was carried out spread during summer season of the year 2012. A comparison of the above results with the value range indicators provided by CPCB indicates the following:

AAQM Station	Location Description	Distance in Km from Centre of Project Site	Direction	Average Result in $\mu\text{g}/\text{m}^3$, except VOCs in mg/m^3							
				PM ₁₀ (100) 24 hrs	PM _{2.5} (60) 24 hrs	SO ₂ (80) 24 hrs	NO _x (80) 24 hrs	Pb (1.0) 24 hrs	NH ₃ (400) 24 hrs	CO (2000) 8 hrs	VOC (NS) Grab
AA 1	At Site	0.0	Base station	85	39	8.2	17.3	<0.5	<0.5	<1145	<0.25
AA 2	Umaraya Village	0.76	NW	103	37	<8.0	10.2	<0.5	<0.5	<1145	<0.25
AA 3	Ekalbara Village	2.08	W	76	37	<8.0	12.1	<0.5	<0.5	<1145	<0.25

AAQM Station	Location Description	Distance in Km from Centre of Project Site	Direction	Average Result in $\mu\text{g}/\text{m}^3$, except VOCs in mg/m^3							
				PM ₁₀ (100) 24 hrs	PM _{2.5} (60) 24 hrs	SO ₂ (80) 24 hrs	NO _x (80) 24 hrs	Pb (1.0) 24 hrs	NH ₃ (400) 24 hrs	CO (2000) 8 hrs	VOC (NS) Grab
AA 4	Valipura (Part of Ekalbara Village)	1.26	SW	77	29	<8.0	14.6	<0.5	<0.5	<1145	<0.25
AA 5	Dabhasa Village	1.86	S	98	41	<8.0	13.2	<0.5	<0.5	<1145	<0.25
AA 6	Luna Village	1.34	SE	86	34	8.9	12.2	<0.5	<0.5	<1145	<0.25
AA 7	Near Umaraya	0.7	NE	63	27	<8.0	12.5	<0.5	<0.5	<1145	<0.25

Inference:

- PM₁₀ – An average values ranges between 63 – 103 $\mu\text{g}/\text{m}^3$. The Average concentration of PM10 at Umraya Village is higher than CPCB limit. This may be due to heavy vehicular movement.
- PM_{2.5} – An average values ranges between 27 – 41 $\mu\text{g}/\text{m}^3$. Within specified limit at all location.
- SO₂ - An average concentration values ranges <8.0 to 8.9 $\mu\text{g}/\text{m}^3$. Within specified limit.
- NO_x – An average concentration values ranges between 10.2 – 17.3 $\mu\text{g}/\text{m}^3$. Within specified limit.
- CO – An average concentration observed below detection limit of the instrument. (i.e. 1 ppm or 1145 $\mu\text{g}/\text{m}^3$)
- A concentration of VOC is observed to be in the range of <0.25 mg/Nm^3 .

1.6.6 Noise

Noise levels were recorded at ten different locations within the study area. The Ambient Noise Level is as per CPCB Guidelines.

Station Code	Noise Monitoring Location	Date of Monitoring	Category of Area/Zone	CPCB Limits in dB (A)		Average Noise levels in dB (A)	
				Day	Night	Leq (Day)	Leq (Night)
NL 1	At project Site - Nr. Filtrate Collection Sump	26/06/12	Industrial	75	70	68.6	55.6
NL 2	At Project Site - Main Gate	26/06/12	Industrial	75	70	67.9	54.3
NL 3	At Project Site – Nr Entry office	27/06/12	Industrial	75	70	62.8	61.3
NL 4	At Project Site – Nr Sludge Drying bed I	26/06/12	Industrial	75	70	68.3	59.5
NL 5	Umaraya Village	23/06/12	Residential	55	45	55.7	43.9
NL 6	Ekalbara Village	23/06/12	Residential	55	45	53.3	46.2
NL 7	Valipura Village	24/06/12	Residential	55	45	54.2	46.3
NL 8	Dabhasa Village	23/06/12	Residential	55	45	54.4	45.5

Station Code	Noise Monitoring Location	Date of Monitoring	Category of Area/Zone	CPCB Limits in dB (A)		Average Noise levels in dB (A)	
				Day	Night	Leq (Day)	Leq (Night)
NL 9	Luna Village	24/06/12	Residential	55	45	55.0	48.5
NL 10	VECL canal Road	24/06/12	Residential	55	45	67.7	53.8

The noise level at Umaraya Village during day time exceeds the specific limit for residential zone. Noise level at Valipura, Dabhasa and Luna village exceeds specific limit for night time. Noise level at VECL Canal Road junction exceeds specific limit for day as well as night time. All this location and along Valipura, Dhabhasa and Luna villages comes in main routes of EICL. So throughout the day and night transportation of heavy vehicles like tanker containing effluent is operative on the same ways.

1.6.7 Ground water Quality

Ground Water samples were collected from different locations within the study area as following and analyzed for parameter mentioned in IS 10500.

Code	Location	Source	Distance from Project Site in Km	Direction w.r.t Project Site	Date of Sampling	Results higher than permissible limits
GW 1	At Site (Mr. A. R. Joshi)	Bore well	0.0	Core area	30/03/12	TDS, chlorides, Total hardness, magnesium
GW 2	Umaraya Village (Surpanch)	Hand Pump	0.75	NW	20/03/12	-
GW 3	Near Umaraya Village (Farm of Padhiyar Lajibhai)	Bore well	0.83	NE	31/03/12	Total Hardness & Magnesium
GW 4	Ekalbara Village (Dhanjibhai)	Hand Pump	2.46	W	20/03/12	-
GW 5	Dabhasa Village (Dharmesh C. Shah, Asst. @ gram Panchayat,	Hand Pump	1.80	SE	20/03/12	-
GW 6	Luna Village Sanjaybhai P Patel	Bore well	1.60	ESE	20/03/12	-
GW 7	Dabhasa Ekalbara Road, Near Valipura (Jaswantsing K. Gohil)	Hand pump	1.40	SW	20/03/12	Total Hardness & Magnesium
GW 8	Dabhasa Umaraya Road (Goverdhanbhai Mahiji)	Bore well	0.78	S	30/03/12	TDS, chlorides, Total hardness, magnesium
GW 9	VECL Road, Near Luna Village (Mukhibhai)	Tube well	1.67	NE	30/03/12	-
GW 10	VECL Road, Near Ekalbara Chokdi,	Bore well	1.54	WSW	30/03/12	-

1.6.8 Surface Water Quality

Surface Water samples were collected from different locations within the study area. From the analysis report of Mahi River near two different locations, which are compared with classes for designated use of River Water

Standards that samples of river are suitable for "E Class" i.e. irrigation, industrial cooling, and controlled waste disposal. At one location near Hinglot Village, river was dry so sampling was not possible from that location.

Code	Location	Date of Sampling	Source	Distance from Project Site in Km	Direction w.r.t Project Site	Results higher than permissible limit and Classification
SW 1	VECL Road, Near Umaraya Crossing	20/03/12	Narmada minor Canal	0.2	SSE	Feecal Coliform & Total Coliform
SW 2	Umaraya Village	-	Dry Pond	0.72	NW	-
SW 3	Luna Village	20/03/12	Pond	1.50	ESE	Feecal Coliform & Total Coliform
SW 4	Dabhasa Village	23/03/12	Pond	1.88	SSE	TDS, Chloride, Total Hardness, Feecal Coliform & Total Coliform
SW5	Near Jaspur	30/03/12	Mahi River	4.91	NE	E
SW 6	Near Mujpur	20/03/12	Mahi River	4.60	W	E
SW 7	Hinglot Village	-	Dry Meni River	6.61	NE	-
SW 8	Mahuvad Village	30/03/12	Pond	3.37	SW	Feecal Coliform & Total Coliform

1.6.9 Soil

Soil samples were collected from four locations within the study area as given following:

Code	Location	Date of Sampling	Source	Distance from Project Site in Km	Direction w.r.t Project Site	Type of Soil
S 1	At Site	30/03/12	Industrial	0.0	Core area	Medium Loam
S 2	Ekalbara Village (Dajibhai)	02/04/12	Agriculture	1.79	W	Silty Clay Loam
S 3	Dabhasa Ekalbara Road, Near Ekalbara (Dhanybhai)	02/04/12	Agriculture	1.59	WSW	Silty Loam
S 4	Valipura (Dabhasa Ekalbara Road, Jaswantsing Gohil)	30/03/12	Agriculture	1.21	SW	Silty Clay Loam
S 5	Dabhasa Village (Chimanbhai G. Shah)	30/03/12	Agriculture	0.87	SSE	Medium Loam
S 6	Luna Village (Mukhibhai)	30/03/12	Agriculture	1.65	E	Clay Loam
S 7	Near Umraya Village (Laljibhai Padhiyar)	31/03/12	Agriculture	0.60	NE	Medium Loam
S 8	Umaraya Village	30/03/12	Agriculture	0.53	NW	Sandy Loam

1.6.10 Biological Environment

A total of 89 plant species were observed in the study area out of which 39 tree species, 16 shrubs species and 19 herb species, 07 climber species, 02 twiners species and 04 grasses species are observed.

A total of 46 species were observed out of which 6 species of mammals, 6 species of Reptiles and 34 species of avifauna were reported in the study area. Common Peafowl (Schedule I) bird species present in the study area.

1.7 Anticipated Environmental Impact Identification, Prediction and Mitigation

1.7.1 Ambient Air

Impact Identification

During the construction phase of the project, the major activities will involve earth work excavation, transport of construction materials, building of structures etc. These activities would cause a general increase in levels of dust and suspended particulate matter in the ambient air.

Impacts on ambient air during operation phase would be due to emissions from operation of additional DG set of 250 and 500 kVA.

The maximum 24 hourly average GLC's are predicted to be $16.32 \mu\text{g}/\text{m}^3$, $1.7 \mu\text{g}/\text{m}^3$ and $0.08 \mu\text{g}/\text{m}^3$ for SO_2 , NO_x and Particulate matter respectively. These GLC's are expected to occur at a distance of 100 m from the source towards the E direction. The baseline average ambient air concentration of SO_2 was observed to be around $8.2 \mu\text{g}/\text{m}^3$ and NO_x was observed to be around $17.3 \mu\text{g}/\text{m}^3$ at the site.

Mitigation Measures

Mitigation measures for air quality impacts during construction phase are:

- Periodical checking of vehicles and construction machinery to ensure compliance of emission standards
- Attenuation of pollution /protection of receptor through greenbelt/green cover
- Ensure periodical washing of construction equipment and transport vehicles to prevent accumulated dust

Mitigation measures for air quality during operation phase are:

- After proposed expansion double trees will be replanted, in case of cutting of trees due to proposed structures location.
- Periodical checking of tankers to ensure compliance of emission standards
- Attenuation of pollution/protection of receptor through greenbelt/green cover.
- Dilution of odourant, odour counter action or neutralize, odour masking or blanketing
- Regular monitoring of of air polluting concentrations
- Designated tankers of EICL are used for existing operation and after proposed expansion same practice will be continued.
- Control vehicle speed on sight.
- All tankers shall be PUC Certified from time to time.
- DG Sets will be operated during power failure only.

1.7.2 Noise

Impact Identification

From Operation of Treatment Units

The existing operation of EICL does not have any adverse impact on surrounding environment as sufficient greenbelt is provided in periphery of EICL. The operation of ETP units and associated machinery such as pumps, blowers, agitators, aerators including the DG set is likely to emit noise in the range of 60 to 65 db (A) and can be experienced at site boundary. Moreover, as treatment of effluent is a continuous activity, such noise is emitted during both daytime and night time. All noise emitting equipments provided with suitable acoustic enclosures in order to control noise such as Air Blowers and DG Sets.

From Effluent Bearing Tankers

Generation of noise during operation will occur due to vehicle movement, especially tankers bearing wastewater for treatment. However their effect will be localized and transient in nature and will principally affect the localities adjacent to the access road.

Mitigation Measures

Mitigation measures for noise will include the following:

- Use of PPEs such as ear plugs and mufflers for operating staff in the CETP area
- Pumps and blowers may be mounted on rubber pads or any other noise absorbing materials;
- Proper scheduling of noise generating activities to minimize noise impacts.
- Usage of well maintained construction equipment meeting the regulatory standards
- Provision of acoustic enclosures on noise generating equipments (such as Air Blowers and DG Set) during operation.
- Periodic maintenance of equipments /replacing whenever necessary/ lubrication of rotating parts etc will reduce noise levels from operating equipments during construction and operation phase.
- In case of steady noise levels above 85-dB(A), initiation of hearing conservation measures
- Implementation of greenbelt for noise attenuation.

1.7.3 Hydrology, Surface water and Groundwater

Impact Identification

Surface Water Resources

The activity proposed for this project does not involve obstruction of streams or utilization of surface water, thus have no impact on the surface water resources.

Surface Water Quality

The tanks and structures constructed in the CETP are provided with bunding walls on sides in order to arrest any leakages or spillage. No chance of contamination of surface water is expected. Hence surface water quality will not have any adverse impact due to contamination of effluent waters.

Mitigation Measures on Surface Water

Following mitigation measures will be implemented for water pollution control:

- Storm Water drainage along with surface drainage is planned in the CETP with rain water harvesting and recharge system.
- Provision of storm water interceptors to arrest any accidental leakages and contamination of surface waters.
- All effluents containing acid / alkali / organic wastes will be properly equalized and treated in the CETP without any land discharge.
- Rejection of Tankers of units if parameters exceed the desired norms
- Effluents containing acid/alkali/organic/toxicwastes will not be accepted and reject tankers will be safely sent to clients end and ensured.
- Dewatering of sludges and appropriate disposal of solids shall be carried out. No leachates shall be disposed off on land.
- Proper operation of CETP in order to ensure treated effluents meets the specified disposal norms for discharge into VECL channel.
- Develop spill prevention plans in case of chemical discharges
- All chemical and fuel storage areas will have proper bunds so that contaminated run-off cannot meet the storm-water drainage system.

Ground Water Resources

16 KLD of groundwater will be drawn from the existing borewell within the site premises after expansion. Padra Taluka is not falling in semi-critical, critical and over-exploited zone specified by CGWA. The consumption of ground water resources is considerably reduced due to recycling and reuse of treated waste waters.

Ground Water Quality

Rain water harvesting and recharge is proposed to be provided in the CETP Premises which will have some storage of water to be used in non-monsoon periods. This will improve the ground water quality. Hence no adverse impact on ground water quality.

Mitigation Measures on Ground Water

The following mitigation measures will be implemented:

- Padra Taluka is not located in semi-critical, critical and over-exploited zone specified by CGWA. Hence, no special permission will be required to withdraw groundwater. At the same time, groundwater withdrawal will decrease from 86.5 KLD to 16 KLD only.
- Storm water drainage system shall be provided to collect surface runoff and recharge ground water.
- Regular Monitoring of ground water from existing borewell.

1.7.4 Land Environment

Impact Identification

During Construction Phase

For proposed expansion, construction of 4416 sq.m of treatment units will be carried out in same premises. No additional land will be acquired for proposed construction work so there will not be any change in landuse due to proposed expansion.

During Operation Phase

The CETP expansion is only treatment of untreated combined influents received from different member industry; its treatment meeting the specified norms and further disposal of treated effluents meeting GPCB norms in the estuary portion of river Mahi in Gulf of Cambay via VECL channel, thereby no adverse impact on the land environment.

Mitigation Measures

- Existing Landuse and green belt within the CETP premises will be maintained.
- Designated tankers having GPS are only used for untreated effluent conveyance from respective member industry to CETP premises. The same practice will be continued after proposed expansion hence tracking of tankers shall be done properly to avoid illegal disposal of untreated effluent; thereby minimizing risk of land pollution.

1.7.5 Soil

Mitigation Measures

- Store, preserve and protect topsoil separately to use it during restoration period; and domestic waste
- Carry out adequate restoration of soil, to the extent possible using the soil stored from piling and excavation activities;

1.7.6 Socio-economic Environment

Impact Identification

Critical analysis of the existing socio-economic profile of the area vis-à-vis its scenario with proposed project activities identifies the following impacts

- Currently 20 persons are employed by for operations. It is anticipated that additionally 20 numbers of persons will be employed during operation. This will make the total employment due to the project to a total of 40 persons.
- Due to proposed expansion, additional capacity for safe and environmentally sustainable mode of effluent treatment and disposal will be generated. At present, many units are not in position to establish operations, due to constrained capacity of EICL. The proposed project will therefore permit setting up of new units and allow expansion of existing units in operation, thereby generating additional indirect employment opportunities in Padra Taluka and Vadodara District.
- The activities would result in an increase in local skill levels through exposure to activities.

Mitigation Measures

- Development of traffic plan may be required as no. of tanker trips due to proposed expansion will increase, while the roads will remain same.
- Upgradation of roads and intersections may reduce traffic congestion due to higher tanker trips.
- Project proponent may provide educational aid to local villages based on need and request from the village Panchayat.

1.7.7 EICL Proposed Tanker Traffic Management

Due to increase in traffic of tankers on account of proposed expansion of CETP the existing road network, especially the Dhabhasa – Umraya Road needs upgradation and widening to cater for increased traffic conditions.

1.7.8 Ecology and Bio Diversity (Flora and Fauna)

Impact Identification

- Changes in activity pattern of terrestrial fauna due to tanker traffic.
- Loss of vegetation due to access cutting and site preparation.
- Accidental discharge of waste water may create impact on surrounding ecology if not handled properly.
- Final Disposal of treated effluents, after insufficient treatment in CETP may create impacts on ecology and surroundings due to its use by farmers and also on the aquatic marine life in estuary portion of river Mahi
- Dust generation due to vehicular movement may increase deposition of dust and dust settling on the vegetation may alter or limit plants abilities to photosynthesize and/or reproduce.

Mitigation Measures

- There is no direct discharge of wastewater in nearby water bodies as effluent will be sufficiently treated at CETP Umaraya and will be disposed off in VECL Channel.
- All the tanker trucks shall be leak proof and the driver shall be trained in handling the dangers posed during transport of such goods and is aware of safety rules for transportation of hazardous materials so that the chances of tanker over turning is very less.
- Acoustic enclosure shall be provided to DG set to reduce the noise intensity.
- There is no ecologically important area (e.g. National Park, Sanctuary) in the study area so impact on such areas is not expected.

1.7.9 Occupational Health and Risk

Operation of DG sets involves many occupational health hazards to the workers at site. DG sets will be operated only during power failure. Major failure modes identified in this project are small leaks in HSD storage tank. Release of HSD can occur from four scenarios.

- Release of HSD due to 10 mm hole in tank, 25 mm hole in tank, 50 mm hole in tank, and catastrophic failure of the HSD storage tank.

It is expected that EICL would have 0.775 KL (2 no) capacity tank for diesel storage.

Mitigation Measures

- Arrangement with periodical medical health check-ups for early detection
- Arrangement to dispose off the waste at approved disposal site
- Provision of preventive measures for potential fire hazards with requisite fire detection, fire-fighting facilities and adequate water storage

1.8 Environmental Management Plan (EMP)

The EMP provides a delivery mechanism to address potential adverse impacts and to introduce standards of good practice to be adopted for all project works. For each stage of the programme, the EMP lists all the

requirements to ensure effective mitigation of every potential biophysical and socio-economic impact identified in the EIA. The EMP covers the following:

- Role of EICL and its contractors;
- A comprehensive listing of the mitigation measures (actions) that EICL shall implement;
- The parameters that shall be monitored to ensure effective implementation of the action;
- The timing for implementation of the action to ensure that the objectives of mitigation are fully met.

1.9 Environmental Monitoring Plan

The Environmental Monitoring plan of EICL is presented as below:

S. No.	Activity	Schedule
Air Pollution Monitoring		
1	Ambient air monitoring of parameters specified by GPCB in their consents from time to time within the EICL's premises.	Once every Quarter.
2	Ambient air monitoring of parameters specified by GPCB in their consents from time to time at different station outside the project site.	Once every season at each station.
3	Stack monitoring of DG Set as given in air consent from time to time.	Once every Quarter for each stack
Water Pollution Monitoring		
1	Monitoring of analysis report of each tanker received from member units for parameters of pH, TDS, SS (Turbidity), COD and Specific Parameters such as total chromium.	Each tankers of member units daily
2	Monitoring of liquid effluent at various stages of treatment parameters such as pH, COD, BOD, SS, TDS, colour Ammonical nitrogen, TOC and Lead.	Daily when in operation
3	Monitoring of other parameters as per consent conditions	Once in a month
4	Monitoring of all effluent parameters by Environmental Auditor	Once in season
Solid waste Generation Monitoring/ Record Keeping		
1	Records of generation of ETP sludge of their dispatch to suppliers for refilling	Weekly
2	Record of generation of waste oils and their treatment	Daily
3	Records of generation, handling, storage, transportation and disposal of solid and hazardous wastes as required by hazardous waste authorization	To be updated daily
Environmental Audit		
1	Environmental statement under the EP (Act), 1986	Once in a year
2	Environmental Audit under the EP (Act), 1986	Twice in a year

1.10 Conclusions

It can be concluded on a positive note that after the implementation of the mitigation measures and environmental management plans, the project activities during the construction and operation phase would have manageable and on balance, the project would be beneficial to surrounding communities and the region. Due to proposed expansion, additional capacity for safe and environmentally sustainable mode of effluent treatment and disposal will be generated. At present, many units are not in position to establish operations, due to constrained capacity of EICL. The proposed project will therefore permit the operation of additional industries or allow expansion of existing member units, thereby generating additional indirect employment opportunities in Padra Taluka and Vadodara District.