1. Introduction

1.1 The City of Auroville

Auroville was founded as an international township of 50,000 inhabitants. The official inauguration took place on February 28th, 1968, with a formal ceremony around an urn into which earth from 124 countries was placed as a symbol of human unity. The project received unanimous endorsement at the General Conference of UNESCO in 1966, 1968, 1970 and 1983.

The city of Auroville is planned to cover a circular area of about 20 sq.km. The inner city area shall have a diameter of 2,5 km, and shall be surrounded by a 1,25 km-wide greenbelt of forest and farmland. The city is to be divided into four radial zones extending from the city centre: Cultural, International, Industrial, and Residential. Parks and green corridors are to be included within all of the zones. The township was established on a plateau with a maximum elevation of 52 m above sea level. It lies in the eastern coastal part of the South Arcot district of Tamil Nadu and to the North of the Union Territory of Pondicherry.

1.2 The Industrial Zone

In the 145-hectare Industrial Zone, primary development in the 'economic area' will be limited to environmentally sensitive manufacturing services and other non-polluting industries, professional consultancy offices, retail and wholesale distribution outlets, vehicle parking, industrial display areas, R&D staff quarters, related welfare facilities, parks and playgrounds, a crèche, canteen, rest rooms, kiosks and convenience stores. In the 'administrative area' of the Industrial Zone there will be a town hall and city level administrative offices, and in the 'vocational & research area' there will be vocational training centers and related laboratories. The adjacent area will be devoted to hostels, dwellings and guest houses, post and communication centers, retail stores and zonal level medical facilities.

1.3 Commercial units

At present there are around 125 active commercial units in Auroville, involved in the fields of architecture and construction, clothing and fashion, weaving and dyeing, computers and software, electronics and engineering, media and entertainment, food processing and catering, handicrafts, renewable energy, pottery, printing and publishing, shops and boutiques, gems and jewellery, travel and tourism, etc. The ownership of all these units is vested in the Auroville Foundation.

From the 125 or so active commercial units in Auroville, about 40 of these are situated within or in the vicinity of the Auroville Industrial Zone. The majority of these units are related to manufacturing and production services; all of these units are small scale industrial units, potentially less polluting.

1.3.1 Udyogam

Udyogam is a newly developed site located in the Auroville Industrial Zone. At Udyogam there is an attempt to bring together commercial units in Auroville so that they may develop and operate in a collective environment. For this purpose a cluster of commercial units is being developed at the Udyogam project site. At present three units including all common infrastructure are being planned at this site. This is a first attempt in Auroville to develop a planned site for commercial activities with integrated and common infrastructure.

The three units that are being developed at the Udyogam site and that are considered in this study are Naturellement, Aurosoya, and New School Crafts.

Naturellement

Naturellement is at present located at the Bharat Nivas and is engaged in food processing activities producing jams, pickles and other preserved foods. Their current production is about 1 ton per month. They anticipate that their production shall increase three-fold when they move to their new production facility at Udyogam.

Aurosoya

Aurosoya is at present located at the Bharat Nivas and is engaged in food processing activities related to soya bean processing. Their principal products are soya milk and tofu. Their current production is about 65 kg per week. When they shall move to their new production facility at Udyogam, they shall be mechanizing their process and therefore expect to increase their production.

New School Crafts

New School Crafts is at present located at Aurobhrindavan and is engaged in food processing activities such as the production of syrups and dried fruits (mukhvas). Their present production capacity is about 40 litres of syrup per day. When they shall move to their new production facility at Udyogam they expect to increase their production.

1.3.2 Aurobhakti

Aurobhakti is located in the Auroville Industrial Zone and houses several commercial units. These are detailed in the table below:

Unit	Activity
• **Aladin**	manufacture of lampshades
• **Auroville Energy Products**	manufacture of wind energy systems
• **Gecko**	manufacture of garments
• **Mereville Trust**	manufacture of incense
• **Rangoli**	manufacture of garments
• **Plastic Sea Songs**	manufacture of woven plastic products

1.4 Wastewater Management in the Auroville Industrial Zone

1.4.1 Current situation:

The density of commercial units in the Industrial Zone is rather low, less than 1 unit per hectare. Common basic infrastructure such as proper roads, and water supply and drainage networks is virtually lacking. As a result of that, most of the existing units have developed their own individual and decentralized infrastructure, including that for wastewater management.

Because of limited financial resources and the lack of proper knowledge in many instances, wastewater treatment in these units is undertaken in a rudimentary manner and at its best primary treatment through improvised septic tank systems is given to the wastewater. In a few instances some form of secondary treatment of wastewater through individual decentralized wastewater treatment systems is being attempted with varying degrees of success.

More recently, as a result of the gradual and planned increase in density of commercial units and production of goods in the Industrial Zone, the problem of pollution caused by wastewater has been more and more recognized and addressed by planners and environmentalists. It is in this context that a Common Wastewater Treatment Plant (CETP) for the proper management of wastewater is being envisaged.

1.4.2 Planned and proposed initiatives:

It is a well-established and demonstrated fact that in most instances common and centralized infrastructure especially that for wastewater management in commercial and industrial areas is preferable to individualized solutions. However, given the nature and trends of development in the Auroville Industrial Zone it appears that complete centralization of infrastructure is at present neither required nor feasible. Therefore an approach for the development of semi-centralized infrastructure through the use of Decentralized Treatment Systems (DTSs) for the common management of wastewater shall be considered in this study. It is in this context that the feasibility of setting up a small- to medium-scale CETP in the Auroville Industrial Zone is studied.

This study therefore investigates the feasibility of setting up a small to medium-scale CETP for the management of wastewater from the localities of Udyogam and Aurobhakti.

1.5 Organization and management of current study

This pre-feasibility study was conducted by Kraft & Associates, Pondicherry, India in association with Kraft Ingenieurburo, Berlin, Germany.

The current study considered wastewater-related information for existing and projected scenarios. Presently, there are no units operating at Udyogam as the site and units are still

being developed. Therefore, data from Naturellement, Aurosoya and Avatar was collected from their respective locations at Bharat Nivas and Aurobhrindavan.

Data were gathered from interviews with the various concerned unit holders and planners. The following units and organizations were approached:

- Naturellement,
- Aurosoya,
- Avatar,
- Aurobhakti,
- Auroville's Future,
- Industrial Zone Monitoring Group,

Site visits and collection of data through filed measurements sampling in some instances was also conducted. Gathered data were processed by Kraft Ingenieurburo and accordingly concepts and preliminary designs were developed.

Budgetary Cost estimations and the pre-feasibility study report were elaborated by Kraft & Associates.

1.6 Terms of Reference (TORs)

The TORs for the pre-feasibility study were:

→ Identification and clarification of tasks,
→ Establishment of limits of planning tasks,
→ Determination of scope of work and required preparation work,
→ Reconnaissance and site visits including interviews,
→ Compilation of collected information,
→ Compilation of concepts and ideas needed for planning,
→ Determination of extraordinary conditions,
→ Elaboration of concepts for proposal,
→ Preliminary assessment of feasibility of proposal,
→ Elaboration of Budgetary Estimates,
→ Indication of planning schedule,
→ Preparation of a Report,

Collection of basic planning data:
The following basic data were collected compiled, assessed, evaluated and processed:

- Information related to production:
  - number and category of employees at each facility,
  - nature of production,
  - volume of production,
  - materials used for production,
  - production process(es),

- growth of production,

- Freshwater related information:
  - source of freshwater,
  - volume of freshwater used from each source,
  - physical, chemical and bacteriological parameters of freshwater used,
  - purpose of freshwater consumption,
  - variation(s) in freshwater consumption,

- Wastewater related information:
  - volume of wastewater produced from each stream,
  - major constituents of wastewater,
  - physical, chemical and bacteriological parameters of wastewater produced,
  - variation(s) in wastewater production,
  - wastewater collection and drainage system(s),
  - existing wastewater treatment system(s),
  - existing wastewater disposal methods and systems,

- Information related to the site:
  - site plans indicating layout of buildings and existing infrastructure, wastewater streams, ground levels, vacant lands, land available for wastewater treatment, location and details of wells and water bodies, other proposed developments, land use plans, etc.,
  - building plans indicating areas of wastewater production and details of wastewater outlets,
  - detailed survey maps of lands used for wastewater related infrastructure,
  - physical, meteorological and ecological conditions present on the site (e.g. nature of soil, seasonal and climatic conditions, type of natural habitats, etc.,).