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***Executive Summary***

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## Executive Summary of draft EIA report for M/s. Shivashakti Sugars Limited

### 1.0 PREAMBLE:

M/s Shivashakti Sugars Limited (SSL) has acquired an area of 85.36 Acres (34.56 Hectares) in Survey Nos. 177 (Part), 178/1A, 178/1B & 178/2 of Saundatti village & Survey Nos. 5/1, 6/1A, 6/1B, 6/2A, 6/2B, 7/2, 95/2, 95/3, 98/1A, 98/1B-1, 98/1C, 98/2, 99/1, 99/2, 99/3 & 99/4 & parts thereof of Yadrav (Yedravi) village falling under the revenue limits of Raibag (Rayabag) Taluku, Belagavi district of Karnataka State. SSL is operating a Sugar Plant of sugar cane crushing capacity of 4800 TCD along with a cogeneration plant of 15 MWhr power. Based on the feasibility reports & availability of sugar cane SSL has decided to upgrade the sugar cane crushing capacity from 4800 TCD to 10000 TCD & Cogeneration of power from 15 MWhr to 60 MWhr at a project cost of Rs. 277.28 Crores.

Existing buildings are spread over an area of 4.123 Hectares (10.142 acres). Proposed expansion of sugar & cogeneration plants shall be located in an area of 2.439 Hectares (6.0 Acres). Around 8.07 Hectares (19.93 acres) has been developed as green belt. Around 4 hectares (9.88 acres) shall be developed as green belt in the proposed expansion. The balance area of 16.563 Hectares (40.745 acres) shall be vacant land. The land requirement for the proposed expansion is 6.0 acres & the land is already in possession of the company. The total water requirement shall be 6205m<sup>3</sup>/d. The wastewater generation shall be in the form of process wastewater from sugar & non process wastewater from cogeneration plant.

### 1.1 NEED OF PUBLIC HEARING

The proposed expansion requires environmental clearance from State Environmental Impact Assessment Authority (SEIAA) Karnataka, Bengaluru duly constituted by Ministry of Environment & Forests (MOEF), New Delhi based on September 2006 notification on environment impact assessment (EIA) issued by MOEF. Hence, SSL submitted an application for environmental clearance to (SEIAA) Karnataka, Bengaluru for terms of reference (TOR) approval for the expansion of Sugarcane crushing capacity and increase in power generation from Cogeneration plant. TOR was approved during the State Level Expert appraisal committee (SEAC Karnataka duly constituted by MOEF) meeting held in the month of August 2015 held at M.S. buildings Bengaluru. SEIAA Karnataka issued TOR, vide letter no. SEIAA IND 17 on September 10, 2015.

### 1.2 HIGHLIGHTS OF THE PROPOSED EXPANSION

|  |  |
|--|--|
| <b>Name of the Promoter / company<br/>Factory Site</b>       | M/s Shivashakti Sugars Limited, Yadrav & Saundatti Villages, Raibag [Rayabag] Taluku, Belagavi District of Karnataka State                 |
| <b>Constitution &amp; Type :</b>                             | Limited Company  |
| <b>Products &amp; By Products</b>                            | 1. Sugar<br>2. Cogeneration power  |
| <b>Installed Capacity of<br/>the Project after Expansion</b> | 10000 TCD Sugar<br>60 MW cogen plant (New)   |
| <b>Working days per annum</b>                                | Sugar plant : 180 to 270 days (Existing)<br>Cogen Plant: 180 to 300 days (Existing)<br>After expansion the same routine shall be followed. |
| <b>Raw material<br/>requirement per annum</b>                | Sugar cane : 1800000 MT to 2700000 MT<br>Bagasse : 450000 MT to 675000 MT  |
| <b>Proposed Project Cost</b>                                 | Rs 277.28 Crores   |
| <b>Estimated cost of environment protection</b>              | Rs. 45 Crores  |

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### Connectivity:

The proposed expansion shall be situated in the existing project site located at Yadrav & Saundatti villages falling under the revenue limits of Raibag Taluku, District Belagavi, Karnataka State. The site is connected by broad gauge railway line of South Western railway on Hubli- Miraj section. Nearest railway line connecting Hubli to Miraj of South Western Railway line is located at a distance of 9.5 Kms in SE direction from the site. The nearest railway station is Raibag which is at 9.7 Kms in ESE direction from the project site. Miraj in Maharashtra is a railway junction situated at 36 Kms in NE direction from the project site. Belagavi is the district place & has a major railway station which is at a distance of 78 kms in SSW direction to the project site.

### 1.3 RAW MATERIAL AND SUSTAINABILITY OF PROJECT

#### Sugar Plant

Raw material for the plant is sugarcane is available in ample quantity for the plant. The sugar factory requirement at 100% capacity is 18.0 lakhs MT to 27.0 lakhs MT. Sugar factory is situated in the sugarcane growing area close to various sources of water in command area.

#### Cogen Power Plant

SSL is currently operating a boiler of capacity of 120 TPH with a steam pressure of 110 Kg/cm<sup>2</sup>. SSL is having a standby boiler of 85 TPH operating at a steam pressure of 87 Kg /cm<sup>2</sup> (**This shall be kept as a standby boiler even after the proposed expansion**). SSL shall install a new boiler of 130 TPH in the proposed expansion. SSL shall implement the expansion of cogeneration power plant keeping in view of availability of additional bagasse from the Sugar plant. During the non availability of bagasse imported coal shall be used. This shall be obtained from New Mangaluru Port.

The expansion of cogeneration plant shall mainly comprise of the following configuration:

- a. Bagasse / biomass (85% or 100% heat input) & Coal (15% or 100% heat input) fired steam boiler of 130 TPH
- b. Turbine generator – 45 MW

Power generation process shall be based on Rankine Steam cycle. The steam generated in the boiler when expanded through a turbine, turns the turbine shaft which is tandem coupled to an electric power generator. The exhaust steam coming out of the turbine shall be used for process (heating the juice heaters, evaporators and pans).

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**1.4. WATER REQUIREMENT:**

**WATER BALANCE WITH CONSUMPTION & DISCHARGE DETAILS (m<sup>3</sup> / d)**

| <b>Sl. No.</b> | <b>Particulars of Water Requirement</b>  | <b>Consumption</b> |
|----------------|--|--------------------|
|                | <b>WATER IN TO SYSTEM</b>  |                    |
| <b>1A</b>      | <b>Source :</b> Fresh water from river / bore wells  | <b>718.00</b>      |
|                | <b>Usage:</b> Domestic use in factory  | 40.00              |
|                | Laboratory   | 02.00              |
|                | For boiler & cooling tower requirements  | 676.00             |
|                | <b>Total</b>   | <b>718.00</b>      |
| <b>1B</b>      | Water intake from condensate (moisture content) in sugar cane juice                              | 5487.00            |
|                | <b>Total of 1A &amp; 1B</b>  | <b>6205.00</b>     |
|                | <b>Waste water generation:</b>   | <b>Discharge</b>   |
| <b>I</b>       | From Process ( including Laboratory & floor wash )   | 1000.00            |
| 1)             | Water Treatment Plant reject (Cogen)   | 85.00              |
| 2)             | Boiler blow down (Cogen) (2% of 250 TPH)   | 120.00             |
| 3)             | Cooling tower blow down (Cogen)  | 760.00             |
| <b>II</b>      | <b>Total Effluent from sugar &amp; cogen</b>   | <b>1965.00</b>     |
| <b>III</b>     | <b>Domestic Sewage</b>   | <b>32.00</b>       |
| <b>IV</b>      | <b>Excess Vapour Condensate recycled back</b>  | <b>60.00</b>       |
| <b>V</b>       | <b>Losses</b>  |                    |
|                | i) Vapour losses to Atmosphere   | 800.00             |
|                | ii) Vapour & drift loss at bearing (mill & turbine) cooling water                                | 180.00             |
|                | iii)Vapour & drift loss from cooling tower   | 670.00             |
|                | iv) Vapour & drift loss from T.G. set cooling tower  | 110.00             |
|                | v) Steam losses at traps & vent at 1% on cane  | 100.00             |
|                | vi) Domestic water loss  | 8.00               |
|                | vii)Vapour loss at crystallization & centrifugation  | 260.00             |
|                | viii)Flash vapour loss at clarifier  | 100.00             |
|                | ix) Vapour loss at mill  | 100.00             |
|                | x) Water Going along with Products & by products viz. Sugar, Bagasse, Molasses, press mud Losses | 1820.00            |
|                | <b>Total Losses</b>  | <b>4148.00</b>     |
|                | <b>Total of II, III, IV &amp; V</b>  | <b>6205.00</b>     |

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### 1.5 BASELINE ENVIRONMENTAL STATUS

#### 1.5.1 PHYSICAL ENVIRONMENT

##### Site Location and its Surroundings

| Sr.no | Features  | Details  |
|-------|---|--|
| 1     | Location  | Yadrav & Saundatti Villages, Raibag [Rayabag] Taluku, Belagavi District  |
| 2     | Altitude  | 560m above MSL   |
| 3     | Longitude   | At 74° 43' 19.27" E  |
| 4     | Latitude  | At 16° 31' 33.29" N  |
| 5     | Max. Temp. (°C)   | 40.0   |
| 6     | Min. Temp. (°C)   | 7.7  |
| 7     | Relative Humidity %   | 26 to 91   |
| 8     | Annual rainfall mm  | 1063.6   |
| 9     | Land availability   | 85.36 acres  |
| 10    | Topography  | Slightly undulating  |
| 11    | Soil Type   | Predominantly clayey   |
| 12    | Nearest Water bodies  | Krishna River – 3.7 kms* – NW<br>Savali Halla - 7.4 kms W<br>Arka Halla - 2.7 kms SW   |
| 13    | Nearest Highway   | Bengaluru to Pune 40 kms - W   |
| 14    | Nearest Railway station   | Rayabag (Raibag) 9.7 kms in ESE  |
| 15    | Nearest Villages  | Yadrav– 0.4 km – ESE<br>Saundatti – 3.1 kms – NNW<br>Saundattiwadi Hamlet – Adjacent in N<br>Nava Diggewadi - 2.5kms – NE<br>Kachkawadi – 2.4 kms – E<br>Nandikurli – 3.3 kms –SSW<br>Nasalapur– 3.4 kms – W |
| 16    | District Place  | Belagavi – 75 kms - SSW  |
| 17    | Nearest Air ports   | Kolhapur airport – 44 kms – WNW<br>Belagavi airport – 74 kms – SSW   |
| 18    | Nearest reserve Forest  | Saundatti RF – 0.2 km - W  |
| 19    | Historical places, Monuments, Heritage sites, wild life sanctuaries, national parks, elephant / tiger reserves, Eco Sensitive zones | None within 10 kms radius  |

\*all distances mentioned in the above table are aerial distances

The Project site is located in Yadrav & Saundatti villages falling under the revenue limits of Raibag Taluku, District Belagavi of Karnataka State with an average MSL of about 560 m. The site falls at 16° 31' 33.29" N Latitude and 74° 43' 19.27" E Longitude. Part of the study area falls within the Survey of India Toposheet No. 47 L/10 (Scale: 1:50000). The study area of 10 Kms radius is covered under Survey of India Toposheet nos. 47 L/10, 47 L/11, 47 L/14 & 47 L/15 [1:50000 scale].

The area is well connected by road. The State Highway (SH-12) connecting Sankeshwar to Bijapur is located at a distance of 6.0 Kms in Western direction to the project site. The National Highway (NH - 4) connecting Bengaluru to Pune is at a distance of 40 Kms in Western direction to the project site. Belagavi is the district head quarters located at a distance of about 75 Kms in SSW from the project site. The nearest airports are Kolhapur airport in Maharashtra state at a distance of 44 Kms in WNW direction & Belagavi airport in Karnataka at a distance of 74 Kms in SSW direction.

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Saundatti reserve forest (RF) is at a distance of 0.2 Km in Western direction to the project site. Sivaji Park RF is at a distance of 1.9 Kms in SE direction to the project site. Rajaram park RF is at distance of 5 Kms in SE direction to the project site.

There are no wild life sanctuaries, national parks and elephant / tiger reserves within 10 Kms radius of the study area.

### 1.5.2. TOPOGRAPHY

The project site area has plane topography with some part having slight undulation.

#### Salient Features of baseline Environmental Studies

| Parameters                | Study   | Inference  |
|---------------------------|---|--|
| Micrometeorological Study | Wind Profile, Temperature, Humidity, rainfall   | To assess air pollution impacts on neighboring environment |
| Air Quality Data          | Particulate Matter PM10 and PM 2.5 micron Sulphur Dioxide( SO2) Oxides of nitrogen ( NOx) Carbon Monoxide ( CO) | To assess air quality                                      |
| Noise Quality             | Noise   | To identify Noise levels                                   |
| Water and Soil Study      | Physicochemical analysis  | To assess quality of water & soil                          |
| Socio-Economic Study      | Demography and occupation & Amenities in the area   | To assess human index                                      |

### 1.5.3. Monitoring locations for Air, Noise, Soil, & Water with Direction

| Sl. No. | Name of the Sampling Points | Direction w. r. t. the plant site in Kms | Distance w. r. t. the plant site in Kms |
|---------|-----------------------------|--|---|
| A1      | Plant Site                  | -  | -                                       |
| A2      | Saundatti                   | 3.1                                      | NNW                                     |
| A3      | Yadravi                     | Adjacent                                 | N                                       |
| A4      | Nava Diggewadi              | 2.5                                      | NE                                      |
| A5      | Kachkawadi                  | 2.4                                      | E                                       |
| A6      | Hanabarahatti               | 3.3                                      | SSW                                     |

### 1.5.4 Air Environment

| CODE | Location Name  | 98 <sup>TH</sup> PERCENTILE VALUES |                   |                 |                 |
|------|----------------|------------------------------------|-------------------|-----------------|-----------------|
|      |                | PM <sub>10</sub>                   | PM <sub>2.5</sub> | SO <sub>2</sub> | NO <sub>x</sub> |
| A-1  | Plant Site     | 52.2                               | 26.0              | 8.5             | 10.7            |
| A-2  | Saundatti      | 48.6                               | 25.4              | 9.1             | 11.4            |
| A-3  | Yadrav         | 49.4                               | 22.0              | 9.6             | 10.4            |
| A-4  | Nava Diggewadi | 50.3                               | 23.5              | 8.8             | 10.2            |
| A-5  | Kachkawadi     | 51.2                               | 22.7              | 7.8             | 9.5             |
| A-6  | Hanabarahatti  | 53.0                               | 21.8              | 9.4             | 10.9            |

*Note: CO values are observed less than 1 ppm during study period.*

The ambient air quality observed during the study period is well within the prescribed National Ambient Air Quality Standards.

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### 1.5.5 Noise Environment

The noise levels observed on all locations were in the range of 49.7 - 53.6 dB (A) during daytime and in the range of 38.5 - 43.1 dB (A) during night time.

| Sr. No. | Monitoring Location/ Village | Day time Noise Level in dB(A)<br>Leq(D) | Night Time Noise Level in dB(A)<br>Leq(N) | CPCB Standards in dB(A) |                        |
|---------|------------------------------|---|---|-------------------------|------------------------|
|         |                              |   |   | Day Time Noise Level    | Night Time Noise Level |
| 1       | Plant Site                   | 52.3                                    | 43.1                                      | 75.0                    | 70.0                   |
| 2       | Saundatti                    | 50.6                                    | 39.8                                      | 55.0                    | 45.0                   |
| 3       | Yadravi                      | 53.1                                    | 42.9                                      | 55.0                    | 45.0                   |
| 4       | Nava Diggewadi               | 53.6                                    | 41.6                                      | 55.0                    | 45.0                   |
| 5       | Kachkawadi                   | 51.8                                    | 39.3                                      | 55.0                    | 45.0                   |
| 6       | Hanabarahatti                | 49.7                                    | 38.5                                      | 55.0                    | 45.0                   |

### 1.5.6 Water Quality

The ground water quality at six locations was monitored. It was observed the hardness of water was in the range of 305 to 590 mg/l which is not on higher side. All the samples were found within the limits specified by IS 10500 except surface water samples.

### 1.5.7 Biological Environment

The study of Flora and Fauna in the 10 kms radius from the project site was carried out. The eco sensitive and wild life sanctuary was not found in 10 Km radius. In the study area trees like Neem, Tamarind, Karanj, Umber, Pipal, Babul and some common trees were observed. As regards fauna is concerned Mongoose, jackal, Squirrel were among the mammals, frog from amphibian, Naja-Naja, Viper from reptiles were noticed. Among the avifauna, Drango, Parrot, Crow, and Green bee eater were found.

## 1.6. ENVIRONMENTAL IMPACT PREDICTION

Environmental impact in the study area reflects in any changes of environmental conditions, adverse or beneficial effects caused or induced by the impact of project if implemented. Superimposition of predicted impact over pre-project base line data shows final picture of environmental conditions. Step of quantitative impact prediction leads to decide suitable environment management plan needed to implement before initiation of project, commissioning stage to mitigate adverse effects on environmental quality. Plant involves activities to set up a plant, machinery, create infrastructure to transport raw material, finished products. It causes various impacts on air & water quality, noise levels, socio-economic environment etc. Next steps describe a brief description of the environmental impacts of proposed Cogen project in construction and operational phases and methodology and results of mathematical and simulation models used in their prediction.

### 1.6.1 IMPACT DURING CONSTRUCTION PAHSE

The construction phase is expected to be one year. The activities will have impact on land environment, water, air, noise level, soil quality and socio economic However, the expansion doesn't involve much construction activity. Therefore its impact on Air Quality, Water Quality, Noise and soil will not be notable. As a matter of fact this activity will have positive impact, as far as socio-economic culture of the people in the vicinity. The construction activity effect will be restricted to factory area.

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### 1.6.2 IMPACT DURING OPERATIONAL PHASE

The operational activities of the plant after expansion will have little impact on physical environment (air & water quality, noise level, cropping pattern etc.) and on socio-economic environment. The solid waste generated shall be utilized in compost manufacture and brick makers which has positive impact. The impact on Air, Noise & Cropping Pattern are the dimensions of Physical environment which are likely to be affected on account of power generation activities.

#### 1.6.2.1 Impact on Air Environment

Prediction of impact on air environment is an important component in environmental impact assessment studies. Several techniques and methodologies are in vogue for predicting the impacts due to proposed industrial development on physico-ecological and socio-economic components of environment. Such predictions are superimposed over the baseline (pre-project) status of environmental quality to derive the ultimate (post-project) scenario of environmental conditions. The quantitative prediction of impacts lead to delineate suitable environmental management plan needed for implementation during the commissioning of proposed activities and in its operational phase in order to mitigate the adverse impacts on environmental quality.

Mathematical models are the best tools to quantitatively describe the cause effect relationship between source of pollution and different components of environment. In case, mathematical models are not available or it is not possible to identify/validate model for a particular situation, predictions are arrived through available scientific knowledge and judgment.

#### Air Quality Prediction

The impact on air quality due to emissions from single source or group of sources is evaluated by use of mathematical models. When air pollutants are emitted into the atmosphere, they are immediately diffused into surrounding atmosphere, transported and diluted due to winds. The air quality models are designed to simulate these processes mathematically and to relate emissions of primary pollutants to the resulting downwind air quality. The inputs include emissions, meteorology and surrounding topographic details to predict the impacts of conservative pollutants.

SSL's proposed of expansion of cogen unit of 15 MW to 60MW, requires 2500 MT per day bagasse as fuel for boiler when operated on 100% bagasse. This expansion of the cogen project meets the heat & power needs of SSL and excess power shall be exported to the KPTCL grid.

#### Stack Details of Proposed Plant

| Sr. No. | Stack  | Fuel (T/Hr) | Emission Rate (g/s)                     | Stack Height (m) | Diameter (m) | Exit Gas Temp. (K) | Velocity (m/s) |
|---------|--------|-------------|---|------------------|--------------|--------------------|----------------|
| 1       | Boiler | 130         | 0.06 (ESP shall work at 99% efficiency) | 90               | 3.5          | 413                | 16             |

#### OVERALL SCENARIO

The maximum ground level concentration due to emissions boiler are superimposed on the maximum baseline concentrations obtained during the study period. The overall scenario with predicted concentrations over the baseline is shown below.



OVERALL SCENARIO (~g/m<sup>3</sup>)

| 24-Hourly Concentrations                   | GROUND LEVEL CONCENTRATIONS |                                    |                          |
|--|-----------------------------|------------------------------------|--------------------------|
|  | Particulate matter (PM10)   | Sulphur dioxide (SO <sub>2</sub> ) | Oxides of Nitrogen (NOx) |
| Baseline Scenario (max)                    | 53.0                        | 9.60                               | 11.40                    |
| Predicted Ground level Concentration (Max) | 0.065                       | 2.96                               | 9.757                    |
| Overall Scenario                           | 53.065<br>{100}*            | 12.56<br>{80}*                     | 21.157<br>{80}*          |

\*NOTE: The values in parentheses is the CPCB limit for Industrial, rural & residential areas.

1.6.2.2 IMPACT ON WATER ENVIRONMENT

The earth work includes cutting and filling. Excavation activities shall be avoided during rainy season and shall be completed during the winter and summer seasons. Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken. Settling pond is planned for storage and recycling of surface water for use in the plant area. The development of green belt in and around plant will be taken up during the monsoon season. New in plant roads shall be metalled / concreted. Toilets with septic tanks are available at site for construction workers. The overall impacts on water environment during construction phase due to proposed activity are temporary and marginal.

1.6.2.3 Impact On Noise Levels

The equipment in the sugar plant and cogeneration plant are / shall be designed for noise levels not exceeding 90 dB (A). Proper encasement of noise generating sources is / will be done to control the noise levels below 75 dB (A) at plant boundary.

The steam turbine generator is / shall be provided with acoustic enclosures and silencers in the exhaust. The steam turbine is housed in a closed building which is considerably reducing the noise. In case of maintenance, the persons working near the steam turbine generator building are provided with ear muffs.

A scientifically designed thick greenbelt in an area of 8 Ha is being developed all around the plant which is acting as noise barrier.

In general the following methods were adopted to control the noise pollution from the proposed units

- The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows.
- The use of complete or partial enclosures.
- Attenuation by use of sound absorbents on walls and fixed or suspended ceilings
- Introduction of control and monitoring rooms having good sound insulation properties.
- The reduction or elimination of noise leakage paths
- The use of vibration insulation techniques

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- The use of ducts and plenum chambers

The use of mufflers, sound attenuation and acoustic louvers in air flow paths, taking particular care to direct inlet and discharge an opening away from critical areas wherever possible, so as to take advantage of direct effects.

### Impact of Vehicular traffic

As a matter of fact of Power Plant does not invite heavy vehicular traffic at the site. There will be an increase in the traffic to and fro from the site. Vehicles used for transportation of sugarcane would be bullock carts, Tractors and Trucks whereas; utility vehicles used for various purposes would be buses, Jeeps, cars and ambulances. Assuming that based on the increase in traffic, the effect on noise level at surrounding villages calculated by using following equation is found to be 42 dB(A).

$$L_{eq}(h)_i = L_{OE} + 10\log(N_i/S_i * T) + 10\log(15/d)^{(1+a)} + \Delta_S - 13$$

Where,

$L_{eq}(h)_i$  is the  $L_{eq}$  at hour h for the  $i^{th}$  vehicle type i.e. autos, medium trucks or heavy trucks.

$L_{OE}$  is the reference mean energy level for the  $i^{th}$  vehicle type. This is the noise emission level for a given vehicle type and is found out by measurement.

$N_i$  is the number of class I vehicles passing during the time T.

$S_i$  is the average speed of the  $i^{th}$  vehicle class in km/hour.

D is the perpendicular distance in meters from the centre line of the traffic lane to the location where noise level is to be predicted.

a- is a factor, which relates to the absorption characteristics of the ground cover between the roadway and the receptor location.

$\Delta_S$  is the shielding factor such as provided by the noise barrier.

Impact of traffic noise after superimposing on background noise level results in the noise level of 45 dB(A), which is less than Karnataka Pollution Control Board limits for rural and Residential area. Hence noise level impact of the traffic is negligible.

### Impact on Topography

The area of the proposed plant is more or less flat terrain. It is predominantly covered with fine to medium grained clay loam as top soil with underlying compacted dense sand. During the construction phase levelling would be required. Apart from the localized construction impacts are confined to the plant site & no significant long term adverse impact on topography is envisaged.

### Impact on Soil

The activities involved in clearing the site for the various units of the production plant such as process units, buildings, raw materials & finished goods sheds, construction of roads, laying of the pipelines (water supply, effluent, telephone, power supply, etc.) would generate topsoil which needs proper management. As the existing ground level of the study area is more or less flat terrain without significant level differences it may not require any major excavation.

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### **Mitigation Measures**

The following measures will be adopted:

- After completion of the construction, the surplus earth will be utilized to fill up the low lying areas, the rubble will be cleared and all un-built surfaces will be reinstated;
- The top soil from the excavated areas will be preserved for re-use during plantation;
- Green belt development will be taken up during construction phase so that the plantations grow to adequate height by the time of commissioning of the plant.
- Species selected for plantation will be fast growing & adapting to local conditions.

### **Socio-economic Environment**

Like other sugar factories SSL is also located in an isolated area. SSL management thought that it would be advantageous to improve the living conditions of people in and around the plant site. It also proposes to employ local skilled and unskilled workers in the proposed expansion of sugar & cogeneration plants. It will therefore generate employment in the local area. It will resolve power crisis and will enhance earnings for village people. In turn local people can avoid uncertainty of jobs, raise their living standards, do supplementary jobs of cane & other farming, cattle, poultry, brick making unit etc. thus to stabilize & prosper in life. This will surely make a positive impact.

#### **1.7 ENVIRONMENT MANAGEMENT PLAN**

##### **1.7.1 Air Pollution control**

The following measures shall be adopted for the control of emissions in the sugar and cogen unit

- Air pollution control equipment like Electrostatic precipitator shall be installed to reduce ground level gaseous emission concentrations.
- Maximum number of bullock carts will be used to transport sugarcane from the farms to the mill site as far as possible which is an environment friendly way out.
- It will be ensured that all vehicles used in transportation have PUC Certificate. It is proposed to have an auto exhaust emission monitoring equipment and trained manpower to carry out PUC checks at regular intervals.
- SSL has laid all internal roads as tar roads and regular water sprinkling shall be carried out on all the rough roads in the proposed expansion to prevent fugitive dust emissions during road making.
- Tree plantation to the extent of 30% of area to lessen environmental impacts of the proposed activities over a period of time shall be implemented. Plantation program shall be designed and a budget shall be allocated for this purpose every year. Initially plantation was carried out along the boundary wall of the plant. Plantation shall be carried out perpendicular to wind direction on the downwind side of SSL to check the flow of dust along with wind. Subsequently plantation activities may be undertaken in remaining area.
- Speed breakers on roads at regular intervals all over the plant area and / or attachment of speed locking system to the accelerators of all vehicles will be used to restrict a speed limit of 20 Kms/h.
- Construction of vehicle parking area having at least brick on edge flooring is planned.
- No overloading of bullock carts, Trucks, trailers used in transporting sugar cane from the agriculture fields to the plant area will be permitted.

##### **1.7.2 Noise Pollution Control**

Relevant noise emitters at SSL are noise-making equipments such as cutters, crushers, mixers, compressors, pumps, centrifuges, blowers, cranes, conveyor belts, vacuum filters, boilers, turbo generator etc. All the equipment produce continuous noise. Noise level impacts of SSL operations are significant only on the operators of machinery and are negligible within buffer zone. This is because

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the noise produced by this machinery gets dissipated due to wave divergence, atmospheric absorption and absorption by noise barriers before being even felt in the buffer zone.

The continuous hammering of noise on the ears of the staff working in the factory premises may lead to some health problem like partial hearing disability, later permanent hearing disability which can be circumvented in plant by proper covering of machines, insulating screens, isolation with polycarbonate sheet or glass partition where in officers can carry out day-to-day work peacefully. Following measures are proposed to lessen noise level impacts on machinery operators and within core and buffer zone of **SSL**.

- Proper lubrication and regular maintenance of all the machinery used.
- Development of greenery / barriers / landscaping of trees/ bushes and shrubs on 8.07 ha.
- Reduced noise exposure to the operators of machinery by work scheduling and by providing ear protective equipment.
- Use rubber sheets in packing in the foundations of machineries to prevent noise transmission to the surrounding.
- Proper isolation & due covering with noise absorbing screens in noise creating areas to make them noise proof.

### **Water Pollution control**

A network of planned storm water drainage is provided and maintained. Rain water harvesting will be carried out to reduce the load on fresh water uptake from river. It will also increase ground water table. Wastewater generation will almost be nil during rainy season and thus its disposal will not be in the picture.

#### **1.7.2.1. Effluent Treatment Plant for Sugar and Co-generation**

Effluent treatment Plant for Sugar & Cogen operations shall have the following distinct advantage:

The effluent shall be treated and the organic loading shall be polished to an extent that the treated water may be reused for

- Plant Floor washings
- Make-up water for cooling tower
- Development of Green Belt, Landscaping and
- Captive Irrigation etc.

Fresh water drawl is avoided to that extent and conservation of water in a broader perspective is achieved. This is particularly of economic significance as fresh water is being sourced from about a distance of 3.7 Kms.

The treatment scheme incorporated is two stage aerobic treatment method for the effluent with the state of the art of diffused Aeration Technology.

#### **1.7.3 SOLID WASTE MANAGEMENT**

Fly ash collected from the ESP hoppers, the air-heater hoppers and the ash collected from the furnace bottom hoppers can be used as landfill, during the seasonal operation of the plant, when Bagasse will be the main and only fuel for burning. The ash content in Bagasse is less than 2 %. In cane trash and the other biomass fuels proposed to be used the ash percentage will not exceed 10%. The total fly ash collected during off season could be used in landfill. The high potash content in the Bagasse ash suits its use as good manure. As the filter press mud from the sugar plant also has a good land nutrient

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value, it is proposed to mix the ash and the press mud and sell the same to the farmers to be used in the cane fields. The maximum ash generated using Bagasse, biomass and cane trash as fuels will be about 6750 MTPA. This generated ash if extra (i.e. not lifted by the farmers), will be given freely to entrepreneur to convert to bio compost, brick producers.

| Sl. No. | Description of by products / Solid Waste | Quantity per month in MT |                 | Mode of Disposal  |
|---------|--|--------------------------|-----------------|---|
|         |  | Existing                 | After Expansion |   |
| 01      | Molasses                                 | 5760                     | 12000           | Shall be sold as raw material for manufacturing of Rectified Spirit   |
| 02      | Bagasse                                  | 46080                    | 96000           | Used as fuel for captive power generation                             |
| 03      | Press mud                                | 5760                     | 12000           | Shall be mixed with boiler ash and given as manure to member farmers. |
| 04      | Boiler ash                               | 393                      | 783             | Shall be mixed with press mud and given as manure to member farmers.  |
| 05      | ETP Sludge                               | 54                       | 108             | Shall be used as manure within premises                               |

### 1.7.4 GREEN BELT DEVELOPMENT

Tree plantation is one of the effective remedial measures to control the Air pollution and noise pollution. It improves aesthetics and climate of the area as well as sustains and supports the biosphere. It is an established fact that trees and vegetation act as vast natural sink for the gaseous as well as particulate air pollutants due to enormous surface area of leaves. It also helps to attenuate the ambient noise level. Plantation around the pollution sources control the air pollution by filtering the air particulate and interacting with gaseous pollutant before it reaches to the ground. Tree plantation also acts as buffer and absorber against accidental release of pollutants. The plantation work for green belt development is / will be carried out as per CPCB guidelines preferring local species would be preferred.

For effective control of air pollutants in and around the proposed industry, a suitable green belt is proposed by taking into consideration the following criteria. The green belt would;

- Mitigate gaseous emissions
- Have sufficient capability to arrest accidental release.
- Effective in wastewater reuse.
- Maintain the ecological balance.
- Control noise pollution to a considerable extent.
- Prevent soil erosion.
- Improve the Aesthetics.

**EXISTING GREEN BELT:** The following is the list of plants planted in the premises of site.

| Names of the plants |
|---------------------|
| Neem tree           |
| Custard apple       |
| Ashoka tree         |
| Gulmohar            |
| Coconut tree        |
| Ornamental tree     |
| Guava tree          |
| Baniam tree         |
| Rasberry            |

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### 1.7.5. BUDGET FOR ENVIRONMENTAL MANAGEMENT

| Sl. No.                                     | Capital Investment  | All figures in Rs. lakhs |
|---|---|--------------------------|
| 1   | Air & Noise Pollution Control Facilities                                  | 3200                     |
| 2   | ETP & firefighting facilities   | 800                      |
| 3   | Green Belt development, Rain water harvesting                             | 300                      |
| 4   | Laboratory Facility for Monitoring, Safety equipment & medical facilities | 200                      |
|   | <b>Total</b>  | <b>4500</b>              |
| Recurring Cost of Operation and Maintenance |   |                          |
|   | Air & Noise Pollution Control Facilities                                  | 105                      |
|   | ETP & firefighting facilities   | 50                       |
|   | Green Belt development, Rain water harvesting                             | <b>23</b>                |
|   | Laboratory Facility for Monitoring, Safety equipment & medical facilities |                          |
|   | <b>Total</b>  | <b>178</b>               |

#### CSR provision by SSL:

SSL is planning to develop nearby villages as per the identified requirement of the region under CSR activity. This will increase the social and economical sector of the region. SSL has decided to adopt three nearby villages to implement CSR. These villages were selected on the basis of shortfall of basic amenities. Majorly these villages are depending on the agriculture. Following are the identified provisions for the area:

- Capacity Building and Training for vocational Courses
- Village infrastructure
- Sustainable power development
- Drinking water facility
- Women Empowerment through training and financial support
- Education Support through Extension of Building, Scholarship, Books
- Primary Health Centres through health camps, up gradation of Building, New Building etc
- Agriculture Development Program

### 1.8 MONITORING PLAN

#### 1.8.1 MONITORING FACILITY

Monitoring schedule given by KSPCB will be strictly followed to ensure the success of environmental management activities. In general, the monitoring schedule shall be as follows:

| Particulars  | location   | Frequency                 |
|--|--|---------------------------|
| Ambient Air Quality  | 2 samples down wind direction at 500m & 1000m<br>1 sample at up wind direction at 500m             | 24 hrs sample half yearly |
| Flue gas from Chimney for flow rate SPM, RSPM, SO <sub>2</sub> , NO <sub>x</sub> | Sampling port of chimney   | Monthly                   |
| Meteorological data  | Site   | Daily                     |
| Ground Water   | 1 Km from ETP<br>2 locations on where the treated wastewater is used for land irrigation/gardening | Half Yearly               |
| River water  | 1 each down and upstream   | Quarterly                 |
| Soil   | From the agriculture land utilizing the pressmud, boiler ash & treated effluent for agriculture.   | Pre and post Monsoon      |
| Waste Water  | At site of final discharge point   | Monthly                   |
| Water From Bore well   | In the vicinity of the factory   | twice a year              |

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### **1.9. RISK ASSESSMENT**

Industrial accidents result in great personal and financial loss. Managing these accidental risks in today's environment is the concern of every industrial unit, because either real or perceived incidents can quickly jeopardize the financial viability of a business. Many facilities involve various manufacturing processes that have the potential for accidents which may be catastrophic to the plant, work force, environment & public.

The main objective of the risk assessment study is to propose a comprehensive but simple approach to carry out risk analysis and conducting feasibility studies for industries and planning and management of industrial prototype hazard analysis study in Indian context.

#### **1.9.1. Risk Analysis Methodologies**

##### **1.9.1.1. Quantitative Risk Assessment (QRA)**

QRA is a mathematical approach to engineers to predict the risks of accidents and give guidance on appropriate means of minimizing them. Nevertheless, while it uses scientific methods and verifiable data, QRA is a rather immature and highly judgmental technique, and its results have a large degree of uncertainty. Despite this, many branches of engineering have found that QRA can give useful guidance. However, QRA should not be the only input to decision-making about safety, as other techniques based on experience and judgment may be appropriate as well. Risk assessment does not have to be quantitative, and adequate guidance on minor hazards can often be obtained using a qualitative approach.

##### **1.9.1.2. Qualitative Method**

- Preliminary risk analysis
- Hazard and operability studies(HAZOP)
- Failure mode and effects analysis(FMEA/FMECA)
- Discussion and conclusion

#### **1.9.2. Qualitative risk analysis methodologies**

Qualitative methods used in risk analysis namely preliminary risk analysis (PRA), hazard and operability study (HAZOP), and failure mode and effects analysis (FMEA/FMECA) are dealt in this section.

##### **1.9.2.1. Preliminary Risk Analysis (PRA)**

Preliminary risk analysis or hazard analysis is a qualitative technique which involves a disciplined analysis of the event sequences which could transform a potential hazard into an accident. In this technique, the possible undesirable events are identified first and then analysed separately. For each undesirable events or hazards, possible improvements, or preventive measures are then formulated.

The result from this methodology provides a basis for determining which categories of hazard should be looked into more closely and which analysis methods are most suitable. Such an analysis helps in identifying activities lacking safety measures. With the aid of a frequency/ consequence diagram, the identified hazards can then be ranked according to risk, allowing measures to be prioritized to prevent accidents.

##### **1.9.2.2. Mitigation Measures**

The purpose of mitigation is to identify measures that safeguard the environment and the community

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affected by the proposal. Mitigation is both a creative and practical phase of the EIA process. It seeks to find the best ways and means of avoiding, minimizing and remedying impacts. Mitigation measures must be translated into action in the correct way and at the right time, if they are to be successful. This process is referred to as impact management and takes place during project implementation. A written plan should be prepared for this purpose, and includes a schedule of agreed actions. Opportunities for impact mitigation will occur throughout the project cycle.

### **1.9.3. Noise Exposure**

High sound levels may be generated from the equipment used in the manufacturing and utilities (e.g. compressed air, vacuum sources, unit operations system, etc). Irrespective of the enclosed design and anti vibration control measures in the work place modules, the workers located close to the machines during manufacturing are exposed to noise.

#### **1.9.3.1. Mitigation measures**

- Good engineering practices.
- The rotation of employees in shift should be followed so as to reduce their exposure to noise sources for longer period.
- Hearing protective devices in the form of ear muff and plug should be used to reduce employee's exposure to high noise levels.
- Comprehensive hearing conservation programs should be carried out to identify noise sources for its prevention/control.
- Noise monitoring and medical surveillance should be carried out at regular intervals so as to assess the workers exposures to noise and corrective measures.

### **1.9.4. STORAGE OF FLAMMABLE LIQUIDS**

Dangerous Substances and Explosive Atmospheres create risks from the indoor storage of dangerous Substances. This has to be controlled by elimination or by reducing the quantities of such substances in the workplace to a minimum and providing mitigation to protect against foreseeable incidents.

These should be located in designated areas that are (wherever possible) away from the immediate processing area and do not jeopardise the means of escape from the workroom/working area. The flammable liquids should be stored separately from other dangerous substances that may enhance the risk of fire or compromise the integrity of the container.

**1.9.4.1. Handling:** Wash thoroughly after handling. Use only in a well-ventilated area. Use ground and bound containers during transfer of the material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers, retained product residue, (liquid and/or vapour), and can be dangerous. Keep containers tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, sparks or open flames.

**1.9.4.2. Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep away from contact with oxidizing materials. Store in a cool, dry, well ventilated area away from incompatible substances & flammable area. Do not store near perchlorates, peroxides, chromic acid or nitric acid.

### **1.9.5. EMISSION MECHANISMS AND CONTROL CONSIDERING STORAGE TANKS**

Emissions from organic liquids in storage occur because of evaporative loss of the liquid during its storage and as a result of changes in the liquid level. The emission sources vary with tank design, as



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does the relative contribution of each type of emission source. Emissions from fixed roof tanks are a result of evaporative losses during storage (known as breathing losses or standing storage losses) and evaporative losses during filling and emptying operations (known as working losses). External and internal floating roof tanks are emission sources because of evaporative losses that occur during standing storage and withdrawal of liquid from the tank. Standing storage losses are a result of evaporative losses through rim seals, deck fittings, and/or deck seams. The loss mechanisms for fixed roof and external and internal floating roof tanks are described in more detail in this section. Variable vapour space tanks are also emission sources because of evaporative losses that result during filling operations.

### **1.9.5.1. Fixed Roof Tanks**

A typical vertical fixed roof tank is type of tank consists of a cylindrical steel shell with a permanently affixed roof, which may vary in design from cone or dome shaped to flat. Losses from fixed roof tanks are caused by changes in temperature, pressure and liquid level.

Fixed roof tanks are either freely vented or equipped with a pressure/vacuum vent. The latter allows the tanks to operate at a slight internal pressure or vacuum to prevent the release of vapors during very small changes in temperature, pressure or liquid level. In the current tank designs, the fixed roof tank is the least expensive to construct and is generally considered the minimum acceptable equipment for storing organic liquids.

### **1.9.5.2. Floating Roof Tanks**

There are two types of floating roof tanks viz. external and internal. A typical external floating roof tank (EFRT) consists of an open topped cylindrical steel shell equipped with a roof that floats on the surface of the stored liquid. The floating roof consists of a deck, fittings, and rim seal system. Floating decks that are currently in use are constructed of welded steel plate and are of two general types: pontoon or double-deck.

An internal floating roof tank (IFRT) has both a permanent fixed roof and a floating roof inside. There are two basic types of internal floating roof tanks; tanks in which the fixed roof is supported by vertical columns within the tank, and tanks with a self-supporting fixed roof and no internal support columns.

## **1.10. DISASTER OR EMERGENCY CONTROL PLAN**

When the full fledged activity of sugar & co-generation will gear up after expansion it will have to follow Factories Act 1948 with all its amendments till date. Any directives from Director Safety, Health & Environment [SHE] will automatically be binding on SSL. In such a condition to appoint a qualified Safety Officer is a must & will be an adequate, wise step in such direction. On site and off site disaster control plans and their perfect implementation will be part and parcel of the management & safety officer. To lessen the probability of hazard that may occur & avoid the consequent damage, a disaster management and control plan has to be worked out for the whole complex in anticipation to the threat.

### **1.10.1 DISASTER PREVENTIVE MEASURES**

The proposed expansion will have following preventive measures to avoid occurrence of disasters:

- i. Specification & marking of safe area to gather in emergency.

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- ii. Design, manufacture and construction of plant, machineries and buildings will be as per national and international codes as applicable in specific cases and laid down by statutory authorities.
- iii. Provision of adequate access ways for movement of equipment and personnel shall be kept.
- iv. Minimum two numbers of gates to escape during disaster shall be provided.
- v. Fuel oil storage shall be in protected area and fenced. The tank will be housed in a dyke wall. As per regulations of CCOE it's testing & certification will be performed every five years regularly.
- vi. Proper colour coding for all process water, air & steam lines will be done.
- vii. Proper insulation for all steam & condensate, hot water lines will be done.
- viii. Provision of circuit breakers, isolation switches, signals will be provided as per electricity act & rules.
- ix. Proper & rigid bonding and earthing to all equipment will be arranged.
- x. Meagre value of earthing connections will be checked each 6 months and the records will be kept.
- xi. System of fire hydrants comprising, of electrical motor driven fire pumps is planned. The fire hydrant system will have electrical motor and a generator driven jockey pump to keep the fire hydrant system properly pressurized.
- xii. Automatic water sprinkling system is planned for all transformers.

### 1.10.2. FIRE FIGHTING ARRANGEMENTS

**BIS 2190** provides Indian standards for firefighting equipment. All firefighting equipment and extinguishers have to be planned according to this standard.

There are four classes of a fire to occur:

| Class | Materials                            | Extinguisher         |
|-------|--------------------------------------|----------------------|
| A     | Cotton, Cloth, paper, wood           | Water type           |
| B     | Oils, Hydrocarbons, Alcohol, Greases | CO <sub>2</sub> type |
| C     | Gases, CNG, LPG, Acetylene,          | Foam type            |
| D     | Electrical & metals                  | Foam                 |

### Recommendation

The fire tender, which will be a part of the project with following minimum fire fighting arrangements, shall be procured:

- Water tank - 500 litres
- CO<sub>2</sub> - 2700 litres
- Foam tank - 45 litres
- CO<sub>2</sub> type fire extinguishers - 6 nos. of 4.5 kgs each

### LOCATION & TYPE OF FIRE EXTINGUISHERS

- Turbo-generator area CO<sub>2</sub> Type, Foam Type Dry chemical powder
- Cable galleries CO<sub>2</sub> Type, Foam Type Dry chemical powder
- High voltage panel CO<sub>2</sub> Type, Foam Type Dry chemical powder
- Control rooms CO<sub>2</sub> Type, Foam Type Dry chemical powder
- MCC rooms CO<sub>2</sub> Type, Foam Type Dry chemical powder
- Pump houses CO<sub>2</sub> Type, Foam type dry chemical powder
- Fuel tank Area CO<sub>2</sub> type, Foam Type Dry chemical powder Sand Basket
- Offices & Godowns Foam or Dry chemical powder Type

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- Crushers house CO<sub>2</sub> Type, Foam Type dry chemical powder

### **1.10.3. ALARM SYSTEM TO BE FOLLOWED DURING DISASTER**

On receiving the message of 'Disaster' from Site Main Controller, fire station control room attendant will sound Siren 'WAVING TYPE' for 5 minutes. Incident controller will arrange to broadcast disaster message through public address system. On receiving the message of "Emergency Over" from incident Controller the fire station control room attendant will give "All Clear Signal" by sounding alarm straight for two minutes. The features of alarm system will be explained to one and all to avoid panic or misunderstanding during disaster.

It is necessary to take one trial for perfect functioning of the siren at least once in a week with prior intimation to **Belagavi Deputy Commissioner**.

### **1.11 HEALTH AND SAFETY MEASURES**

The safety considerations in the design of the proposed project would be provided to contain and control emergency.

#### **Health and safety measures:**

- Regular inspection and maintenance of pollution control systems.
- Statutory approvals, waste treatment and disposal including stack emissions etc.
- Fully fledged fire protection system.
- Gloves and protective equipment to prevent health hazards.
- Use of splash proof safety goggles and shoes.
- To impart training at various levels including contractors and transport personnel for observing safe work practices.
- Clearly define the procedures for inspection, operation and emergency shutdown of the process operations.
- To device systematic accident prevention program to ensure safe and healthy working environment.
- Compliance of all statutory regulations.
- Environment monitoring and control of process parameters at various unit operations by providing control measures in the plant.
- Eliminate unreasonable, research and where appropriate, implement advance technology in the design, production services and to prevent pollution as well as conserve, recover and recycle raw materials.
- The workers exposed to noisy sources will be provided with ear muffs/plugs.
- Preventive maintenance activities so as to have smooth operations.
- Audit programs must be carried out to review the management system for identifying, evaluating and controlling environmental, health and safety hazards.
- The health of the workers will be regularly checked by a well qualified doctor and proper records will be kept for each worker.

### **1.12 Project Benefits**

**M/s. Shivashakti Sugars Limited** proposes to expand the existing sugar cane crushing capacity from 4800 TCD to 10000 TCD sugar mill and 15 MW to 60 MW Cogeneration power plant at

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Yedravi (Yedrav) & Saundatti villages falling under the jurisdiction of **Raibag (Rayabag) taluku**, Belagavi district in Karnataka . The benefits of the project can be stated as follows:

- Near (Yadrav) Yedravi & Saundatti villages falling under the jurisdiction of **Raibag (Rayabag) taluku** the irrigation schemes and sugarcane growing area will be sufficient to fulfill the raw material requirement of **SSL**.
- This project will have long run benefits **Raibag** taluku of Belagavi district. Sugar mill is an agro based project using Sugar cane as sole raw material. Sugar cane cultivators i.e. Farmers will receive many benefits such as transport, education, community center etc.
- In the first stroke due to less distance from the farms they will get good price for cane. Next, farmers will get treated waste streams to be used as nutrients on farms. Thus they will achieve good returns for cane.
- Utilizing conservation plan they will get precious nutrients at merely throw away price. In this area crops like cotton, tur, jawar, bajra are cultivated, which will also fetch profits to the farmers.
- Solid waste of sugar mill i. e. Bagasse is useful for power generation
- There will be remarkable reduction in the waste from the complex. Thus such an attempt of use of waste material will also provide **SSL** an opportunity to pay higher price to sugarcane grower.
- **SSL** plans to sell molasses to other distilleries that produce anhydrous ethanol to provide precious fuel to automobiles and contribute to save Petrol, thereby foreign exchange. Indian Oil sector obtains fuel ethanol from sugar sector with good price.
- Power shortage is a crucial issue in the Country. A decision to opt for additional capacity of co-generation by **SSL** using bagasse will provide power for self consumption and also other parts of villages under rural electrification plan.
- This will raise funds to pay good price to farmers. This industry will provide revenue to State and Central Government.
- At villages Yedravi & Saundatti of Raibag Taluku of Belagavi district, good scope exists to provide facilities like road, power, health care centers and educational institutes in the area. **SSL** has already initiated socioeconomic development of the nearby villages.
- It will be a nucleus for forecasted accelerated growth in the region near Yedravi & Saundatti villages falling under the jurisdiction of **Raibag taluku**. As liquid cash will be available to the farmers', supplementary units to farms like poultry, cattle growing and milk products and other food items, silkworm growing and silk weaving, Edible seeds crushing to yield oils, handmade paper units can be initiated. **SSL** shall initiate this plan amongst the villagers and farmers jointly.
- Both direct and indirect employment is next important issue at the door step. **SSL** has initiated recruitment of senior staff and persons needed in construction phase to minimize migration from village to city.
- At the national and the state levels the benefits include decentralized power generation, reduction in T&D loss, reduced emissions, reduction in the imports of petroleum products, increased tax revenues and reduction in the transportation cost. The project will have excellent multiplier effect and will become truly a win-win situation for all the stakeholders and for local people.

### **1.13. CONCLUSION**

**M/s. Shivashakti Sugars Limited (SSL)** is proposing to expand its cane crushing capacity from 4800 TCD to 10000 TCD & power generation from 15 MW to 60 MW cogen at Yadrav (Yedravi) & Soundatti Villages, Raibag Taluku, Belagavi district, Karnataka. This expansion will add more revenue to farmers. After the establishment of the factory, the standard of living of the entire area will improve. The land & other infrastructure are already available. **SSL** proposes to adopt Zero Liquid discharge, maximum recycle of water and complete utilization of waste. The impacts would be amenable to technological control and effective environmental management in both the phases (construction & Operation).

Based on the above, it is concluded that the adverse environmental impacts due to construction and operation phase can be mitigated to an acceptable level by implementation of various mitigatory measures envisaged.