

9.1 Water Supply

The total population of the SDA area for which the Comprehensive Development Plan (CDP) is formulated has grown from 1.72 lacs in 1971 to 3.5 lacs in 2001. As per the statistics, about 12500 household (only 18%) consumers enjoy drinking water supply provided by the Public Health Engineering Organization (PHEO). Most of the household water connections are with MIHIG / commercial establishments / industries / public institutions etc. Most of the remaining about 82 percent households of poor and EWS group of society do not have drinking water supply provided by PHEO but they get water through tube well distribution system or personally owned tube well.

The surface source of water for the cluster towns is located at

- (i) Ayodhya Sarovar on river Mahanadi and
- (ii) Hirakud dam.

The average rainfall in this area is around 152 centimeters per year and it helps recharging the under ground water table. The 40 MLD capacity water treatment plant under Greater Sambalpur Water Supply Scheme and 9.0 MLD Water Treatment Plant at Hirakud have now a potential to treat about 55.0 million liters of potable water daily for use. Presently, about 32.87 MLD of water is made available to the public. The surface source of water for the cluster towns (Sambalpur, Burla and Hirakud) located at (i) Hirakud dam (23 MLD), (ii) Ayodhya Sarovar on river Mahanadi (2.75 MLD) and (iii) Production from Wells at Remed and Gopalpali (0.25 MLD) thus have in all total designed capacity of 26 MLD. The 40 MLD capacity water treatment plant at Bareipali Chowk under Greater Sambalpur Water Supply Scheme, 9.0 MLD water treatments Plant at Hirakud and 2.25 MGD at Modipara on river Mahanadi have now a potential to treat about 52.0 to 55.0 million liters of potable water daily for use. Considering the population of 1,80,948 (2001) in Sambalpur, at the rate of 135 litres per head about 24 MLD of water is made available to the public.

As per the information collected from Public Health Engineering Department in 2009, details of salient features of water supply system at Sambalpur, Burla and Hirakud towns is stated below in **Table 9A**.

Table 9A**Salient Features of Water Supply System in Urban Centers of SDA area, 2009**

Sr. No.	Description	Sambalpur	Burla	Hirakud
1	Location of surface source	Ayodhya Sarovar on river Mahanadi	Tube well	Tube well
2	Hirakud Dam Mahanadi river	Yes Yes	Yes	Yes
3	Location of Treatment Plant	(i) Baraipali (ii) Modipara	Within Town	Near Dam
4	Distribution Facility (Storage Water Tank)	(i) Budharaja Hillock (ii) Brooks Hill (iii) Circuit House (iv) Modipara	Nr. Kirba and Nr. Hospital	Durga Mandir hill Top Reservoir
5	Distribution of pipe line	67.50 Km in wards Rising main 1000mm 300 mm to 80 mm dia pipelines	Rising gravity main 1000mm 450 mm to 110 mm dia pipelines	Rising gravity main 1000mm 200 mm to 100 mm dia pipelines
6	Number of Tube wells (in Golconda tube)	494 in all wards	5 and 1 deep borewell in Golconda (&3 tubewells are not working)	5 working (&2 not working)
7	Supply per day	26 MLD	Adequate	Adequate
8	Supply per capita per day	135 liters	Adequate	Adequate
10	Coverage Area	(i) Partially covered 10 wards (ii) Fully covered 19 wards	Developed Burla	Developed Hirakud
11	Number of connections	(i) Domestic 6914	All households,	All households,

		(ii) Industrial 10 (iii) Commercial 146 (iv) Institutional 145	factories and community buildings.	factories and community buildings.
12	Total	7215	---	---
13	Rate of water charge per connection	Rs. 80.00 per month on average	---	---
14	Ground water table	15 meters	15 meters	15 meters

In Sambalpur, the water treatment plants are located at (i) Baraipali and (ii) Modipara. The distribution system points are available at (i) Budharaja Hillock (ii) Brookhill (iii) Circuit house and (iv) Modipara. Moreover, at Sambalpur 67.50 Kilometers of 4 inch to 12 inch size distribution pipe lines are laid down in different wards of the municipality. In all there are 494 Tube Wells in 29 wards of Sambalpur, 15 tube wells (and 3 not working) and 1 deep bore well in Burla and 5 tube wells (and 2 not working) at Hirakud. At Sambalpur Water supply area is fully covered in 19 wards where as 10 wards are partially covered by water supply.

Refer **Figure 9.1** for Utilities and Services in the SDA area. The pocket of the urban areas in the SDA where water supply is presently not available and is to be introduced in future is also depicted in this figure. Urban area of Sambalpur just outside the municipality area has not yet covered by the network of water supply system. Priority must be given for supply of water in these areas. There are such pockets in Burla and Hirakud urban areas also. Network of different diameter pipelines for water supply ranging from 1000mm dia rising main in Sambalpur to 100 mm dia pipeline in Hirakud have also been depicted in this map.

Location of existing water supply components like intake well, storage reservoirs, pump house, overhead tank, sump, water treatment plant, pump house, bore well etc. are shown in the plan at **Figure 9.1**.

In the absence of underground sewerage system in 95 percent of the area of Sambalpur, most of the untreated sewerage is dumped in to existing natural drain “Dhobijore Nala” and other natural drains located all over the area. This untreated sewerage and dirt thrown in these channels drain. out to river Mahanadi which is the life line of the entire Orissa and pollute the water body perennially. Moreover, keeping in view the topography which has natural drainage system from west to east, the storm water flows from Burla- Hirakud towns towards Sambalpur town and in to the river Mahanadi on south west. Thus, the source of drinking water of river Mahanadi poses serious problems for water treatment and to some extent causes health risk to the citizens. There are other water ponds and bodies on the land and it is necessary to protect all water bodies including river Mahanadi from pollution.

**A3 size fig. 9.1 to be inserted
separately**

This will help improve community health and hygiene.

To enable the people of all sections of the society to have potable water, necessary policy is required to be formulated and keeping in mind this goal, appropriate water supply scheme for the Greater Sambalpur is the need of the day. The underground sewerage system essential for the healthy environment of the area is required to be implemented early.

In the rural area of additional 67 villages included in the SDA, life line commodity of water availability to the community is through the facility of 65 wells, 56 tanks, 65 hand pumps, availability of river, canal, spring and other source seems to be satisfactory. During summer the community uses hand pumps available in the villages.

Water Supply system in the SDA area is looked after by:

1. State Public Health Engineering Organization (PHEO) and
2. Orissa Water Supply and Sewerage Board (OWSSB)

The annual O & M cost and revenue collected from water tariff for the years 2001- 2004 are stated in the **Table 9B** below.

Table 9B

Cost and Water Tariff per annum, 2001- 2004

Sr. No.	Year	Revenue collected from water tariff (Rs. in Lakhs)	Amount O&M cost (Rs. in Lakhs)
1	2001-02	28.95	46.88
2	2002-03	37.24	115.34
3	2003-04	65.70	149.35

Source: Preliminary Project Proposal for Integrated Sewerage System of Greater Sambalpur Town (Sambalpur-Burla-Hirakud), December 2004, Office of the Executive Engineer, Public Health, Sambalpur

Less than fifty percent of the amount of cost under O & M has been recovered from the consumers during the years 2001-2004 and to achieve self sustainability suitable action to revise the tariff structure and improvement in collection system is essential.

The total population of the area under the jurisdiction of Sambalpur Development Authority (SDA) as per the 2001 census figures is 3,49,914 which is expected to be 5,75,000 by 2030. The 67 villages added in July 2011 in the SDA are having population of 92,437 in 2001. The projected population for these villages by 2030 is expected to be 1,50,500. These villages will have to augment the present system of water supply from time to time, keeping in mind the demand of water. Independent water supply schemes will have to be provided for proposed Community Satellite Town at Madhupur – Jogipali, Socio-Economic Node at Rengali and Industrial Manufacturing / Marketing Node at Lapanga.

At the rate of 125 liters per capita per day (lpcd), the requirement of potable water in 2030

will be about 53 MLD for the development area of Sambalpur, Burla and Hirakud (population 424500 x 125 liters of water per capita per day = 53 MLD). Since the availability of treated water in the area is 52 to 55 MLD at present, the present area under Sambalpur Development Authority will get required amount of water up to the year 2031. However, the additional water supply pipe line net work will have to be under taken for the growing population from time to time.

It is pertinent to note that the Public Health Division at Sambalpur under the Housing And Urban Development Department of the Government of Orissa had prepared a report in the year 2008 on the improvement of water supply system to different areas of the Sambalpur Municipality and arrived at project cost of Rs. 109.66 crores. The objective was to provide 100% coverage of piped water supply in municipality area of Sambalpur to meet the present as well as the future demand of the projected population of 5,81,250 by the year 2041 in an efficient, economic and sustainable manner to benefit all categories of people including women, children and those below poverty line. SDA can take the support of this report and can plan for the water supply system for at least the Sambalpur municipality area.

Recently PBS Consultancy Services, Hyderabad has submitted a draft of Detailed Project Report (DPR) for Water Supply to Uncovered Area of Sambalpur Town so that issues related to provision of adequate portable water to then citizens in deprived area with improved service performance level is taken care of. This report has identified two areas which need augmentation of water supply. One is the uncovered area within the municipality and the other is the fringe area in the periphery of the municipality which is undergoing rapid urbanization. Water demand is calculated for next 30 years i.e. 2045 and is estimated to be 15 MLD. The proposed water supply system in then uncovered area is designed to be integrated with the existing water supply system for Sambalpur with provision for augmentation of capacity from 40 MLD to 55 MLD. The design of water treatment plant (WTP) to meet the intermediate demand by year 2026 of the uncovered areas of Sambalpur municipality has been proposed in this report. Source of water supply is proposed to be Hirakud Dam reservoir. Pumping system is designed for 15 years life cycle. The raw water pumping main is proposed to be laid along the side at NH-6 from Bareipalli WTP site to Ainthapalli WTP site. The water treatment plant (WTP) is designed to treat 9.2 MLD raw water with 20 hrs operation to meet the intermediate water demand of uncovered and fringe area by the year 2026. A clear water pumping plant at Ainthapalli WTP site is proposed for pumping the intermediate demand of the area covered under the proposed water supply system for the uncovered areas. Technical design of various water system components have been proposed in this DPR. In this report, UGR and ESR have been proposed in Ward No. 9, 3 and at Dhanupalli along with connecting branch pipe lines to the UGRs and distribution network for uncovered area in Ward No. 9 and 3. This report has estimated the total cost of providing the water to the uncovered area of Sambalpur town to the tune of Rs. 36.77 crores.

It is advised that the SDA shall refer the final report and undertake the project for supply of water in the uncovered areas of Sambalpur town as and when it is submitted.

A Japanese Consultancy firm JICA – CCI based at Bhubaneswar is working on financing the water supply scheme in the Sambalpur municipality area. The recommendations of these consultancy firms will be of great help to SDA in planning and implementing the water

supply schemes in the area. PHED will be providing the water supply in the area which are declared as urban area by the SDA.

Water supply scheme is taken care of by Sub Divisional Officer at Burla. The water supply is being totally financed by the Mahanadi Coalfield Limited (MCL) based at Burla. New 6 MLD treatment plant will be necessary. Executive Engineer, PH division Sambalpur will take care of new treatment plant, pumping arrangements, new pipelines, replacement of old pipelines and new storage facilities. Burla Medical College campus is expanding. Thus their requirement will also rise. Construction of 1 lac liter capacity overhead water tank at College of Engineering and 5 lac liter capacity at Bhati club is already under progress in Burla at the cost of Rs. 8.68 crores. Expenditure of Rs. 3.50 crores has already been made in this financial year of 2011-12. Rest amount will be spent in the next financial year 2012-13.

In Hirakud, the demand is for 4.5 MLD whereas existing water supply infrastructure is to the tune of 9 MLD and so no future plan for water supply is required for Hirakud. With the growing population and new areas are developed only new network of required diameter of pipelines and related infrastructure will be needed.

9.2 Sewerage and Sanitation System

In absence of the organized sewerage system in majority areas of Sambalpur, Burla and Hirakud towns, pollution of river Mahanadi threatens the community health and hygiene. As per the report on “Preliminary Project Proposal for Integrated Sewerage System of Greater Sambalpur Town” December 2004, Office of the Executive Engineer, Public Health Division, Sambalpur, about 60 percent of the population depends on various types of latrines in Sambalpur Complex as stated below:

1. Leaching pit system of latrines is used by 30 percent of the community.
2. Septic tank system of latrines is used by 28 to 30 percent of the community.
3. Rest 40 percent of the community adopt open defecation system.

All these systems drain defected sewage to the natural storm water drains having flow of water from east to west on the city land. The “Dhobijore Nalla” passing through the heart of Sambalpur carries most of the sewage water and dumps the same in to river Mahanadi and thus polluting the river water / bed and subsoil water strata.

Absence of underground network of sewerage pipe lines for collection of sewage from most of the households, sewage pumping stations, sewage treatment and disposal facility is a major draw back to maintain the sustainable environment in the city complex.

The untreated waste water flows in to the natural existing streams where inhabitants bath and wash clothes and utensils. The farmers use this water in the agricultural fields. This is causing health hazard to the residents of the complex.

With the development of Industrial units at Burla, Hirakud and in the linear corridor between Sambalpur and Jharsuguda disposal of polluted out flow of waste water has become a problem. This industrial out flow finds way in to the natural storm water streams which ultimately is dumped in to the river Mahanadi. About 80 percent of the people who belong to economically weaker section with people who belong to the group surviving below poverty

line create maximum sewerage pollution problem.

The discharge of untreated sewage of Sambalpur and Hirakud, in river bed through outfalls of Durgapali Nala, Chandan nagar, Sadakghat, Swargdwar, Ramjipada, Dhobijore, Haradjor, Hatpada, Daleipara, Municipality Office and Katchery ghat, have to be given proper attention. In fact treatment of various polluting effluents should be worked out and only the treated effluent may be discharged into the river Mahanadi. In Burla the wastes and storm water are dumped into the power channel and waste of medical college hospital is drained to a pond in Kirba. Thus the sewage and waste from the various parts of Sambalpur, Burla and Hirakud must be treated before the same are discharged into river Mahanadi / pond.

The treatment of sewerage is essential to check the decay in the environment as well as to provide hygienic conditions for the population. As per the census of 2001, the population of the development area of the three towns of Sambalpur, Burla and Hirakud was 0.219 million. Since the total development area of three towns is 172.22 square kilometers the density of population worked out to 1273 persons per square kilometer. It is a low average density and therefore it will be easier to work on formulating low cost sewerage scheme for the complex. Presently, about 2.6 lac people residing in the development area of Sambalpur, Burla and Hirakud as per 2011 census generates roughly 17 MLD of waste water which find way to the river Mahanadi. At this rate by 2030, projected population of 4.24 lac people shall be generating about 28 MLD of waste water to be drained in the river Mahanadi. Effective sewage disposal system has to be worked out and primary treatment plant must be provided before the waste water is drained in the river.

The major storm water channels like Dhobijor Nala, Tangra Nala and Rivulets etc. require renovation, pitching on the banks etc. A systematic programme of renovation of the existing water channels is required to be under taken. Waste water and sludge treatment facility as proposed in the plan is required to be under taken.

The organized sewerage system existing in few institutional campuses including that in medical college area serving about 5 percent of the urban population requires renovation.

There is total absence of sewerage system in growing city area under development. Especially the majority of the population consisting of urban poor developing dwelling units on new urban land should be provided with sewerage system at the public cost.

The local authorities functioning in the SDA area must have necessary equipments to maintain septic tanks and cess pools in the residential areas.

It is the demand of the time that underground sewerage system as formulated by the office of the Executive Engineer , Public health Division, Sambalpur is implemented under the supervision and with the participation of,

- (i) Public Health Engineering Organization and
- (ii) Orissa Water Supply and Sewerage Board.

It was estimated that the underground sewerage system as formulated by the office of the Executive Engineer, Public health Division, Sambalpur would have cost Rupees 2980 million in 2009. They have proposed integrated sewerage system for collection, transportation, treatment and hygienic disposal of domestic waste water generated in Sambalpur, Burla and Hirakud towns to meet the present and projected requirement by the end of year 2039. The

project cost includes, laying down of sewers, construction of sewage pumping station, sewage treatment plant, replacement and rehabilitation of sewers, low cost sanitation units, renovation of Dhobijore Nala, renovation of open type waste water collection drains, sewer cleaning equipments and other administrative expenditures. Thus it requires huge amount of finance which will have to be obtained in future when the underground sewerage is laid. SDA can refer to this document while finalizing the construction of sewage disposal system in the area. For the time being Sludge and Sewage treatment facility in Sambalpur near Dhobijore and Tangra Nalaha is proposed to save the area from air and water pollution at the bank of the river Mahanadi.

It also gets polluted with the various domestic, agricultural and industrial wastes. In absence of underground sewerage and storm water drainage system it is proposed to provide for sludge, sewage and pollutant treatment plants before the same are mixed up with the surface water.

Recently, TTI Consulting Engineers (India) Pvt. Ltd. has also submitted Detailed Project Report (DPR) for Sewerage System of Sambalpur town to Orissa Water Supply and Sewerage Board (OWSSB) for improving the quality of life, environmental sustainability, health and safety and abatement of pollution of river Mahanadi. For the DPR, the population of Sambalpur town for 2030 has been estimated to be 2,70,987 persons. The project area is Sambalpur town consisting of 29 wards and 21 villages outside the municipality area. The SDA area for which the CDP is being prepared consists of development area of Sambalpur, Burla, Hirakud and surrounding 67 villages. As per this DPR, the abatement of pollution of River Mahanadi will be achieved by providing sewerage System (Core Component) to the Sambalpur town and by addressing non-point sources of pollution (non-core components: community toilets, Dhobi Ghat, crematorium, river front development, etc.), the balance pollution will be controlled. The proposed sewerage system consists of 8 sewerage catchments having sewage pumping stations at **Durgapali, telecom colony, Govindtola, Angukliapada, Sarla village, Kuluthkani, Turipoda and at Kumarpada**. 225 Kilometers of sewer network of pipes, 7 intermediate sewage pumping stations, one terminal sewage pumping station and one sewage treatment plant (STP) having capacity of 42 MLD at **Bhatra** is proposed in this report. The STP is designed to discharge the treated sewage into river Mahanadi. Use of trenchless technology for construction of sewer has also been proposed. As per this DPR, the total cost of providing Sewerage system within Sambalpur Municipality area is proposed to be Rs. 371 crores and outside municipality area is proposed to be Rs. 34.50 crores. The report anticipates completion of project work within 3 years. Refer **Annexure 9.1** for the Executive Summary of the detailed project report for sewerage system of Sambalpur town prepared by consultant TTI Consulting Engineers (India) Pvt. Ltd. for Orissa Water Supply and Sewerage Board (OWSSB) and refer **Annexure 9.2** for the map showing the sewerage system of Sambalpur town.

It is recommended that the SDA shall adopt these proposals of the report for providing the good sewerage facility in the Sambalpur within the stipulated time period.

9.3 Drainage System

After the flood of 1982, a detailed master plan for the proper drainage system in Sambalpur town was prepared by the Superintending Engineer, Hirakud Dam Circle, Burla in June 1995. The project cost was estimated to be Rs. 2564.81 lakhs/- as per 1994 rates. The works proposed in this report “**DRAINAGE MASTER PLAN OF SAMBALPUR TOWN (REVISED)**” may be taken up by the SDA with water supply and sewage disposal board for implementation of the identified works. This will go in long way to solve the drainage problem of the Sambalpur town in the SDA area including taking care of flooding.

9.4 Storm Water Drainage

The high land from Hirakud dam site on north - west of Greater Sambalpur gradually has gentle slope towards south - east which provides natural drainage in the direction of river Mahanadi. Thus the topography of the area allows the storm water to flow from the parts of city land in to the river Mahanadi.

The existing natural drains from Solpali, Solaband, Larbanga and Jamadarpali villages take the storm water to river Mahanadi and New Hirakud land site in Hirakud area. The natural inclination of land helps draining off the storm water from the lands of urban and rural Hirakud. In Burla from North - west uplands the storm water flows towards Sikrdi and Baijamunda villages in south - east and ultimately the storm water finds its way into river Mahanadi. In Sambalpur, the storm water flows into the natural drain from the villages Jamdarpali on north to village Dengsargi on south and further to Dhobijor Nala. . Dhobijor Nala which passes through the heart of the city drains the storm water along with the sewage water further towards south – east into the river Mahnadi. The storm water flows in Tangra Nala from villages around Malipali on north towards south. The storm water along with sewage is dumped into Tangra Nala which is connected to Dhobijore Nala joining river Mahanadi. The storm water from villages Singpali, Kainsir, Baidarnuapali and Pardhiapali flows towards east in to the natural drains and rivulets which join the river Mahanadi on south.

It is pertinent to note that the Government of Orissa has formulated the Odisha Urban Sanitation Strategy (OUSS) and has got prepared the City Sanitation Plan (CSP) for Sambalpur from the OPHS as the consultant. As per the draft report on City Sanitation Plan submitted by the consultant recently, in Sambalpur, there are 6 major drains laden with both storm water and sewage finally flowing into the Mahanadi River. Due to encroachment and deposition of solid waste the Tangra nala and Dhobijor nala is choked causing flood in the town. It is proposed in the report that all the roads of the municipality need to have a covered type drain on one side of the road well networked with the primary drains and finally disposal to the natural drains or water bodies. This report has estimated the total project cost for storm water drainage to the tune of Rs. 90 crores to be implemented over a period of four years i.e. 2012 to 2016.

The SDA shall adopt the proposal of this report to manage the storm water drainage atleast in the Sambalpur municipality area.

However, the SDA may also realign and straighten the natural drainage channel namely,

Dhobijor and Tangra Nalas to avoid flooding and to pitch these nala by 3 feet stones on both the internal side and to construct 15 feet wide stone walkway with trees planted at 50 feet center to center within the built up area in Sambalpur. (Refer **Figure 9.1**)

Location of proposed public toilets (WC and bath places) as discussed in Chapter 3, existing landfill sites in Sambalpur, Burla, Hirakud and stone quarries are also depicted in the map at **Figure 9.1**.

9.5 Power Supply

At present power is supplied in the SDA area by Western Electric Supply Corporation (WESCO) and NTPC Talcher. WESCO has taken over supply of power from GRIDCO. From Hirakud power station and NTPC the power is supplied. The Sambalpur – I & II and Burla electric sub-divisions supply electricity to the urban area of Sambalpur, Burla and Hirakud. The total demand of electricity by Industries is the highest (60%). Households and Commercial activities use 21% and 11% electricity generated. The total number of consumers in the entire Sambalpur Electrical Division is 31,633 only. This means less than 50% of the households use electricity and the dependency is on non electric means of lighting. Street lights along the road side and at public places consist of mercury bar light and halogen light which provide satisfactory service to the road users. In all within the Sambalpur municipal Area there is 3943 number of light points.

As per the UDPFI guidelines, the requirement of power supply is worked out to be 2KW per household which includes domestic, commercial, industrial and other requirements. At this rate, the power requirement of the SDA for the projected population of 5.75 lacs works out to be 230MW by 2030 considering the household of 5 persons. Considering the norm of one electric sub-station of 11KV for a population of 15000, for the SDA area 38 such sub-station shall be required by 2030 to cater to the need of 5.75 lac projected population.

Enough power is generated by the Hirakud Hydro Power project and will cater to the need of 5.75 lac population of SDA projected for 2030.

9.6 Street Lights

Street lights along the road side and at public places consist of mercury bar light and halogen light which provide satisfactory service to the road users. In all within the Sambalpur Municipal Area there are about 4000 number of light points. With the expansion of built up area in SDA, additional 2300 street lights will have to be provided on roads and in public areas.

9.7 Fire Services

Sambalpur is equipped with Fire Services. As per the UDPFI guidelines, 1 fire station is required for 2 lakh population. At this rate, by 2030, 3 such fire stations shall be required in the SDA area. The Sambalpur municipality and the big industrial units in the SDA area can have the fire tenders for the emergency.

9.8 Public Toilets

Details of the public toilets have already been discussed in Chapter 3 earlier where it has been proposed to provide 19 such toilet blocks having 380 WC and 380 washing places with water taps in the Sambalpur Municipality area. Three such public toilet blocks have been proposed in Burla NAC area having 60 WC and 60 washing places with water taps. Similarly, one such public toilet block has been proposed in Hirakud NAC area also having 20 WC and 20 washing places with water taps (Refer **Figure 9.1**).